

FUTURES THEORIES 21

PARADIGMS IN FUTURES FIELD

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Table of contents

Table of contents	3
Preface	5
1 Concept and methodology in meta-theory-level research of paradigm	10
1.1 The concept of paradigm in science philosophy	10
1.1.1 The concept of paradigm according to Kuhn	10
1.1.2 Other views related to paradigm concept	12
1.1.3 Criticism of paradigm concept	14
1.1.4 Conclusions of science philosophical considerations related to paradigm	17
1.2 Meta-level research of paradigms	18
1.2.1 Meta-level research of scientific practice	18
1.2.2 Meta-theory research embedded in scientific practice	22
1.2.3 Conclusions of meta-theory research	24
1.3 Methodology of meta-theory research of futures field paradigms	25
1.3.1 Methodological characteristics of complex meta-level analysis of futures field	27
1.3.2 Operationalization and dynamization of futures field paradigm concept	30
2 Evolution of paradigm, crisis of paradigm and search for a way out in futures field	36
2.1 Becoming an area of science without an independent paradigm	36
2.2 Positivism as a paradigm of futures research	40
2.2.1 World and future view, subject of inquiry, goal and task	42
2.2.2 Methodological considerations and application of methods	46
2.2.3 Practical example for the positivist paradigm of futures field	48
2.2.4 Professional matrix of the positivist futures research paradigm	52
2.3 Crisis of paradigm and search for a way out in the 1990's	54
2.3.1 Unworkability of forecasts, dissatisfaction of social practice	54
2.3.2 Self-revision and search for a way out	56
2.3.3 New paradigm perspectives in the 1990's	62
3 New paradigms in the futures field	66
3.1 The evolutionary paradigm	67
3.1.1 World and future view, subject of inquiry, goal and task	67

3.1.2 Methodological principles and application of methods	72
3.1.3 Practical example for the evolutionary futures paradigm	77
3.1.4 The professional matrix of the evolutionary futures studies paradigm	80
3.2 The critical paradigm	82
3.2.1 World and future view, subject of inquiry, goal and task	84
3.2.2 Methodological principles and application of methods	86
3.2.3 Practical example for the critical futures paradigm	92
3.2.4 The professional matrix of the critical futures studies paradigm	98
4 Dynamic and comparative analysis of paradigms in futures field	100
4.1 Meta-analysis of paradigm dynamics	100
4.1.1 Characteristic features of the paradigm shift	100
4.1.2 Changes in the interdisciplinarity of the futures field	103
4.1.3 The futures field becoming a post-normal science	106
4.2 Comparative meta-analysis of paradigms	109
4.2.1 Alternativeness and competition of the new paradigms	109
4.2.2 Set of paradigms of the future field	113
4.2.3 Analysis of blind spots	118
4.3 Pattern of the development of the futures field up to now	125
5 Complex paradigm dynamics of the futures field	128
5.1 Complex analysis of the range of possibilities	128
5.1.1 Possibilities for the future that can be derived from the pattern of development up to now	128
5.1.2 Responses to challenges of the future	132
5.2 Interpretation of integral futures	135
5.3 Outline of the paradigm of integral futures	138
5.3.1 Coevolutionary paradigm of theoretical integral futures	140
5.3.2 Participatory paradigm of practical integral futures	143
5.4 Dynamic paradigm map of paradigms for futures field	145
5.5 Paradigms of futures field and the development of the futures field	148
Summary: Findings of the complex meta-analysis, possible use of the results and directions of further development	154
References	157

Preface

The futures field became an independent area of social sciences as a normal science in the 1970's. From the 1980's *the discourse concerning the issue of paradigm within the futures field became continuous. These debates focused partly on the criticism of the positivist paradigm of futures field that was named futures research in the practice and partly on search for new paradigms of the futures field.* An approach that already appeared in the debates asserted that it is in terms of its trends and paradigms and their changes that it is expedient to interpret the evolution and development of the futures field. *Sohail Inayatullah* recognised predictive/empirical, cultural/interpretative and critical/post-structural futures trends in the pursuit of futures field (*Inayatullah, 1990*). *Mika Mannermaa* determined descriptive, scenario building and evolutionary paradigms (*Mannermaa, 1991*). I called the attention to the process of evolution of trends in the futures field. I pointed out that in the early 1990's the trend that planned to improve the positivist paradigm by the so-called multiple approach and the new trends shifting towards the evolutionary and critical approach were present in the futures field simultaneously (*Hideg, 1992 and 1998/b*). Both of them were and are named futures studies. *Jim Dator* argued in favour of surpassing the positivist paradigm and the futures field becoming a post-modern science (*Dator, 1993*). *Richard Slaughter* held the position that it was the critical futures studies initiated by him that brought a change of paradigmatic depth in the pursuit of futures studies (*Slaughter, 1998*). On the other hand, *Mika Mannermaa* considered the perspective of evolutionary research the new and efficient frameworks of practising futures studies (*Mannermaa, 1998*). I argued in favour of that both evolutionary and post-modern approach affect the objective, methodology and methods of the futures field and its approach to the future and to the nature of its subject of research as well as of the information that can be obtained of it by futures field. Therefore, the new research perspectives indicate a change of paradigm depth in the pursuit of futures field as a science: scientific pursuit of futures field is rearranged in terms of two new paradigms, the evolutionary and the critical paradigms (*Hideg, 2002*).

Petri Tapio and Olli Hietanen typologised specific possible scientific schools/paradigms on the basis of possible relations between the knowledge of the futures field and cultural/social/human values (*Tapio & Hietanen, 2002*). By this typology of possibilities they pointed out the many ways how decision-makers can use various forecasts made within the frameworks of the futures field. However, they did not examine that it is actually what schools/paradigms and decision-making solutions that shape and for what reasons they are able to shape the futures field and decision-making practice and the relation between the two.

Ever since the issue of paradigm has not come to a rest in the futures field. Although increasing research activities focus on new solutions of specific theoretical/methodological problems of the futures field, their effects and consequences concerning the new paradigms for futures field and the issue of the paradigmatic future of the futures field have not become the subject of research. In the meantime, the so-called

foresight activity has developed and become generally accepted in practice, in addition to or instead of forecasts, stating that the future cannot be forecast, but by this new kind of foreseeing and futures field it is possible to prepare for the future. Although in 2004 *Richard Slaughter* raised the thought of *integral futures* to stop competition between paradigms at last and to achieve that various future knowledge being connected to each other should control the work of future practitioners (*Slaughter, 2004*), the interpretation of the integral futures constitutes the subject of disputes as well. The new developments and circumstances in the area of the futures field raise the following questions: Have the theoretical/methodological developments in the past decade created the evolutionary and the critical paradigm for futures field? Are the two new paradigms actually different from the positivist paradigm of futures research? What science the futures field has become through changes in paradigms and in the competition of paradigms? How can the futures field come out of the by now fruitless competition of alternative paradigms and how can it implement integral futures? How does foresight activity widespread in practice fit in with the process of the development of the futures field? How can the science of futures respond at paradigmatic level to the new challenges arising at the beginning of the 21st century? In order to answer the above questions, *I have made the issue of paradigms for futures field and changes in paradigms, the process how the futures field has become a science and the course of its development, the contribution of competing paradigms to the development of the futures field, the connection of the futures field to other sciences and interdisciplinarity as well as the possibility and the form of paradigm shift in futures field the subject of systematic research.*

The objective of the research has been to show what paradigms have developed in the futures field, what characterises the paradigm shift and the futures field that has surpassed the paradigm shift, and how the futures field can develop and be developed paradigmatically. I have achieved this objective within the frameworks of a *meta-theoretical framework*. Meta-theoretical researches *are analyses based on the empirical and facts, pursued below the philosophical level and above the disciplinary level, aimed at scientific knowledge, method and paradigms the objective of which is either to explore the evolution, features and development of scientific knowledge or to explore new research perspectives or conscious paradigm development*. My meta-theoretical research belongs to the range of meta-theoretical researches that *concentrate on exploring the evolutionary pattern of scientific paradigms*. However, I have based this not only on the simple but *complex dynamical examination* of paradigms. It makes the analysis of changes in paradigms in real time complete by taking account of the interaction between the past, present and possible futures of paradigms. To this end, *I have further developed meta-analytical considerations and methodology*.

In order to substantiate and further develop meta-analytical considerations, I survey and analyse the aspects of the philosophy of science that discuss the frameworks and content of interpretation of the concept of scientific paradigm and the changes in and dynamics of scientific paradigms. With the help of the philosophy of science I have searched for the answer to the question *whether the category of paradigm is suitable for providing a comprehensive characterisation of the paradigmatic development and possibilities of improvement of a field of science setting out from the past, spanning the present and shapable future*.

In order to work out a complex meta-analytical methodology, I have analysed the meta-theoretical researches that address the paradigms of science in terms of their

contexts, applied approach, methods and used sources. I have looked for the answer to the question that in a meta-theoretical research covering the paradigms and paradigm dynamics of a field of science

- what components a paradigm should be considered to be consisted of,
- how can the reconstruction of paradigms be carried out,
- how can the comparative and dynamic analysis of paradigms be connected,
- after building from bottom up and making the evolutionary pattern or paradigm map of currently existing paradigms, how is it possible to get to possible and implementable new paradigms,
- how can possible new paradigms be built into the evolutionary pattern, and how can a paradigm map expressing complex dynamics be created,
- how can the development of the futures field be interpreted on the basis of complex paradigm dynamics?

Studying the meta-theoretical researches of paradigms provided me only with a partial answer to the question what components the paradigm should consist of in the meta-analysis when the subject of research is the paradigm of a specific field of science and the aim of the meta-analysis is to make the dynamic paradigm map. According to the methodological literature, the paradigm matrix that determines the components of paradigms has five elements: it contains ontological, epistemological, methodological, axiological elements and components applying to the researcher's position that do not change in time. If we know the researches carried out in the area of the futures field also at the level of research planning, then we know that it is necessary to make decisions in other subject areas that affect the shaping of each of the above components. Such subject areas are *harmonised formulation of the subject, objective and task of the research*, and it is expedient to formulate them as two separate paradigm components. The subject of research is an ontological kind of component, while the objective and task of research carries epistemological and axiological features. It is expedient to divide the methodological component into *methodological principles and rules of applying methods* to help deeper understanding and comparative analysis of specific paradigms for futures field. I have operationalised the paradigm matrix by the alterations, i.e., I have adjusted it to the peculiar features of the pursuit of futures field because alterations increase only the extent of details of paradigm components but do not affect their character.

According to the literature, the paradigm matrix is used in dynamic meta-analytical examinations in a manner that considers the particular content of the permanent components as elements changing in time, i.e., so far they have used only simple dynamization. The dynamic paradigm matrix further developed by me has also preserved this simple dynamic feature. *In addition to that, I have made it possible that (i) the paradigm matrix itself could be shaped in time in terms of the range of interpretation, values, i.e., content of its components, and that (ii) at a point of time or in a period the paradigm matrix could have several values. By allowing these possibilities the paradigm matrix has become suitable for reconstructing and building paradigms for futures field in a manner that enables follow up and presentation of the development of the cultural/social challenges having been or going to be addressed to the futures field and possible ways of developing the responses to them.*

The literature of meta-analytical methodology proposes that analyses should be carried out by building from bottom up in order to reconstruct existing paradigms and to show their evolutionary pattern. This procedure has been followed by this research as

well but in accordance with dynamic and operationalised futures paradigm matrix. In the reconstruction of paradigms in futures field, on the one hand, the paradigms developed so far have been presented, and, on the other hand, usability of assumptions made in the operationalization and dynamization of the paradigm matrix have been supported.

With the paradigm matrix of the reconstructed paradigms for futures field I have carried out dynamic and comparative analyses to enable making the dynamics of paradigms for futures field and the paradigm map. The literature of the meta-analytical methodology does not give a clear answer as to how a paradigm map that expresses complex dynamics should be made. To explore complex dynamics, it is also necessary to let the future produce its effect on the evolutionary pattern that can be explored from the past and the present. Methodologically I have solved this by supplementing real time dynamic and comparative examinations with the complex analysis of the range of possibilities. I have examined the continuation of the paradigm dynamics of the futures field not only as a possible consequence of the past and the present but also in terms of new challenges arriving from the social/cultural environment. This research context has allowed *complex analysis of the possibilities of the future of paradigm dynamics and paradigm building in terms of predetermined, selected criteria and aspects presumed of the future*. I have carried out the analyses in a manner moving from top down to ensure that the results of paradigm building should be also part of the complex paradigm dynamics. *Through the complex meta-analysis of paradigms for futures field based on their dynamic and operationalised paradigm matrix, by making and as an organic part of the dynamic paradigm map of paradigms for futures field has my response been produced with regard to the possible and implementable interpretation of integral futures and to the paradigms of integral futures.*

This book gives an account of this method development and the results of the meta-analysis that applies further developed methodology. Chapter one presents the elaboration of the meta-analytical methodology further developed for the analysis of the complex dynamics of paradigms for futures field. Chapter two and chapter three contain the reconstruction of paradigms for futures field and the systematic construction of their paradigm matrices. Chapter four covers the dynamic and comparative analysis of paradigms for futures field. Chapter five moving through the analysis of possibilities of further changes in paradigms, more specifically the possible and implementable paradigmatic interpretation of integral futures, gets to drawing the complex dynamic paradigm map of paradigms for futures field. Finally, I have summed up the contribution of paradigms and paradigm shifts to the development of the futures field, workability of the developed complex meta-analytical procedure and possible ways of using the results in practice and further developing them.

I started my researches leading to writing this book, as I felt obliged to carry out analyses in the theory of the futures field, within the frameworks of my *OTKA (Hungarian Scientific Research Fund)* program (2005-2009) no. T 48539 entitled “*Jövőkutatás az interaktív társadalomban*” (*Futures studies in interactive society*). My participation between 2004 and 2007 in the cooperation theme of *COST – European Coordination in Science and Technology – A22* entitled “*Foresight Methodologies - Exploring New Way to Explore the Future*” made it obvious to me that further development of the practice of the futures field having become widely accepted can be carried out and can be successful only by working out solid scientific bases. Between 2010 and 2012, working on the topic entitled “*A közép-magyarországi régió*

tudásgazdasága jövőképek kialakítása interaktív foresight-tal” (*Development of the vision of future of the knowledge-based economy of the Central Hungary region by interactive foresight*) of the sub-project entitled “A tudás alapú gazdaság Magyarországon, az innovációs szemlélet erősödésének és a K+F teljesítmények növelésének feltételei” (*Knowledge-based economy in Hungary, conditions of strengthening of innovation approach and increasing R+D performance*), (SROP-4.2.1/B-09/1/KMR-2010-0005, 4 R + D + I subproject) supported by the TÁMOP (SROP, Social Renewal Operational Programme) my theoretical research became complete by connecting integral futures and its paradigms also to the practice of the futures field. Herewith I express my thanks to *OTKA*, the *European Science Foundation* and the *TÁMOP* for providing me with conditions for research. I owe fellow researchers participating in the projects and readers thanks for their collaboration efforts, criticism and urging by which they helped me to crystallise my train of thoughts and statements and cast them in a final form.

The Author

1 Concept and methodology in meta-theory-level research of paradigm

1.1 The concept of paradigm in science philosophy

1.1.1 The concept of paradigm according to Kuhn

Thomas Kuhn studied theoretical aspects of scientific practices in the 1950's and early 1960's. He extended his observations to both on the fields of natural and social sciences. He pondered on the nature of scientific inquiry, namely, what kinds of strategies lead to gaining and adding new knowledge to the body of science, reasons for choosing theories and hypotheses, what are the motivations behind setting up problem statement and choice of methodology in scientific inquiry. He also extended his inquiry to reasons for shifts in theory and methodology of research, and on top of these, what sorts of background factors determine gaining priorities and popularity of new concepts and methods, rather than studying epistemology and philosophical aspects of the utility of research. As a result of his studies, *Kuhn* formulated and introduced the concept of *paradigm* of scientific inquiry for the evaluation of changes in scientific approach to understand natural and social phenomena.

Kuhn defined paradigm of scientific inquiry, referred as paradigm in the followings, as follows: "These I take to be universally recognized scientific achievements that for a time provide model problems and solutions to a community of practitioners." (*Kuhn*, 1970, p. viii). Thus, the concept of paradigm in this context covers the accepted items from the available collection of knowledge gained by theories, concepts, methods and results of a certain field in a given era. These items secure relevance if they applied in a holistic manner for building models of problem-solving in scientific practice. The characteristics of paradigm are consistency, applicability for a variety of problems and capacity to acquire new scientific information, thus a paradigm, *per definition*, is acceptable and useable means for the community of scholars and researchers. The formulation in both vocabulary and concepts of a certain paradigm must bear the power to be practical as means of communication among the research community of a certain field (*Kuhn*, 1977/a).

Kuhn stressed in the first edition of his work on paradigms that old and new paradigms are incommensurable (*Kuhn*, 1962). New paradigm must be born in a revolutionary manner under the circumstances when the set of new empirical results is no longer describable by the prevalent approaches of science in interpretation of observations about reality, thus as a consequence, old paradigm necessarily must become extinct. The other driving force of a new paradigm development is the radical change in views about reality as a consequence of massive social changes that exerts the way of scientific thinking. In most of the cases, there is no run of decisive experiment happens or unexpected observation doesn't occur that radically change views and approaches, rather introduction of new ideologies based on social value shifts constrain the development of new paradigms. Since the social world values varying products and ideas according to changes in needs and wants of social practice, fields of science develop paradigms unequally. As a consequence, paradigms borrowed from other fields often prove to be applicable for a given science. The

pioneering explanation of functions of paradigm shifts by *Kuhn* in the 1960's renewed the beliefs in the significance of positivist scientific approach, moreover, initialized discourse about the effectiveness of science in the social-cultural domain.

Kuhn refined and extended his definition of paradigm in the 1970's, giving an information theory-based formulation treating paradigm a disciplinary matrix with elements of ontological precursors, symbolic statements, values, models and cases that considered standard items¹. By defining paradigm as a disciplinary matrix, *Kuhn* set paradigm to the level of discipline (*Kuhn*, 1977/a, 1977/b). With this interpretation, the notion of paradigm became operationalizable and the variables can be discussed as functions of each others. By selecting the set of variables that describe the functions and operation of science, syntax is determined for the operation of science in general and scientific fields particularly. Paradigm is not a social construction and contract anymore, but discipline that determines scientific practices and capable of making predictions. Hence, paradigm is an operational tool for the scientific community.

Significant characteristic of paradigm is, in *Kuhn's* interpretation, dynamism and that this dynamism is assured by scholar communities. *Kuhn* revealed this feature of paradigm in such era, when objectivity and result-orientation were regarded exclusive features of science neglecting the epistemological aspects of research. Since *Kuhn's* work, role of individual scientists and scientific workshops are acknowledged in their roles of determining priorities and methodology of science. Moreover, paradigm is dynamic, its content and context is function of time. This feature is applicable for the social-economic and historical discourse of science as *Kuhn* demonstrated in his famous book titled "The Structure of Scientific Revolutions" (*Kuhn*, 1962).

Kuhn portrayed natural history of science using the notions of paradigm and paradigm shift in his discourse of development of science treated as an exact discipline. In his view, development of science is not linear, rather segmented by series of revolutionary changes that sequence science into paradigms. He also stressed out that the prevalent paradigm of a given field determines research topics and views on its content and context. If a certain field adopts a paradigm-consistent theory and methodology, it becomes a driving force for producing *novum* that, in consequence, assures high explanation and prediction power.

The accumulation of knowledge always is accompanied by collection of unexpected and unexplainable data *i.e.* outliers if they are treated with the prevalent paradigm. These data, however, are outliers only from the viewpoint of the prevalent paradigm. On the other hand, they are often act as catalysts for constructing new theoretical frameworks created by scientific workshops with conflicting ideas and practice, thus the efforts explaining outliers open pathways up to new paradigms. The formulation of a new paradigm is result of competition and debate among different schools of academic knowledge in the case if one of the new approaches is capable of more effective explanation of results thus description of

¹ *Kuhn* said: "For present purposes I suggest 'disciplinary matrix': 'disciplinary' because it refers to the common possession of the practitioners of a particular discipline; 'matrix' because it is composed of ordered elements of various sorts, each requiring further specification" (*Kuhn*, 1970, p. 182).

observed reality. These breakpoints in scientific discourse can be treated as revolutions in science.

In summary, *Kuhn* interpreted development of science as a series of paradigm shifts. Paradigm shift is a qualitative change that deconstructs former views on the basic aims and goals of disciplines and science as a whole and constructs a new, hitherto hidden framework on the treatment of search for knowledge. Revolution in science on top of that, is a basic and complete transformation of views on the ontology and methodology of science.

1.1.2 Other views related to paradigm concept

Kuhn's concept provoked a debate on the explanation power and generalization capacity of paradigm as a tool in the discourse on ontology of science and research methodology. Criticisms of paradigm and expansion ideas of the concept are summarized in the followings.

Imre Lakatos concluded from his science sociological research that involvement of theories in paradigm concept is misleading since theories are directed to the subjects of research therefore theories can be evaluated on the basis of their validity and not by their fit to an ideology domain *i.e.* paradigm. He suggested the introduction of the notion of *research program* as a replacement of paradigm. However, this concept reduces the paradigm concept to the level of research methodology. In *Lakatos'* view, research program is a positive heuristics oriented towards reaching goals and its content is a set of principles, theories, models and methodology that supports the aim of research (*Lakatos, 1978*). He argued that a research program necessarily reflected a commonly shared concept on treatment of the research topic, since a research program was teamwork. In the contrary, research program immanently is not an ideology, since ideology is never scientific in its nature. He even assumed competition ran among research programs *i.e.* parallel paradigms existed; nothing else was decisive factor in validity assessment of programs among competitors than the relevance of results to reality.

Lakatos treated scientific methodology as clusters of principles and practices of research programs that did not form an era-specific paradigm of science. He reduced his observations to laboratory practice in his study and omitted programs that aim philosophical aspects of science. His sample of subjects limited the validity of his results to research programs and impeded him to delimit results to paradigm level.

Larry Laudan, in contrast to *Lakatos*, argued that paradigm was a system of theories; therefore it was a useful category. However, *Laudan* used the term *research tradition* to characterize the complex dynamics of the methodology of scientific research. In his perspective research tradition is the know-how of handling research topics. This know-how is not only methodology, but includes the legacy of former scientist' taboos and traditions in terms of ontology and recipes, that is a blend of metaphysics and methodology, it "is a set of assumptions about how those entities interact, assumptions about the proper methods to use for constructing and testing theories about those entities" (*Laudan, 1977, p. 97*). *Laudan* treated paradigm as a maxi-level theory composed of two parts. The first part is formed from

metaphysics and scientific ideology; second one is the implicit methodological framework. However, mini-theory is nothing else, than the operation of a research program. Researchers can freely choose from the pool of mini-theories and select the most utilitarian one. *Laudan* assumed that a research team may work in accordance to two research traditions, but at the same time they are conservative in terms of their relations to maxi-level theories.

Paradigms, in other words maxi-level theories, are not consistent and change in time by reformulation. Maxi-level theories are higher level-concepts to mini-level theories, since they provide guidelines for mini-level theory formulations (*Laudan, 1977*). *Laudan* regarded the significance of *Kuhn's* paradigm concept in differentiating between maxi- and mini-level theories classified by in their cognitive and heuristic strengths. In *Laudan's* concept, there is such a phenomenon that might be called global science theory based on his observation of orthodoxy of maxi-level theories in contrast to the variability of mini-level theories. *Laudan* treated paradigm as a discipline-independent maxi-level theory and matched to a timely stable ideology of science that prevalent in a certain era. He regarded paradigm as a useful concept that makes dynamics of science development with its milestones and mutual dependency operationalizable. He pointed out that paradigms evolved in a variety of disciplines; but they are interdisciplinary in nature. Furthermore, they foster formation of new disciplines. However, *Laudan* missed to point out that paradigms had the characteristics of detachment from the disciplinary level moreover popular paradigms had the capacity to rule their original discipline for extended period of time exceeding their era-specificity. He also observed the adaptability of paradigms *i.e.* paradigms were altered according to the needs of research.

Ian Hacking positioned paradigm concept on disciplinary level. He treated prevalent and multi-era scientific way of thinking as *style of scientific reasoning* (*Hacking, 1985*). The style of scientific reasoning acts as *Zeitgeist* and its radical change does mean revolution in science, rather than renewal of disciplinary-level paradigms. The style transformation is not only linked to disciplinary-level paradigm shifts but forms in interdisciplinary discourses. The alternative ways of scientific reasoning gain new ideas from their inherent pool of cumulative knowledge. The development of scientific reasoning is analog to the Neurath-Quine metaphor, that is: science likes to a boat "which, if we are to rebuild it, we must rebuild plank by plank while staying afloat in it." (*Quine, 1960, p. 3*).

Hacking added a remarkable notion on the discourse of paradigm hoisting the significance of interdisciplinarity as key factor among judging criteria to the toolbox of scientific reasoning. In addition to that, he proved that science was a coherent system that was capable to renew itself radically beginning from the basics. He contradicted with that notion to *Kuhn* and his followers who argued that science was a social-cultural construction implying that scientific paradigms were subjects of changes deriving from the social cultural context.

It can be concluded from the above discussed science philosophical considerations that the content of paradigm is function of the context of paradigm. Paradigm can be defined as meta-concept that is characteristic to a given era, however, paradigm may describe program of scientist(s) that proves to be school formative. On top of that, discussion of

paradigm concept must be extended to investigation of linearity of scientific reasoning formation over time and the ways scientific practice is affected by its social-cultural context. In order to clarify these aspects of paradigm, rejections of paradigm concept must be discussed.

1.1.3 Criticism of paradigm concept

Discussion of paradigm concept is not complete, unless views that reject paradigm are evaluated. By that means, proper content and context of paradigm can be confined.

Karl Popper offered the most deliberate and congruent argumentation on the futility of paradigm concept in thinking on the structure and operation of the world. *Karl Popper* pointed out, that if paradigms were not related and not interconnected any reference of the notion of 'truth' could be detected in the concept of paradigm. On the other hand, if they are compatible, there is no revolution in science. *Karl Popper* offered a resolution for that inconsistency. Namely, science, *per definition*, relies on two assumptions. First, science searches for description and analysis of reality. Second is that those theories, observations and experiments that science applies for inquiries inherently narrow their focus on the observable segment of universe. It means that scientific inquires are never able to determine theories in what extent match with reality, but the method of falsification enables the judgment of true and untrue characteristics of theories. Thus, *science develops in an evolutionary manner consequently science does exist without revolutions and paradigms* (*Popper, 1972*). *Karl Popper's* concept implies that science is capable of continuous development through self-correction inherently. *Karl Popper* opened a new field of debate on the nature of evolution with that argumentation, having stressed out that evolution was opposite of revolution and evolution was the sum of step-by-step changes thorough self-correction. (*Popper, 2002/a*).

According to *Karl Popper*, the self-revision nature of science postulates the continuous discourse of the scientific community. He said "... science and scientific objectivity do not (and cannot) result from the attempts of an individual scientist to be 'objective', but from the friendly hostile co operation of many scientists. Scientific objectivity can be described as the inter-subjectivity of scientific method." (*Popper, 2011, p. 424*).

Karl Popper made an other important point emphasising the significance of *criticism* in scientific discourse, it is "the method of proposing bold hypotheses, and exposing them to the severest criticism, in order to detect where we have erred." (*Popper, 2002/b, p. 86*). Scientific inquiry begins with problem statement and hypothesis formulation. Problem solution is performed by testing of hypothesis. Part of hypothesis testing is comparison and contrasting with other hypotheses that are performed by criticism and debates. Debates may continue until a certain hypothesis is rejected or accepted. In *Karl Popper's* view the process of critical examination has two characteristics. It is dialectic and continuous. "The various competing theories are compared and critically discussed, in order to detect their shortcomings; and the always changing, always inconclusive results of the critical discussion constitute what may be called 'the science of the day'". (*Popper, 2002/b, p. 97*).

Referring to the Karl Popper's critical concept and Herbert Simon's bounded rationality theory (Simon, 1976) a narrowed use of paradigm as scientific inquiry has been developed. *In this context the paradigm is used as a research procedure.* I think that this latest meaning of paradigm constitutes a very general framework. If it is used for framework to answer a certain research problem, then content concerns of paradigm defined by Kuhn need to answer immediately. Hoisting criticism and procedure into characteristics of paradigm, Thomas Kuhn's paradigm concept becomes more plausible by emphasising its dynamic nature and embedment in research process.

The evolutionary view on the progression of science is extended by a school of science philosophers stating that science is not a coherent system, *i.e.* variations do exist in interpretation of tasks and treating subjects, but these differences are not significant enough to deserve calling them paradigms (*e.g.* Toulmin, 1972).

The role of scientists, that can be *objective observer, observing participant or participating observer* together with their knowledge and socialization background, also influences views on significance of paradigm in science (Polanyi, 1964). An emerging new trend in positioning scientists in the process of inquiry is recognition of their participant aspect that involves influencing effect².

The participating observer status is particularly significant in social sciences since scientists are members of the system studied. Moreover, subjectivity can not be omitted in social research because the reality under investigation is loaded with value judgements (Weber, 1949, Myrdal, 1958). Thus, the position of "free-floating intelligentsia" named by Karl Mannheim is vain (Mannheim, 1991). Even more, choice of paradigm is influenced by the social-cultural context of research. Parallel to that, paradigm modifications are subjects of traditions of academic schools. The error of subjectivity can only be corrected by evaluation of results achieved by simultaneous and longitudinal research projects.

Another school of science philosophers treats differences in scientific attitudes as a natural consequence of interspecies diversity with reference to Charles Darwin's diversity theory (Darwin, 2009). György Kampis formulated his scepticism against paradigm as follows: Paradigm takes evident a feeling shared by all scientists, namely theories are all different worlds divided by barriers of perspectives (Kampis, 2000). He argued, that paradigm was a false concept since it was monolithic and static thus did not bear the criticism of reality. Scientists are able to communicate and understand each other even though they think differently thus no scientist does exist representing an intact paradigm. According to György Kampis, paradigm is an exaggerated simplification missing the acknowledgement of structure within structure that is the natural state of knowledge accumulation. Science

² Ilya Prigogine and Isabelle Stengers observed a shift in the role of scientist by studying complex non-equilibrium dynamics of social systems. On one hand, scientists observe changes objectively but on the other hand, they induce transformation since they are "products" of complex non-equilibrium systems. Additionally, activity of social world influences natural processes. Thus, it is more effective in understanding the role of scientific community in search of reality if scientists are regarded as participating observers rather than objective observers (Prigogine & Stengers, 1985).

develops in an evolutionary manner and views and concepts vary sequentially. He totally rejects *Thomas Kuhn's* paradigm as a rigid and non-operationalizable concept because it misses inner consistency since if it reflects reality scientists will not be able to communicate and capable to shift paradigm. However, *György Kampis* admits that similar views are interchangeable easier than completely different ones. He resolves this contradiction to his own criticism on *Thomas Kuhn's* paradigm theory by stating that scientific concepts bear multifold dynamic meanings. In summary, this ambiguousness of scientific concepts holds the key to construct the evolutionary theory thus real theory of science that is *the variation-selection model* (*Kampis, 2000*).

In my opinion *paradigm is not replaceable with a dynamic-evolutionary approach*. Paradigm may comply with the species concept in *Charles Darwin's* theory. Use of paradigm is practical if the inquiry is executed on species level, describing specific characteristics of species, their interactions, impact on the environment and dependency on environment. Interspecies interactions gain importance if they are studied in the context of a given micro environment. In other words: if the level of inquiry is narrow, generalization power of results is lost. Paradigm level inquiry is useful when mapping of patterns and dominant constituents of relative stability is the aim of study. *Evolutionary theory and hermeneutics* gain popularity time-to-time at given disciplines. The effectiveness of these approaches can be judged by their strengths in forming paradigms and their impact on science philosophy. This study limits its goal to paradigm and delimits to a science history reconstruction in the futures fields.

Thomas Kuhn's paradigm concept proved to be a rigid and monolithic approach in its original version. However, it opened fields for fruitful debates that demonstrated its potential for modular treatment making it applicable for further refinement.

Paul Feyerabend also negated paradigm on evolutionary basis. He argued that according to the *Gödel-theorem* (*Gödel, 1986*), a monolithic theory such as a paradigm has no full explanation strength (*Feyerabend, 1970/a*). The so-called *blind spot of paradigm* is a recognized characteristic of paradigm but if one rejects paradigm on *Gödel-theorem* other theories can also be rejected on this basis. In my opinion, corresponding paradigms can be matched in a way that supports each other's explanation strength if blind spots are mapped. With this method, paradigm is useful in description of shifts in methodologies.

Paul Feyerabend added social acceptance in his critic on paradigm stating that if paradigms prevailed science, operation of science was comparable to the operation of organized crime (*Feyerabend, 1970/a*). He emphasised the significance of social-human values selection in judging results of science. In his opinion, happiness and self-realization are the highest-ranked values and science must support in achieving that goals. Science is a tool for human evolution that aims in his view happiness and self-realization. The progress of science is not other than the continuation of biological evolution of the human species. This may be the only way to survive, therefore he cannot accept the *Kuhn's* meaning of normal science (*Feyerabend, 1970/a*). In this perspective science is irrational, just a puzzle-solving consuming all human intellectual resources with proliferation and stamina. Science demonstrates all human features but lacks science-specific features (*Feyerabend, 1970/b*).

With that notion, *Paul Feyerabend* put not only paradigm but science-specific methodology in question. He basically fulfilled *Thomas Kuhn's* prediction about the impact of social-cultural determination on scientific thinking stating that new era brought new approaches. However, *Paul Feyerabend* disavowed the integrity of science by claiming social utility the only evaluation criterion. This view is inaccurate since every segment of human activity is organized and coordinated by mutually accepted codices of ethics, rules, terminology and know-hows. These codices evidently change in time reflecting social needs and wants causing emergence of new crafts and disciplines and making others extinct.

In summary, critics of *Thomas Kuhn's* paradigm concept elucidate the limits of paradigm only, but paradigm has become generally accepted among scholars in describing features of science. Scientists, who want to position themselves in the social-cultural matrix use *Thomas Kuhn's* lingo (*Ihde, 1998*).

1.1.4 Conclusions of science philosophical considerations related to paradigm

The conclusions of critical overview of concepts and considerations related to paradigm are summarized as follow:

- Paradigm is a dynamic category that is capable to organize and interpret models, their changes and additionally methodology and ethics of science as a whole and/or a particular discipline.
- Paradigm is capable to describe dynamics of evolution in science as a whole and/or a particular discipline. Science philosophy developed two approaches for explaining changes in science: (i) Science develops through radical/revolutionary paradigm shifts, (ii) Science develops according to a variation-selection evolutionary pattern.
- Scholars who refuse paradigm as a concept use conceptual considerations of paradigm.
- Denial of paradigm can be traced back to two basic concepts: (i) Science is not static and monolithic, and (ii). Science is not a specific sphere of human activity since it lacks specific characteristics. This critic is invalid because spheres of human activity are segmented with their norms, ethics, rules, lingo and practices *i.e.* competency characteristics. These competency standards are the basis of vocational education and quality assurance for example.
- Paradigm can be operationalized as a procedure. Scientific methods must have specific standard procedures, norms and ethics that assure the validity and reliability of results. The procedural interpretation of paradigm would eliminate the paradigm debate but the underlying concerns about science would not. If a research project would be treated as an independent paradigm, repeatability, validity and reliability check, plus extension and comparison strength of research would be lost. There would be no need for scientific communication thus scientific community would be meaningless. Without communication of scientific community the body of knowledge would be lost for mankind.
- Critics of paradigm made a point by emphasizing that *paradigm and paradigm shift are not exclusive characteristics of scientific activity*. In science, a continuous and

step-by-step accumulation of knowledge is also detectable. This observation is formulated in the *variation-selection development model*. Level and subject of inquiry are decisive factors in choice of model. In my opinion, if formation and dynamics of new disciplines are the goals of inquiry, paradigm is a useful concept. Paradigm shifts are practical in studying evolution of an interdisciplinary field to independent disciplines. Futures field, my recent subject of study, particularly shows such features, *e.g.* it is contemporary, it is strongly connected to interdisciplinary fields, and its subject gained high importance on social level since offers solutions for concerns about mankind's future that can be thoroughly discussed with the concepts of paradigm and paradigm shifts.

- *Thomas Kuhn's* paradigm concept and the variation-selection model are products of different eras responding to different needs and wants in interpretation of science. Critically comparing the two models I hypothesize that *both models are useable for describing the dynamics of science evolution depending on the state of science development. As a consequence, the two above mentioned model can be used alternately.*

1.2 Meta-level research of paradigms

Science philosophy defines science, paradigm of sciences and discusses science evolution by *a priori* norms. Hence, lessons of science philosophy are limited to framework and aspects for paradigm research. Methodology must be constructed in order to make paradigm research feasible. Meta-level research is the level of inquiry that may provide guidelines for methodology set-up. Meta-level research is empirical and positioned below philosophical and above disciplinary level, with scientific knowledge, methods and paradigms³ in focus, aiming at description and explanation of characteristics of scientific knowledge formation or directed to paradigm formulation. Up to now, there is no clear subject and methodology of meta-level research rather it is a compilation of case studies and evaluations. Meta-level research can be classified into two categories depending on their subjects. One field deals with scientific practice in general the other is embedded in the routine of a discipline.

1.2.1 Meta-level research of scientific practice

This group of meta-level research is closely related to the program of naturalization of science-philosophy (*Bloor, 1976*) that gained popularity in the second half of the 20th century. This approach uses longitudinal and case studies to describe and explain the process of scientific knowledge accumulation. These meta-level analyses⁴ use empirical studies

³ On the view of *Loet Leydesdorff* paradigms as systems of theories are incommensurable but are comparable and evaluable if they are analyzed by external measures. Since paradigms are products of the human mind in theory everyone can understand and study them. Different paradigms use different axes for reflection so they can be seen as incommensurable. They also compete with each other during their understanding, at the same time. The competing theories constitute a new level of reflective communication system in this way. This level is placed over the level of subject to be understood therefore reflective analyst can understand the paradigm shift and incommensurability of paradigms is only partial (*Leydesdorff, 2001*).

⁴ This research field is known as science studies or science and technology studies.

which research sample is collected from individual scientific groups and projects. The evaluation methodology is comparison of results achieved by disciplines and its aim is either detection of characteristics of knowledge accumulation in general or a paradigm. Many times the goal is to demonstrate that knowledge accumulation has no specific characteristics.

On the naturalization program of science philosophy underlying goal is empirical study of dynamics of scientific research. One significant field of studies on complex dynamics of knowledge accumulation is nature of paradigm, paradigm shift, comparison of paradigms, and development of new paradigm (e.g. Guba & Lincoln, 1994; Knight, 1994; Eden, 2007). The methodology is, yet still under development, that *research uses completed research projects as sample. They perform secondary and dynamical comparative analyses using multiple evaluation criteria.* The result is either reconstruction of paradigm shifts, construction of paradigm map or development of new paradigm. Frequently, the research aims exploration of parameter set that is capable of paradigm development. The debates on meta-level research boost the efforts on scientific paradigm development.

David Hull performed an empirical and evolutionary meta-level analysis and found that pattern of scientific knowledge can be constructed if phylogenetical taxonomy and individuality of disciplines are hypothesized (Hull, 1988). *Disciplinarity of science is a decisive organization pattern of evolution of scientific knowledge.* According to John Wilkins, scientific knowledge is diverse in logical structuring. Disciplines use different blends of axiomatic, model-based theoremic and inspiration-based cognitive thinking. *Disciplines develop their own characteristic cognitive formulas and paradigms* (Wilkins, 1998).

Helga Nowotny, Peter Scott, Michael Gibbons and some other researchers concluded that a new scheme of scientific knowledge accumulation emerged in the end of 20th century and the beginning of 21th century. This new scheme presents the following features: (i) disintegration of the traditional hierarchy of theoretical, general and applied sciences and innovation, (ii) networking of knowledge accumulation, and (iii) *production of knowledge by interaction between theory and practice.* Thus scientific knowledge becomes contextualized and additionally goal-oriented paradigm formation based on the consensus of stakeholders (Gibbons et al., 1994 and Nowotny & Scott & Gibbons, 2001).

In addition to qualitative studies, quantitative studies also took place in meta-level analysis. For example, analysis of connection of citation indexes shows that *the dynamic network of scientific novum shows a critical self-organization pattern* (Render, 1998). According to Mark Buchanan, this conclusion of analysis of scientometric data supports Thomas Kuhn's view on the development of science because his conception comprises every type of changes in science, namely the ways of keeping or discarding research traditions (Buchanan, 2000). The proof for self-organization pattern of science and knowledge supports the hypothesis that *evolution of science and knowledge comprises both micro changes and macro transformations.* As I discussed in section 1.1, Otto Neurath, Willard Quine and Karl Popper hypothesized the prevalence of small changes in the evolution of science.

The other prevalent domain of meta-level science study is a new form of *secondary analysis of scientific publications and their social-cultural context that aims integration and synthesis* (Glass, 1976). Content and environment are treated with equal weighing in the process of comparative and/or dynamic analysis. *This type of meta-level analysis is particularly suitable for detection of paradigms and their comparison since blind spots of paradigms become visible* (Luhmann, 1994)⁵. Figure 1 shows a paradigm map that reflects the relationships among scientific paradigms.

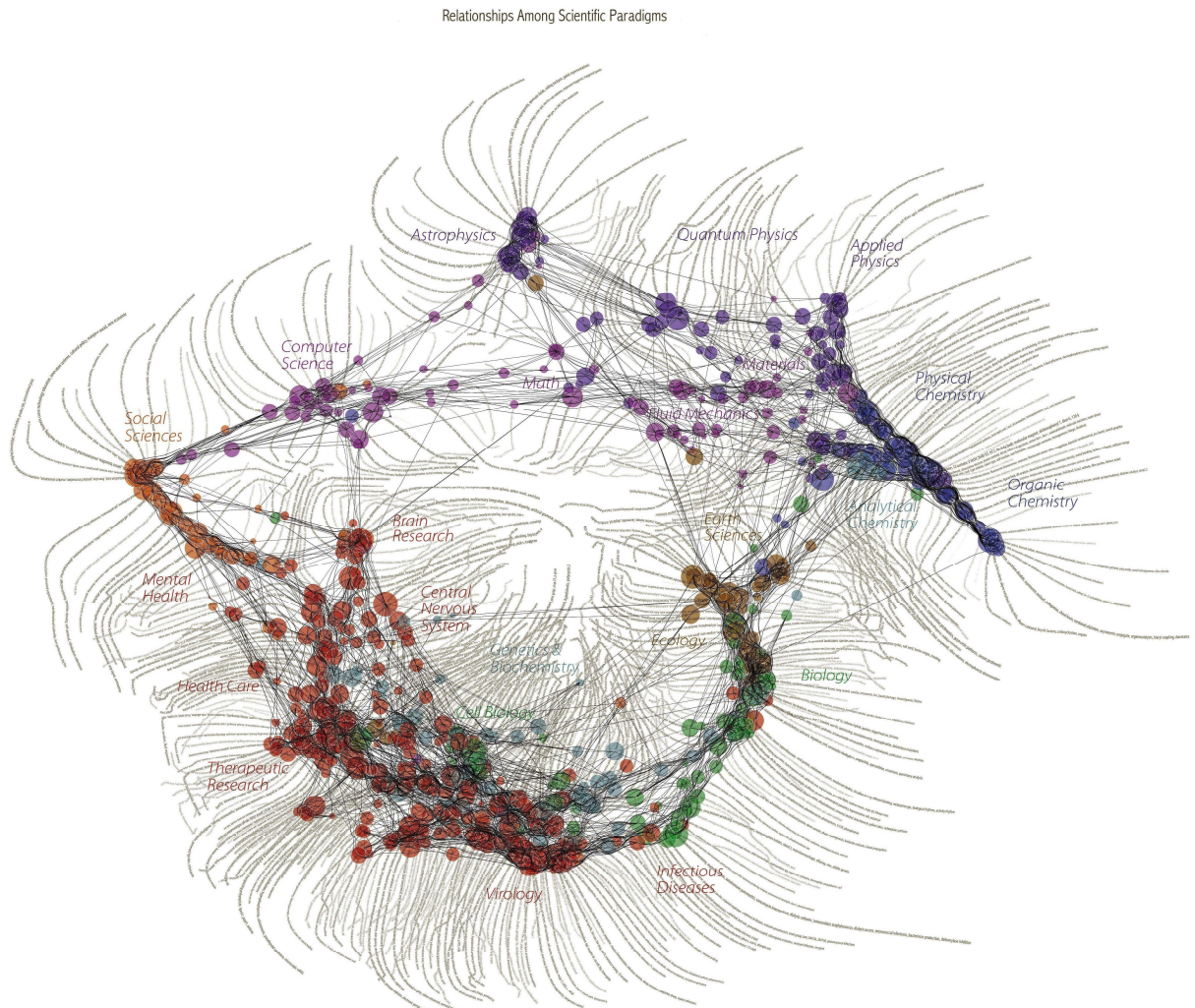
In general, scientists familiar with both scientific result interpretation and scientometrics are capable for such analyses. *Loet Leydesdorff* sets a more rigorous criterion for scientific capacities stating *that meta-level research can be successful only if the researcher takes not only an observer but participant position* (Leydesdorff, 2001). The observer status offers a distant, either above or outside position for the researcher. This position makes *reflection* on the topic and its subjects possible. In the contrary, the participant status assumes that the researcher is skilled in the discipline under study, moreover cultivates it thus capable for *self-reflection*. Therefore, *researcher as participating observer is able to understand paradigms and interpret them*.

Thomas Kuhn made a general listing of the matrix elements only. Meta-level research constructed the operationalization of paradigm research. Social science and cognitive meta-theory research are the leading forces of this work. In the 1990's, the disputes of qualitative turn in social science boosted listing and description of paradigm components. That era positioned the role of researcher into the paradigm parameter set (Guba & Lincoln, 1994). According to that research, *ontology component* of paradigm points to the reality segment defining the content of related reality, while *epistemology component* directs to the elements of assumed reality of paradigm and their characteristics. *Methodology component* comprises the methods suitable gaining new knowledge related to paradigm. *Position and role of researcher component* clarifies the relation of researcher to the reality and information concerned. *John Heron* and *Peter Reason* added *axiology component* that defines the values of paradigms from social perspective (Heron & Reason, 1997).

Additionally, meta-level paradigm research in social sciences is directed to the *listing and interpretation of paradigm component set*. This research reflects the recent situation, whereas multiple paradigms coexist in social sciences. Generalizable products of meta-level research are paradigm maps that visualize the paradigms in use and their connections. They are useful in assessment of similarities and dissimilarities, choice of paradigm and perspectives of paradigm development.

⁵ According to a study using a database of 800,000 publications that was published in 2007, science uses 776 paradigms worldwide. This number reflects the frequency of paradigm usage by disciplines as shown in Figure 1. This map also visualizes that paradigm often used to characterize phenomena and processes. (Source: Research & Node Layout: Kevin Boyack and Dick Klavans (mapofscience.com); Data: Thompson ISI; Graphics & Typography: W. Bradford Paley (didi.com/brad); Commissioned Katy Börner (scimaps.org) http://farm1.static.flickr.com/82/430561725_4eb7bc5d8a_o.jpg. Downloaded: July 7, 2009.)

Figure 1. *Map of paradigms, 2007*



Source: Research & Node Layout: Kevin Boyack and Dick Klavans (mapofscience.com); Data: Thompson ISI; Graphics & Typography: W. Bradford Paley (didi.com/brad); Commissioned Katy Börner (scimaps.org), http://farm1.static.flickr.com/82/430561725_4eb7bc5d8a_o.jpg. Downloaded July 7 2009.

Computer science is eminent in methodology development of paradigm research by adapting and developing software programs based on theoretical and meta-level paradigm research. Computer science focuses on intelligent human beings capable of expedient information collection and knowledge accumulation. The problem is that knowledge accumulation is done along multiple paradigms in a given discipline. In order to develop an expert software, incommensurable paradigms has to be treated on a common basis. The solution is that paradigms are taken into components and then comparative analysis of the

components is performed. The comparative analysis comprises Ontology, Epistemology, Preference and Methodology modules. The collected common components are used to create a new artificial paradigm *e.g.* meta-paradigm. This paradigm is used then for software development. Computer science calls this procedure meta-theory research. *This meta-theory research is a bottom-up approach until the phase of comparative analysis of paradigms. The next phase is an integrative generalization procedure that constructs the artificial new paradigm. Finally, in a top-down application phase new software or software family is developed*⁶. Meta-theory research proved its utility for paradigm selection and development for a diverse range of problems.

A promising application of meta-theory research is *meta-level study of cognitive sciences* (Pléh, 2003). One segment of this research comprises empirical and experimental study of human cognition and learning including scientific cognition. The other segment is concerned with adaption of knowledge about human cognition for development of artificial intelligence. *Up to now, there is no general theory and meta-paradigm developed for human, including scientific cognition, thus propagation of scientific paradigms seems to be endless.*

1.2.2 Meta-theory research embedded in scientific practice

The other main factor that catalyzed meta-theory research is the continuous change of disciplines representing signs of both differentiation and integration. *János Kornai* rightly emphasized the dynamic nature of science and its paradigmatical consequences 30 years after the publication of *Thomas Kuhn's* thesis. *János Kornai* found that the quest for system paradigm was instinctive because facts reinforced the hypothesis that systems existed in reality. The underlying question is that why systems transform and when and how they shift to another system. Researchers deliberately change paradigm if political preference and ideology impose stress on them or *further research requires interdisciplinarity*. In economy, system paradigm is not exactly formulated yet, its explanation and predictive strength is weaker than the prevalent one's and its mathematical instrumentation is weak but it gains popularity since it opens new perspectives for economy (*Kornai, 1999*).

⁶ A good example for meta-theory research is TOGA meta-theory development. Source theories were collected from Physics, Engineering, system and cognitive paradigms, and social and social scientific paradigms. Common constituents were selected by decomposition and comparison. These common constituents are: Ontology, Epistemology, Preference and Methodology. These constituents formed TOGA that is Top-down Object-based Goal-oriented Approach meta-theory. The angle of the meta-theory is the view point of the perspective of an intelligent being subjective perspective. This theory formulates the knowledge accumulation of an entity with intelligence and social-cultural background who has constrained knowledge. In summary, this theory assumes that an entity with constrained knowledge always develops its own philosophy that can be tailored with collection, processing and merge of new information. There is no absolute reality, therefore true and false are not valid concepts, but beneficent and expedient are always testable. This theory is basically the cognitive model for human rational problem-solving.

The ontological axiom of the theory is that intelligent and real problems are organized in pairs. The problem pair is constituted from the intelligent abstract entity and its environment. They are in an interactive relationship. The epistemological axiom is that the ontological axiom can be broken by parallel, top-down goal- and subject-oriented frameworks. These frameworks are defined by the actor. Preference is also chosen by this actor. The third axiom comprises the methodology with meta-modeling assumptions, axioms and model frames. TOGA gained wide-range application in decision-making, knowledge management and coaching (*Gadomski & Nanni, 1992*).

The acceleration of changes in science accumulates massive amount knowledge and as a consequence, it *forms a variety of new disciplines*. The differentiation process makes subfields independent disciplines like nuclear physics or institutional economy within physics and economics. Integration pattern is represented in the merge of overlapping field, such as neuroscience, economic sociology and environmental economy. The third pattern reflects the reaction to a new problem statement by formation of new discipline, *e.g.* futures field and human ecology.

The third trend is that practical problems force the organization of disciplines on a common platform. Such fields are human cognition and climate change. Interdisciplinary research can exist along a relatively long time-line without structuring to a new discipline. Cognitive disciplines are good examples of this trend. Both traditional and interdisciplinary approaches coexist in solving problems of this field (*Pléh, 2007*). Some interdisciplinary research strives for independence and become a separate discipline. Computer science went through that process. That transformation gave birth to fields such as Intelligent Information Management and Spatial Informatics that deals with spatial dynamics of society in general, and finds applications in studying regional developments and improvement. *Changes in the focus of research together with introduction of interdisciplinary approach may also invoke refinement of disciplinary paradigms and formation of new paradigms*. In the case of psychology, research is performed along parallel paradigms, *i.e.* cognitive, constructivist and evolutionary, that provoked a continuous consultation on paradigms among psychologists.

Formation of new disciplines and rearrangement of disciplines evoke the transformation of disciplinary level paradigm to meta-paradigm or new disciplines produce new paradigms. *Most frequently interdisciplinary research transforms disciplinary paradigms to meta-paradigms*. Research plans of interdisciplinary research must include subject and methodology of research. In the planning phase paradigm-related consideration often occur concerning subject, philosophical aspects and methodology of research, together with reliability and validity of results. Researchers' competency is giving proper answers to these questions. *Disputes in the planning phase can be treated as paradigm formation even if the disputes focus only to the research topic*. If the research is thoroughly planned, research can be done according to existing or new paradigm. If paradigm must be matched and/or development of new paradigm becomes a necessity, *science development is supported as a by-product of research by revealing new contexts of changing reality thus these types of researches accelerate knowledge accumulation*. This process increases the number of paradigms, reduces of their lifetimes and boosts paradigm competition.

A frequent case is when *mutual agreement settles for the process of research only*. This case can be treated as multidisciplinary research. The result is formed by synthesis of partial results that are produced with the use of separate paradigms. Methodology of research becomes the *procedural model of research* that proves to be useful in detection of uncertainties and defining of new research problems following the general model of problem-solving from methodological point of view. If research continues according to the refined plan interdisciplinary characteristics of research may become more explicit and may turn to paradigm formation. For example, co-operation of cognitive sciences through decades

resulted in common paradigm development. Connectionism⁷ became meta-paradigm since then. For instance, cognitive approach became accepted in Psychology owing to participation in interdisciplinary research.

Due to rapid changes and transformations of research fields it is inconceivable that a certain researcher would do research along one single paradigm lifelong. *It is generally accepted nowadays that a researcher or a research team must be familiar with many paradigms and able to shift and develop paradigms.* Since modern research is done in teams, researcher must also be able to understand and use others' results who work under other paradigms, moreover, he/she must be prepared to connect his/her results to others'. Theoretical positioning of paradigm development and paradigm shift is not a central concern of research nowadays as it was *Thomas Kuhn's* time. *Rather, paradigms, paradigm shifts and meta-paradigms support discovery of new research contexts and their transformation to practical scientific results.*

In addition to the general use of paradigms and their increase in numbers, *discourses on know-how of science became common feature of science both on disciplinary and interdisciplinary levels. This type of meta-theory level discourse and research* is not a science philosophical topic anymore, rather it is done above-discipline level or on multi- and interdisciplinary level or above them. *Meta-level discourses and researches are done in practice for the purpose of development of new disciplines and their further refinement or planning of methodology of a certain interdisciplinary research.*

1.2.3 Conclusions of meta-theory research

There is a common line in the recent meta-theory research, namely, the *quest for knowledge about science, scientific knowledge, scientific method and paradigm be achieved by empirical, fact-based thus scientific means.* Sources of empirical facts derive from scientometric measurements, sociological observations of scientific teams and workshops, methodologies and reports, methodology handbooks, publications about new research perspectives, theoretical-methodological publications and paradigm disputes, *etc.* These primary sources are analyzed from the perspectives of environment and content or they are numerically analyzed from the viewpoint of meta-analysis. The results of these secondary analyses are then summarized in the form of comparative and/or dynamic analyses to get answers for meta-analytical research questions.

Subjects of meta-analyses vary widely. They may focus on presentation of a discipline or a group of disciplines, their characteristics related to knowledge production capabilities, and their complex dynamics, reconstruction of paradigms and their changes, foundation of paradigm development or construction of a "synthetic" paradigm.

⁷ Connectionism means relationship principle. It assumes that human mind is such a network that its every apex is connected to many other apexes through connections with changing intensity. This theory does not define central unit and rules are replaced by connections with changing intensity. The carrier of knowledge is the connection itself. Research uses planned experiments on this field (*Clark, 1993*). Connectionism is called Interactionism in social sciences.

Meta-theory research is always a bottom-up approach, but after synthesis phase it can turn to top-down phase if the aim of research is a well-defined science study or practical/industrial goal.

Meta-theory research is also done embedded in discourse of practice of science. Albeit, the aim of these researches is methodological foundation of a disciplinary, multi- or interdisciplinary problem, they must be considered meta-theory research, because the application of the existing theoretical-methodological tradition is insufficient. Original solutions require paradigm developments in many cases. This task is executed on disciplinary level either by individual researchers or research teams. For this reason, these types of researches can be called meta-theory practices. In the practice of science it becomes not only more prevalent but it provides an increasing amount of data for cognitive and forecasting meta-theory research.

The recent science organization and reorganization processes have twofold significance:

- They increase the number of co-existing paradigms and the frequency of paradigm shifts, and
- They boost meta-theory research that aims paradigm development.

The overviewed *meta-theory researches reinforce the significance of paradigm research on one side and they provide methodological solutions for meta-theory research of paradigms on the other side.*

Methodological considerations are summarized as follows:

- Constituents of standard practices of meta-theory are expedient to implement them into the construction of paradigm concept defined for futures field.
- Use of secondary analyses of theoretical and methodological literature related to futures field including debates and methodological description of futures field research programs are effective in reconstruction and/or development of futures field paradigms.
- Both dynamical and comparative analyses can be performed on futures field paradigms.
- Operational models of futures field can be assembled by studying futures field paradigms.
- Although meta-theory research is too diverse and unsettled in methodology yet, they catalyze further meta-theory research by meta-methodology development.
- Results of meta-theory research of futures field paradigms can contribute to the strengthening of disciplinary, multi- or interdisciplinary paradigm discourses related to futures field.

1.3 Methodology of meta-theory research of futures field paradigms

Meta-theory research of futures field is feasible because futures field has scientific foundations therefore it is a discipline. Thus it bears paradigm and additionally regular

discourses on its paradigm and meta-theory do exist. The paradigm-related questions exposed in the Preface can be answered on meta-theory foundation if the aim of meta-analysis is mapping of paradigms related to futures field, what are the characteristics of paradigm shift and the paradigms of futures field after paradigm shift and additionally in what ways futures field develops and is developable further on paradigm path. Research in this direction must be done on meta-theory level because its goal is above the ambitions of separate futures field paradigms. Insomuch, the aim of research is within the boundaries of futures field, results may enhance futures field itself thus meta-analysis is, in this respect, self-reflection.

As a consequence, *the researcher's role in meta-theory research must be a participating observer status*. I used the reflection in order to make an outlook to science philosophy and paradigm-related aspects of meta-theory research, moreover, I included time dimension in the research and I placed intertextuality, namely interpretation and extension of common concepts of futures field paradigm into to focus of my research. Self-reflection possibility of observer status also supported me in my efforts, since I am, as a participant, familiar with the interpretation and timely changes of the lingo of futures field's theoretical and methodological toolbox. I also observed new phenomena and dealt with their explanation due to my own research and forecasting and foresight practice.

Background of my research derives from multiple sources. I used critical review of literature for systematic presentation of paradigms useful for futures field research and additionally for comparative and meta-level analysis of views and ideas on futures field paradigms. Sources of paradigm development and theoretical-methodological considerations are products of research I did with the support of Országos Tudományos Kutatási Alap (Hungarian Scientific Research Fund) and practice gained by making prognoses and foresights. Those experiences supported me in the evaluation and harmonization of the diversity of concepts used in futures field paradigm research and in a deeper understanding of the requirements of a proposal both in theory-methodology and praxis that is properly fitted to the fluid needs of paradigm research.

I used additionally my participation observation knowledge gained on WFSF (World Futures Studies Federation) world congresses, national conferences in futures studies, and on participation in European COST A22 cooperative programs⁸ and futures field teaching experience.

Literature was selected according to the following criteria: (i) discussed the interaction between paradigm and social-cultural environment, (ii) represented a thorough range of opposing ideas and solution proposals, and (iii) covered the period of 1970's-to-date. The literature research contained content interpretation, comparative analyses and synthesis. The aim of my research was the production of new knowledge in futures field that is integrative, comprehensive, supported by data, transparent, capable of practical use and expandable.

⁸ The European Coordination in Science and Technology (COST) A22 program under the title of Advancing Foresight Methodologies: Exploring new ways to explore the future was run from 2004 to 2007. The research was funded by the European Science Foundation.

1.3.1 Methodological characteristics of complex meta-level analysis of futures field

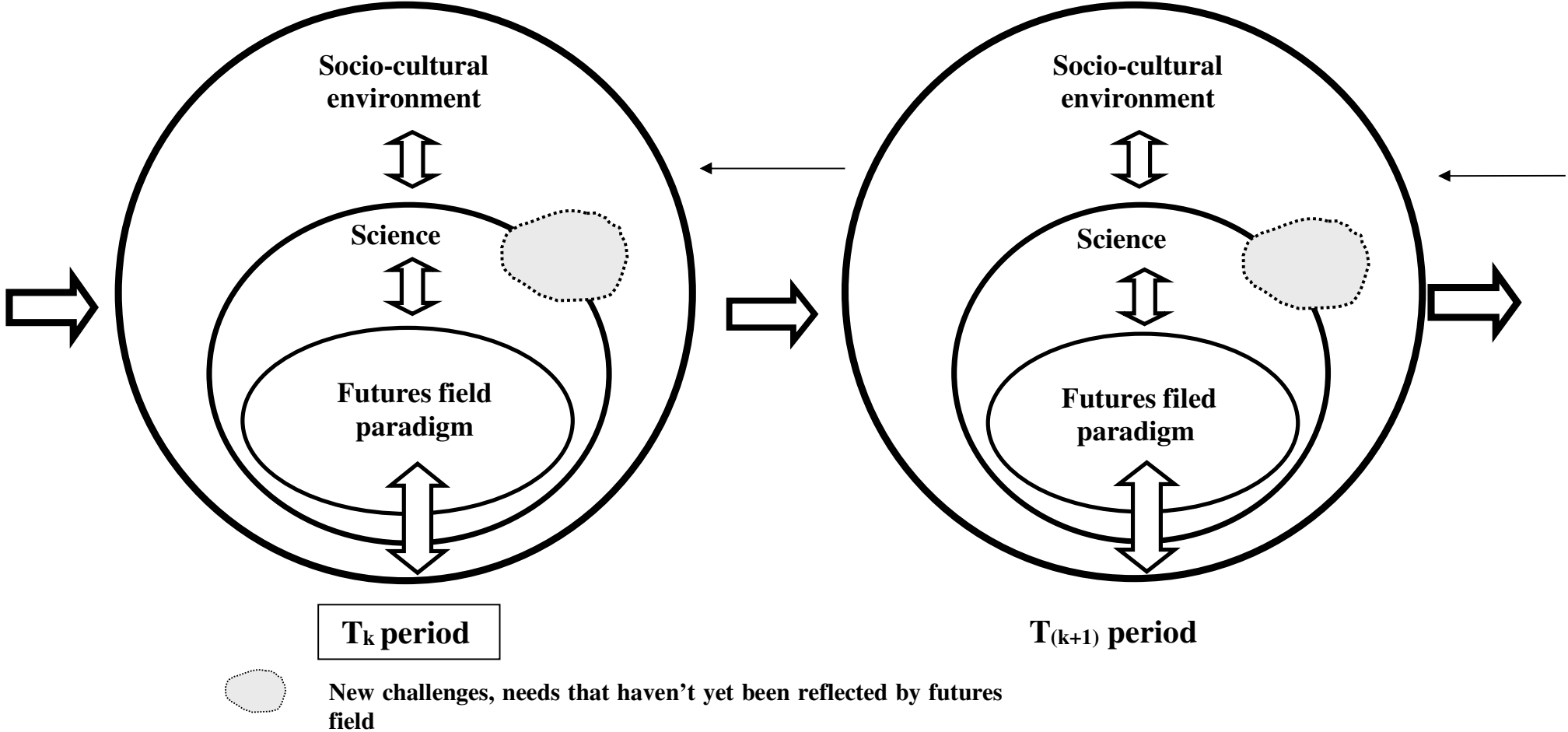
Two schools of meta-theory research of paradigms have been developed. One is *longitudinal analysis* that focuses on paradigm changes and paradigm shifts. Another is *comparative analysis* of competing paradigms that altogether form the paradigm pool. It deals with the development of new paradigm or meta-paradigm by the exploration of commonalties and differences of the components of paradigm pool. *My work designates a third approach*. It aims the reconstruction of the complex dynamics of futures field paradigms on top of the longitudinal presentation of paradigm changes and shifts connecting them to the future possibilities of paradigm changes by using the results of comparative analysis of paradigms.

In order to explore the complex paradigm dynamics internal and external driving forces of paradigm changes in futures field must be evaluated. *My assumption was that futures field paradigms are in interactions with the socio-cultural environment involving the scientific one i.e. mutually influencing each other and those interactions are functions of time*. Figure 2 shows the schematic model of the interaction network of futures field paradigms.

This approach is similar to the traditional dynamic analysis in its longitudinal perspective but differs in paradigm comparison characteristics and uses the assumption that paradigm formation is done under prognosis stress as a built-in feature. Therefore the complex paradigm dynamics must deal not only with past and present processes but with future vector as well, i.e. it must include the pool of options and scenarios formed at a given time about the foreseeable processes. This pool of options can be collected partly from possible scenarios of future paradigm dynamics and partly from new impacts derive from changes in the social-cultural environment. An integrated futures field research formulated in the form of paradigm that discloses and analyses the relation between futures field science and social-cultural impacts means a complex paradigm dynamics. An important limitation of this approach is that the pool of options is restricted to answers given to challenges observed in the present about foreseeable future as summarized in Figure 3.

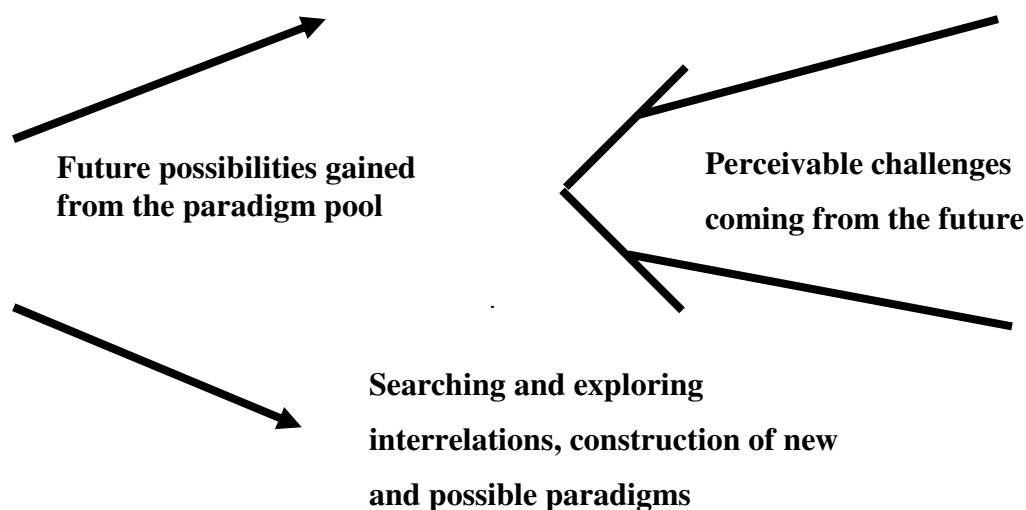
This research task can be accomplished by bottom-to-top analysis, if paradigm is operationalized in a dynamic manner and the variable is expanded to its components as detailed in Section 1.3.2. In order to present a set of futures field paradigms secondary analysis is the choice of method using research data and results of theoretical-methodological discussions. Using a wide range of relevant literature their content is sorted out by paradigm components and their dynamics in time. Kuhn stressed that paradigm must be illustrated by examples thus the analysis includes case studies. Forecast and foresight case studies support understanding of abstract paradigms. *The matrix of possible scenarios is analysed with top-down approach*. The construction of integrated futures field paradigm and its positioning into

Figure 2. Model of dynamic relationships between futures field paradigm and its environment



Source: Self-made

Figure 3. *Complex analysis of possibility space*



Source: Self-made

the complex futures field paradigm dynamics are also performed by top-down analysis.

This meta-theory research yielded the reconstruction futures field paradigms, paradigm crisis and paradigm shift. I performed a dynamic and comparative analysis using reconstructed and systematically characterized paradigms that resulted in features of complex paradigm dynamics, nature of futures field as a discipline and possibilities for further expansion of paradigm dynamics. I used critics and expectations articulated by the social-cultural environment, analyses of paradigm set and blind-spots of paradigms and futures field researchers experiences and reactions for the description of complex dynamical features and the evolution patterns of futures field paradigms. I studied in the framework of complex probability analysis the extent and characteristics of probability domain of paradigm shifts by time and the extent and characteristics of probability domain of future challenges observed in present time. I defined the overlapping section of the above described two probability domains and used to formulate the probable and realizable interpretation of integrated futures field on paradigm level.

However, this meta-theory research of complex paradigm dynamics is not capable to present every probable future scenario since it is performed using available data exist today. *It is limited by our present knowledge, perceived challenges and our capacity reacting to them.* The other limitation resides in the subjectivity of researcher involving both knowledge and affinity to certain problems. This limitation means that paradigm-level future of futures field is open for further adjustment. On the other hand, the probability domain is function of perceived challenges thus the complex paradigm dynamics can be further elaborated. Thus, my meta-theory research is best used as

methodology for further futures field studies and expandable to other disciplines. Disciplinary results related to futures field designate expedient paradigm developments thus feedback futures field theory, methodology and forecast and foresight making.

The complex meta-level analysis of futures field paradigms can be divided into three consecutive steps as shown in Table 1. The first step is reconstruction of chronology and history of futures field paradigms. In this phase analysis and segmentation of paradigm history circumstances and the systematic construction of paradigm matrices take place. The second phase includes dynamic and comparative meta-analysis of existing paradigms and the inquiry of the paradigm set including elimination possibilities of blind spots. The third phase is concerned with probability analysis of paradigm dynamics continuity, presentation of complex paradigm dynamics of futures field and interpretation of the evolutionary aspect of futures field from paradigm point of view. This third phase is based on the synthesis of results of the two preceding steps. This synthesis includes the interpretation of new integrated futures field that capable of reacting to new challenges and describing of its paradigms matched to the complex paradigm dynamics.

Table 1. *Work schedule of complex meta-analysis of futures field paradigms*

<p>Phase 1 Reconstruction of paradigm history and construction of paradigm matrices</p>
<p>Phase 2</p> <ul style="list-style-type: none"> • Dynamic and comparative analysis of paradigm matrices • Analysis of paradigm set and its blind spots
<p>Phase 3 <i>Synthesis</i></p> <ul style="list-style-type: none"> • Complex probability analysis of continuation complex paradigm dynamics • Interpretation of integrated futures field and its paradigms matched to complex paradigm dynamics • Evolution of futures field from paradigm and paradigms shift point of view

Source: Self-made

Chapter 2 and 3 discuss Phase 1, Chapter 4 discusses Phase 2 and Chapter 5 discusses phase 3. Since the central category of complex meta-analysis is futures field paradigm I dynamized and operationalized this concept.

1.3.2 Operationalization and dynamization of futures field paradigm concept

The operationalization and dynamization of futures field paradigms for the requirements of complex meta-analysis must reflect the changing nature of paradigm both in time and space and must include standard constituents. *I used Kuhn's paradigm definition as a starting point for the operationalization of futures field paradigm concept involving those critics and developments that are acceptable from my point of view. The operationalized paradigm is a dynamic research hypothesis that is useable for a complete analysis and capable for summing up the results of synthesis.*

Operationalization of paradigm concept and construction of research hypothesis are essential for the goal of meta-analysis since there is no systematic interpretation of

paradigm exists in spite of long-time debates. In the following chapters I will discuss in details the peculiar situation of futures field research, namely futures field researchers deal with paradigm-related topics but the discussions lack systematic inquiry of futures field paradigms.

Finnish researchers, *Petri Tapio* and *Olli Hietanen* were the first ones that dealt with futures field paradigm typology. They constructed a table where rows contain scientific schools and the columns include the significance of knowledge and values from political point of view (*Tapio & Hietanen, 2002, p. 610*). Petri Tapio and Olli Hietanen use views of scientific schools as synonym of paradigm. They follow this practice deliberately because in their interpretation the aim of futures field is production of ideas for political decision makers⁹. This futures field paradigm typology is not suitable for my purposes however I found it useful for the operationalization of futures field paradigm concept.

I define paradigm as a concept that comprises the view of a given discipline, list of its subject, goals, and tasks including methodology, rules that specify the application of methods and expectations about the reliability and validity of results. *In futures field view*

⁹ *Petri Tapio* and *Olli Hietanen* organized theoretical scientific workshops according to perceived significance of knowledge and values for political decision-makers as postulated by futures field scholars. They arranged schools on a scale which one end-point is the assumption that suggestions for political decision-makers derive from objective knowledge and they are not loaded with value judgments. Another end point is the assumption that future is unpredictable and values are subjective thus there is no place for scholarly study of future yet recommendations can be made on a subjective ground. Their scale is divided to five categories between the two extreme situations depending on the portions of knowledge and value attribution blended. They call one end of the scale Comte-type positivism while the other end is labeled as democratic anarchy. The intermediate transitions are categories of optimist humanism where both knowledge and value are objectively grounded that used in recommendations. According to plural humanism strategy recommendations include objective knowledge and subjective values. Polling democracy postulates that recommendations reflect objective knowledge that partly derives from objective knowledge about subjective values. The authors distinguish two categories of pragmatism. These are critical and relative pragmatism. Critical pragmatism is such approach that may express inter-subjective knowledge and values in recommendations. Relative pragmatism permits subjective knowledge and values in recommendation formulation.

Although the authors' goal differs from the aim of this study it is worth discussing their approach and typology. Although every segment of their list of approaches is used in the practice of forecasting *scientific workshop is not a synonym of paradigm*. Comte-type positivism and optimist humanism may develop along to a single way of thinking and paradigm because knowledge and value are identical in both approaches. Plural humanism may be called a way of thinking but it is not a paradigm since treating knowledge and values as separate entities, grounded idea about future cannot be formed. At best this approach is able to make statements about desired future. Plural humanism is part of positivist humanism since values play role in utilization of knowledge only. Polling democracy also reflects pragmatism in its aspect of choosing values by polling assuming that value choice and knowledge use are democratic in this manner. Critical pragmatism may be paradigm itself since it postulates that knowledge and values are social constructs. They are formed in inter-subjective or social discourses thus create social reality. Relativist pragmatism and democratic anarchy reflect a postmodern everything-is-acceptable view since everybody may word recommendation and suggests what they wish. Since there is no need relying on scientific paradigm for these types of suggestions, use of paradigm in this context is unjustified in my view. In summary, *the above discussed seven approaches or schools may be narrowed to positivist paradigm, constructive paradigm, pragmatism and postmodern, paradigmless way of thinking*.

Concerning paradigms, the *Tapio & Hietanen* typology does not offer elaborated hypothesis even for future-related case studies. It postulates futures field as a skill which only goal is wording recommendations for decision-makers. I included that critic of *Tapio & Hietanen* typology because a historical overview of the variety of future-related studies should strive for completeness in order to understand the influence of those studies on thinking, methodological considerations and impact on future-forming.

means sum of futures field researchers' ideas about future, relation of this conceived future to scientific knowledge accumulated about past and present and social values including ideologies. Obviously, stakeholders of a given discipline view the world and results of other disciplines from their own discipline-determined angle. This identification with the topic is necessary for the organization of views on future to a discipline and for systematic research in this context. Naturally, this positioning involves a specific approach to its subject and determines the relation and engagement to other disciplines and its place in culture and society.

However, positioning does not mean that single future paradigm forms. Since futures field is an interdisciplinary subject, researchers differ in their attachments to other disciplines and they bring their past-time experiences and social-cultural determination to paradigm formation. These differences develop different future concepts at a given time-slice and following generations of future specialists manifest altered future paradigms. Thus content and interpretation of paradigm is in a constant development. External forces, such as actual paradigm shift and paradigm shift of related disciplines also influence paradigm formation. These external forces drive changes of meta-paradigms, paradigms of related disciplines expectation of practice and changes of ideologies. Thus, futures field paradigm is a dynamic category by nature and paradigm shift is a complete renewal of paradigm both in content and interpretation contexts.

In order to rigorously discuss theoretical-methodological aspects of futures field, a paradigm matrix scheme can be assigned that lists constituents of futures field paradigm without exact definition. This matrix scheme is in accordance with the paradigm topology developed by Egon Guba and Yvonna Lincoln (Guba & Lincoln, 1994) that lists researcher's attitude, goals and preferences, ontological, epistemological and methodological considerations. In addition, this matrix includes the axiological aspect – “the worthwhileness” – suggested by John Heron and Peter Reason that states values attributed to the knowledge gained by a certain paradigm (Heron & Reason, 1997).

Thus futures field paradigm matrix has seven constituents arranged in rows instead of six, since the subject of inquiry gets a separate row. (See Table 2) Since subject of futures field inquiry may change by ontological and preferential considerations it belongs to both these components, therefore it is reasonable to treat it with special attention. Order of rows reflects the particular inner logic of futures field research.

Table 2. Scheme of dynamic paradigm matrix of futures field paradigm

Components (c) _t	Paradigm characteristics E _{jt} [(c) _t]
World and futures views	
Researcher/research team's position	
Subject of inquiry in the futures field	
Goal and task of research	
Methodological considerations	
Rules of method application	
“Worthwhileness”, and usefulness of research results	

Source: Self-made

Rows include those paradigm components (c_i) that are essential to each paradigm and they form together a paradigm in this case a futures field paradigm. Index t refers to the timely nature of components. Index i expresses that number of paradigm components may vary by time. The second column includes the paradigm characteristics ($E_{jt}[(c_i)_t]$) by components at t time. If competing paradigms co-exist the content of this column can be more than one at t time that is expressed by index j .

The specific content of paradigm matrix components has two constituents. One is meaning or interpretation that differs in each paradigm. The second one is the specific subject that meaning or interpretation refers to. The range of this specific subject can be same or different by paradigms. Using a mathematical simile each paradigm components has a range of domain and codomain. Separation of these two aspects of content made dynamic and comparative analysis of paradigm components and the disclosure of variation-combination characteristics possible. In this analysis I assumed that number of constituents is constant thus their subject and interpretation may only vary.

I previously mentioned *significance of future and world views or approach to the future and the word*. This aspect is basically positioning and it comprises assumptions about future, its situation in world view including background information and hypothetic expectations. Futures field paradigm is connected most closely through future and world views with other disciplines, scientific interpretation of the world, external cultural values, ideologies, intellectual life and expectations of practice.

Researcher/research team's position is closely attached to future and world view in research. Choice of view-point influences the quality and quantity characteristics of reality segment under study. Researcher's world view and position influences the other components of paradigm as well.

Subject of inquiry includes those aspects of perceived future that are researchable with the methodological toolbox of futures field by scientifically correct, reliable and socially utilizable manners. Subject of inquiry becomes correctly-defined in the context of research goals and tasks.

Goal and task of research include theoretical expectations about the outcome of research, work schedule and criteria about limitations, delimitations and applicability of results. This component of paradigm links paradigm most closely to practice since the aim of research is influenced by expectations arriving from society. This feature of futures field paradigm is highlighted because theoretical and applied research on this field is interconnected and is subject of urging social expectations (Kovács, 1970). At the same time, aim and task of research go through refinement according to the subject of research and researcher's future view.

Methodological considerations include those set of cogitations and perceptions that assure scientifically correct execution of research. The choice of methods reflects future and world views and they influence other components of paradigm matrix.

Rules of method application involve effective use of methods, recognizing their limitations and planned development of methods that are subjects of methodological considerations and functions of other components of paradigm matrix. Rules of futures field paradigm is prominently connected by methodology and method use to other

disciplines and their paradigms. This linking is a precursor of making futures field an established discipline, that still in need of learning from other disciplines. Hopefully, futures field will have the capacity in making contribution to other disciplines.

“Worthwhileness”, or utility and usefulness of research results reflect the validity and reliability of results and give indication about the applicability of results.

I outlined in the previous section the basic necessity of linking paradigm components to a unit-forming entity that mutually define each other. This relations form paradigm only if they generate a consistent system, this system is understandable and accepted by members of futures field scientific community that apply it in their research and results are utilized by social practice.

Paradigm is an open and dynamic category. Index **t** represents this feature in the two-dimensional presentation indicating that both content of rows and columns may change in time. Actual descriptors of paradigm take place in the second column. If every component changes or new row components take position and their relation network changes then the matrix shows sign of paradigm shift. Change of content of certain row components indicates formation of new paradigm school. Therefore this matrix is useable for representation of *complex paradigm dynamics*.

This two-dimensional matrix representation formulation can be treated as a particular, *multi-dimensional time and space continuum frame of human thinking about future*. Using this scheme a number of matrices can be constructed depending on the descriptors in the second column. Matrix variants can be constructed within a single matrix if qualities of certain components change and/or their relations to external factors or to each other transform. In theory, each component can be refined. Almost every research program can be structured using this itinerary.

This futures field paradigm matrix is partly in accordance with paradigm topologies of quoted literature and partly differs from them. *The difference is in the dynamization feature that is the matrix does not require a priori paradigm set-up at the beginning but the matrix gives paradigm as a solution following the research schedule. Obviously, paradigm matrix is hypothetical and conditional only until research does not support it with solutions from reasoning, historical facts, practical forecasts and foresight studies thus inner consistency of paradigm matrix reconstruction, reasons of paradigm shifts, defining circumstances and their consequences do not occur. This dynamic paradigm matrix is also capable of description of paradigm shift and interpretation of hypothesis of new paradigm forming.*

According to the extension of Gödel theorem i.e. incompleteness of theories and Paul Feyerabend’s critic every paradigm has blind spot (Feyerabend, 1970/a). I did not extend paradigm matrix with this component because it rather belongs to the dynamic than inner consistency feature of paradigm. Identification of blind spots supports paradigm refinement thus analysis of blind spots and blind spot elimination take place in the course of meta-analysis. *Dynamic paradigm matrix is used* in this type of analysis.

Meta-theory research and meta-analysis enable research of the following items based on futures field dynamic paradigm matrix:

- Development of consistent content and blind spot of a given futures field paradigm, refinement and upgrading of paradigm,
- Such dynamic features of futures field that match the change of body of knowledge and expectations of practice,
- Reasons, consequences and return of paradigm set of futures field, competition of paradigms and paradigm shift,
- Relations among futures field paradigms that make development and constituting paradigm variants possible,
- Formation of new paradigms and paradigm variants according to developments in the body of knowledge and changing expectations of practice.

This paradigm matrix scheme enables interpretation of characteristics of futures field paradigm shift by dynamization and operationalization of paradigm components and paradigm descriptors to variables. Using this scheme it can be decided whether Kuhn's serial paradigm shift concept or the variation-selection development model assuming continuous and small-scale changes is valid with regards to conditions and connections in futures field scientific practice (Popper, 1972, Kampis, 2000). Use of time dimension as a variable makes the analysis of possible futures of futures field paradigms and construction of integrated futures field paradigm also possible using this paradigm matrix.

2 Evolution of paradigm, crisis of paradigm and search for a way out in futures field

In this chapter I analyse how the futures field became an area of science with its own unique paradigm in the 1970's and 1980's; what causes gave rise to the crisis of this paradigm in the 1990's and in what directions the futures field looked at possibilities for its further development. With regard to the above periods, complex meta-theoretical research focuses (i) on the dynamics of the relations between the futures field and its cultural/social environment, and (ii) on determination of the professional matrix of the positivist paradigm and new research perspectives.

2.1 *Becoming an area of science without an independent paradigm*

The futures field became an independent area of science in the 1970's and 1980's. *Futures field was either placed within modern social sciences or was classified as one of the areas of human sciences, i.e., Humanities.* For example, in Hungary it has been a recognised area of science since 1976 and belongs to the IX Section of Economics and Law of the Hungarian Academy of Sciences (MTA) (Hideg *et al.*, 1992). However, in the European Union it is classified among human sciences, e.g., regarding researches carried out under COST¹⁰.

Rapid development of the futures field began after World War 2. *Ossip Flechtheim* published material discussing the necessity, name and subject of the science of the future as early as the 1940's when the term futures field was coined. He *called the futures field futurology, i.e., science of the future, study of the future, which combines the philosophical criticism and synthesis of the future, the doctrine of prognoses and projections as well as the theory of programming and planning* (Flechtheim, 1966). His definition clearly shows that futurology must have an approach to the future, specific ideas about the future, a methodology and methods for working them out as well as thoughts concerning the use of ideas about the future. Using our present vocabulary, if we want to deal with the future as a science, then its paradigm must be developed as well.

Prognostics played a decisive role in the futures field becoming a science. Prognostics was successfully practised from the 1920's, either in relation to scientific predictions or as part of special sciences. This scientific precedent has become part of the futures field having turned into an independent area of science both in terms of approach and methodology. *From prognostics the futures field carried on with the focus on the future that occurs later on, the emphasis on the genetic relation between the past, the present and the future and its forecast methodology.*¹¹ *Growing of the futures field did not begin with*

¹⁰ A22 theme entitled „Foresight Methodologies – Exploring New Ways to Explore the Future” was researched under the framework of COST (European Coordination in Science and Technology) financed by European Science Foundation between 2004 and 2007.

¹¹ Within the subject area of prognostics, it is by all means necessary to mention a few important authors and their works that have produced their effect until today. For example, *Nikolai Kondratieff's* method worked

working out its independent paradigm but with the development of forecasts and visions of the future where along and simultaneously with solving new tasks they dealt with theoretical and methodological issues as well as adaptation and development of methods. In particular it was forecasting economic and scientific/technological progress that developed rapidly on the basis of the assertion that *anyone who "knows the future" will be able to develop faster*. The importance of the future with regards to development is an organic part of Western culture. However, the competition of the two world regimes living together further increased their significance. They became more and more important not only as cultural values but at the level of daily political, social, economic and social control decisions as well.

From the 1960's the need for dealing with issues concerning the long term future of specific countries, societies and the world appeared in order to provide scientific bases for political and governmental professional policy decisions. Where planning evolved in controlling society – planned economy in socialist countries and democratic planning in Western European countries – dealing with the future was connected with the scientific bases of planning. It was in this period when scientifically based long-term visions of the future were first created based on social/economic objectives. It was in response to these practical needs that the basic works of the futures field of the period were created. The following are considered standard works even today: *The Image of the Future* by *Fred Polak*, *The Year 2000* by *Herman Kahn* and *Anthony Wiener*, *The Limits to Growth* by *Dennis L. and Donella Meadows*, *Jorgen Randers* and *William Behrens*, *Civilisation at the Crossroads* by *Radovan Richta* and his team, *Long-Range Perspectives and Planning (A nagy távlatok és a tervezés)* by *Géza Kovács* (*Polak*, 1961, *Kahn & Wiener*, 1967, *Meadows et al.*, 1972, *Richta*, 1968, *Kovács*, 1970). I have mentioned only a few significant texts in terms of the shaping of the paradigm because this paper does not cover the history of the futures field¹².

This golden age of rapid growth of forecasts was followed not by theory of science and methodological debates but by *ideological disputes and oppositions*. Handling the futures field on the basis of ideology made it difficult for it to become a science in the ideologically divided world both in the East and the West. The futures field was considered in the Western countries either the shaper of the official ideology (for example, the activity of *Herman Kahn* and *Anthony Wiener* and the Hudson Institute) or excessively leftist criticism (for example, response to *The Limits to Growth* by *Dennis Meadows* et al.), while in the socialist countries of the period the futurology branch of the futures field was classified as unnecessary or bourgeois science. Even the at that time most widely known and first Soviet futures researcher, *Igor Bestushev-Lada* wrote about bourgeois futurology, while his book entitled *Okno v budushchee* launched study of the so-called Marxist futurology or social prognostics in the Eastern bloc (*Bestushev-Lada*, 1970). Once détente,

out for analysing macro-statistical data and theory and method of long waves was published in 1925 (*Kondratieff*, 1993). *Oskar Morgenstern* wrote a book in 1928 on making economic forecast (*Morgenstern*, 1928). *Erich Jantsh* published a guidebook in 1967 on the methodology of technological forecast. *Robert Ayres* wrote a book in 1969 on utilising technological forecast in long-term planning (*Jantsh*, 1967, *Ayres*, 1969). *George Box* and *Gwilym Jenkins* published a book in 1970 on utilising statistical time series analysis in forecasting (*Box & Jenkins*, 1970).

¹² The first step in the research of the futures field was taken by *Erzsébet Nováky*, *Viorica Ramba Varga* and *Mária Kalas Kőszeginé* in their book published in 2001, in which they had the history of futures research of former European socialist countries for each country written by authentic authors (*Nováky & Ramba Varga & Kőszegi Kalas*, 2001).

peaceful coexistence and competition of the two world regimes had started, ideological disputes and oppositions decreased as well. The emphasis was placed on solving daily problems and accelerating social/economic progress.

On the other hand, futures practitioners were urged by this refusal *to develop the new area of science without values as much as possible and looking for relations with each other*. This is valid even if the futures field of former socialist countries was shaped to serve socialist planning, while it was carried out within the frameworks of bourgeois democracy and democratic planning in the Western countries. The bases for becoming relatively independent of the social regime were provided by the selected research topics and the tolerance present among researchers of the future. The progress of science and technology, the future economy of each country or forecasting the growth and development potential of the world represented topics of research that were important within any social regime and ideology even in public thinking that placed growth and progress in the centre. The tolerance of futures researchers was based on the fact that science is neutral in terms of values and that knowledge serves progress. If we deal with the future on a scientific basis, then we can eliminate ideological oppositions and disputes from the futures field. The aforesaid changes in the international and local social environment also helped to advance the strengthening of this tolerance.

It is a good example of tolerant building of contacts that futures researchers working in the Eastern bloc (e.g., *József Bognár, Mihály Simai, Igor Bestushev-Lada, Mircea Malitza, Mária Kalas Kőszeginé*) also participated in the Club of Rome or setting up the WFSF in 1972 in a period when scientific relations between the East and West were not widely accepted yet in the area of social sciences. Thereby the futures field could belong to the few areas of social sciences where futures researchers of the former socialist countries started their relevant researches under almost identical initial conditions and many of them have preserved their school creating and paradigm shaping role.

Such school creating and paradigm shaping role was played by *Géza Kovács* in Hungary. The futures research group founded by him has been active ever since at the Corvinus University Budapest and its legal predecessors, and since then has invariably been at the forefront in working towards progress in the futures field. Until the change of regime, serious scientific potential and international recognition was acquired by *Radovan Richta's* research community at the Academy of Sciences of Czechoslovakia, *Igor Bestushev-Lada's* research team within the Institute of Sociology of the Soviet Academy of Sciences, *Jan Sicinsky's* scientific community called Poland in 2000 at the Polish Academy of Sciences.¹³

In the countries of the Western bloc, several long established and currently prospering schools and scientific research groups developed in the 1970's and 1980's. Such as, for example, *Jim Dator's* Research Center for Futures Studies at the University of Hawaii, *Eleonora Masini's* research team at the Gregorian University of Rome, *Sohail Inayatullah* and the Graduate Institute of Futures Studies at Tamkang University, the Futures Research Centre of the University of Turku led by *Pentti Malaska*. *These schools represent not only continuity of the professional matrix in the futures field but – as we shall*

¹³ However, it must be noted that quite paradoxically it was the change of regime that dealt the futures research of the former socialist countries the heaviest blow. Apart from a few research groups, it almost terminated and starts to revive nowadays almost 20 years after the change of regime.

see – also play an important part in the theoretical a methodological renewal of the futures field.

The process of the futures field becoming a science is also indicated by the fact that *they started to teach the futures field at more and more higher education institutions throughout the world.* Although education is characterised by diversity even today (Dator ed., 2002), *textbooks and manuals of the futures field were created relatively early.* Looking back from the present, the most well-known and the most used of them are, for example, Handbook of Futures Research edited by *Jib Fowles*, Looking Foreward – A Guide to Futures Research by *Olaf Helmer*, Technological Planning and Social Futures by *Erich Jantsch*, Futures Research: New Directions by *Harold Linstone* and *Clive Simmonds*, as well as textbooks and manuals for example Practice of Futures Research and Forecasting and Forecasting, Reliability, Reality (Jövőkutatás és előrejelzés a gyakorlatban, and Előrejelzés, megbízhatóság, valóság) by *Lajos Besenyei*, *Erzsébet Gidai*, and *Erzsébet Nováky* in Hungary (Fowles, 1978, Helmer, 1983, Jantsch, 1972, Linstone & Simmonds, 1977, Besenyei & Gidai & Nováky, 1977 and 1982). In terms of paradigm, textbooks and handbooks are significant because they sum up clear theoretical and methodological answers and well working methods as well as rules for applying methods.

The process of the futures field becoming a science is indicated by *the setting up of international scientific organisations, appearance of scientific periodicals of the field and the organisation of regular scientific conferences.* WFS, the World Futures Society was set up in 1966 and it founded its magazine entitled The Futurist in 1967, and then in 1985 it launched a quarterly called Futures Research Quarterly. WFSF, the World Futures Studies Federation was established in 1972 to counterbalance WFS's America-, politics- and business-centeredness. Ever since both world organisations have held world conferences on various futures topics annually or once every 2-3 years. The most renowned international futures periodical Futures was founded in 1969 and the periodical entitled Technological Forecasting and Social Change as early as in 1954. Furthermore, independent periodicals for regularly publishing studies in the futures field were established in numerous countries. E.g., the French Futuribles, the Spanish-Catalan Prospectiva, or the Hungarian Prognosztika between 1972 and 1988.

The historical milestones of the early phase of the futures field imply that it relatively soon became an independent science pursued extensively in a wide range of areas. *In the 1970's and 1980's it was able to satisfy all the requirements that usually characterises a normal science.* It is an important feature in its development that scientists and researchers operating in various countries and various areas of science – mainly in philosophy, sociology, political sciences, economics, natural sciences – felt the need and importance to study the future as an independent discipline almost at the same time. They expressed these thoughts not only in their research work and papers but also through setting up world scientific organisations and periodicals. Perhaps we can say that *the futures field has become a science in the rapid process of local initiatives turning into global efforts. And then the newly appearing international organisations and periodicals and their activity urged efforts to work out the scientific bases of futures systematically.*

The futures field has become an independent area of science under the interactive influence of several processes: it was helped by social practice that turned towards the future through formulating new and peculiar needs as well as by early precedents of studying the future within science outside predictions of special areas of science in

practising prognostics. Making use of the ideological neutrality of science and its approach serving social progress, the futures field soon became an independent area of science. In 1970's and 1980's it became a new and autonomous field of research equipped with scientific research groups, international organisations, academic periodicals, technical books and textbooks. Its study created an inspiring medium for developing its scientific features and paradigm as well. (See Table 3)

Table 3. *Environmental connections of the futures field becoming an independent area of science*

Cultural – social environment	Science	Futures field
The future and progress are fundamental cultural assets in Western culture	Usefulness of science in society is unquestionable: all knowledge is valuable	Prognostics as scientific precedent evolved within positivist science to know the future in advance within special areas of science or as their practice oriented part (successful practising of forecasts covering particular fields)
Coexistence and competition of the two world regimes increase basic values: anyone “who knows the future will develop faster”	Science serves to know reality – positivist approach to science	Extending preliminary knowledge of the future to the future of societies and the world
Need to know the future in advance based on scientific considerations and to use this knowledge in controlling society	Science is to be developed also to serve social progress	<i>The academic study of the future should become an independent area of science</i>

Source: Self-made

2.2 Positivism as a paradigm of futures research

The futures field that became an independent area of science did not think in terms of an independent and peculiar paradigm. In the 1970's its primary task was to show that beside the positivist approach to science it has its own research task, theory and methodology. First of all, it had to give an answer to the question as to why it is necessary to study the future as an independent discipline when the criteria of academic studies of each special area of science are: cognition, explanatory force and capability of prediction. Each discipline makes predictions and their validity confirms reliability of the information acquired by them. These criteria of academic studies did not fundamentally change when *Karl Popper* mitigated demonstrability by falsification. The ability to foresee, induction of the yet unknown or yet not existing facts must characterise all disciplines. The *raison d'être* of the futures field was that even the joint efforts of scientific research and predictions cannot cover the area of reality that is the subject of the futures field. *The futures field addresses issues concerning society and man that arise while reality is taking shape, and no other discipline considers them in the context of their interactions as the subject of their research.* “...geographical prediction remains part of geography, social one still belongs to

sociology scientific and technological predictions are parts of relevant fields of science and technology, but at the same time all of them integrate to an overall social forecast since their laws, methods and manners are common having strong connections with each other like with other parts of their host disciplines. This new complex system, this new branch of science sometimes is called futurology...” (Bestushev-Lada, 1973, p. 47). The quotation taken from Igor Bestushev-Lada still carries uncertainty of terminology – social forecast, futurology – but characterises well the process and context in which the futures field had to define itself.

Definition of the subject of research emphasising deviation from former areas of science implies the multi- or interdisciplinary subject of research of the futures field. This could be carried out occasionally, but it is just the rise in the volume and improvement of the quality of scientific findings that makes it reasonable for man and society to use them expediently in order to shape reality. In terms of our analysis, this is the direct cause of the appearance of the requirement for futures research. However, the bases for satisfying this need were provided by the spectacular results of the development of science by the middle of the 20th century. Thus the appearance of futures field itself is one of the outputs or at least the consequence of progress in science.

For this reason, futures field appearing in the phase of the positivist attitude to and study of science abounding in results, as a matter of fact, defined itself also as a positivist discipline, more specifically as social science. The English term *futures research* exactly expresses this self-definition. The use of ‘futures’, i.e., future in plural, implies that the future is composite, the processes that take shape in the future might be realised in many ways owing to the uncertainty of future time; yet, by our knowledge and scientific methods accumulated so far they can be made the subject of research as well. The phrase ‘research’ refers to that.¹⁴

In spite of that, one might raise the argument against futures research *what kind of science is the one whose subject does not exist yet?* The answer to this question was given by futures research on the basis of the positivist attitude to science. *The past, the present and the future are genetically interrelated.* The arrow of time in human, societal reality is only one-way direction: it leads from the past through the present to the future. So, the future is determined by the objective tendencies in development regarding which we can obtain information on the basis of the past and the present. In this way, the *future*, even if it does not exist directly, *is yet potentially a part of the existing reality.* This future can be known in the present because the laws, the principles and tendencies hidden in the genetic relation of the past, the present and the future can be explored and recognised by employing the methods of science. However, *getting to know the future* in the present can be only preliminary and provisional and *never total.* *Preliminary knowledge obtained of the future is knowledge with dual probability:* on the one hand, its probability is real provided that the future does not exist yet at the time of making the forecast, and, on the other hand, it is subjective because our information cannot be complete even in general and our methods cannot be perfect (Besenyei & Gidai & Nováky, 1977). Nevertheless, even within these

¹⁴ Although there are basically different definitions in the literature with regard to the name of the area of science, I discuss them only with respect to the aspects that concern the level of the paradigm. Here and now I present the definition that expresses the positivist approach to science the most consistently; the other definitions will appear in the discussion of other paradigms and subject areas related to them.

confines it is possible to obtain preliminary knowledge of the future that is reliable because it complies with the current level of development of science. Futures research is an intellectual activity that deals with gaining knowledge of the future in advance by employing scientific tools (Kovács, 1970). As the future is a scene where complex processes are taking shape, futures research can be defined most concisely as *the science of complexity and change* (Amara, 1981).

What follows is presentation of the positivist paradigm of futures research in accordance with the working hypothesis of the paradigm matrix formulated in section 1.3.3, by systematically expounding the features that are typical of this paradigm.

2.2.1 World and future view, subject of inquiry, goal and task

It is easy to reconstruct the world and future view, the subject of inquiry, the aim and the task of research on the positivist paradigm because plenty of literature is available. Lots of forecasts were made in the spirit thereof. It is actually confusion arising from the plenty and selection that causes difficulty. In this regard, it must be noted by all means that *what is going to be discussed here is not the personal approach to the world of specific researchers or research teams but presentation of a kind of scientific, professional attitude, which, as a matter of fact, can be connected much more with certain practitioners of the profession or their work carried out in the relevant period than with others.* Thus neither here, nor later on do I want to classify or qualify the referenced researchers of the future, I only intend to support the fact by quotations from their works that a paradigm does exist in the futures field, in addition to the diversity and changes of individual approaches.

The world and future view of the positivist futures research paradigm is characterised by acceptance of the positivist scientific world view. In terms of scientific analysis, the future does not fall within the realm of mystic teachings or fantasy. The future is a new condition or series of conditions in time realised as the outcome of the past and the present, a part of potentially existing or might be existing reality. *Researchers of the future examine this reality as observers* even if being a member of society they are also taking part in shaping the future. Yet, the level of their investigation is not individual; they *study objective historical processes* instead. This "looking at" approach to the future and the world shows itself most spectacularly in the fact that researchers of the future speak and write about changes of various subject areas and phenomena in time, the laws and development tendencies implied in them or the expected turning points of progress. What they formulate about the future is not their subjective opinion but description of the changes in the things of the world that can be reasonably expected and made probable. That is why almost every paper on forecast of this kind begins with the explanation that the author rules out the possibility of the occurrence of huge natural disasters or irrational futures and sets the aim of presenting so-called surprise-free scenarios, the most probably occurring futures (Kahn & Wiener, 1967). If we can recognise changes in the present, then the future will not take us by surprise, it will be possible to adjust to it, influence and shape it.

This approach to the future and the world was adopted by the researchers of the future in the former socialist countries as well. Although they considered futures research the external range of planning and an activity serving planning, they did not think that the future could be shaped at their discretion by socialist planning. As their *raison d'être* they asserted that it is just the futures research by which more extensive scientific bases can be provided for planning, i.e., planning must be built on objective development tendencies and

laws of changes. “The scope of futures research is always wider than the scope of decisions since the number of connections where changes in the future can be researched is much more than those that can be controlled, regulated by premeditated decisions pointing towards the future. What is more, we must know the future development of definitely more connections to be able to plan the future of fewer connections reliably.” (Kovács, 1979, p 40).

This approach to the future and the world also characterised futures research that made scientific visions of the future. Researchers of the future who worked out visions of said future were thinking also in terms of laws and principles, objectively possible futures, but believed that the future is determined by the present to a lower extent when looking at longer terms in the future. By handling the level of economic progress as a determining factor of social progress and treating social progress as an objective law, visions of the future made on the basis of the positivist paradigm essentially represented an identical approach to the future and the world. This world and future view was the post-industrial society (Bell, 1974). Scientific technical optimism and GDP per capita as indicators of economic progress were determining factors of all forecasts and visions of the future in the period irrespective of whether or not they were made in the countries of the Western or Eastern bloc. The terminology used in the former socialist countries did not always express it directly because they used the phraseology of Marxism/Leninism (see e.g., Kovács, 1970). However, as the most important issue in visions of the future was to forecast catching up with or lagging behind the developed countries, obviously in a professional sense socialist visions of the future also reflected a very similar approach to the future and the world, and the professional approach to the future and the world of those who made them was also very similar.

Furthermore, futures practitioners represented a common standpoint regarding the issue that *in man’s world the future is connected with development and progress.* Development and progress mean not only the process how things and connections become more complex but also satisfaction of new human needs, definitely more in quantity and/or faster changes in time. It is not by accident that the category of *speeding time* became popular and widely accepted in futures research in that period.

It is by all means necessary to touch on the so-called *prospective futures* originating from France and widespread in South European countries because in certain aspects it is different from the paradigm features discussed so far. Although its approach to the future and the world was fundamentally based on the positivist attitude to science, it does not consider the future to be only the domain of extrapolation of development tendencies. By future the prospective futures research also means the time that will come later on, but concerning forecasting of future events *it deems it important to anticipate and select value-conscious futures.* That is what its distinctive feature arises from: *it adopts a critical attitude to both the present and the future.* With regard to democratic planning, it considers extrapolation of desirable future its goal and task (Jouvenel, 1967, Godet, 1993).

I believe that the critical attitude and undertaking the formulation of desirable future had only school shaping significance in the 1970’s in the futures field. In those years these futures schools looked for desirous futures also within the frameworks provided by development tendencies and mostly used the same methods for making forecasts. At that time, undertaking anticipation of desirable futures appeared only as assuming another task in the futures research.

The subject of inquiry of futures field in the positivist paradigm is changes in the objective reality. More specifically, changes in every existing entity that can be connected with social existence. This still too general definition became more particular as futures research was able to determine the objects, phenomena, connections of the objects of the world of nature and society related to social existence and their changes in time as the subject of forecast. This determination of the subject is always characterised by complexity even if it is a seemingly very simple object. For example, the subject of demographic forecast can be merely the changes in the number of the population. However, demographic forecast is not only a simple advance calculation of the expected number of the population but its preliminary estimate while paying regard to a wider and/or narrower scope of the factors that produce impact on its changes. In this manner, however, the real subject of the forecast is a complex system of connections and its dynamics. The formulation of the subject of the forecast itself is a research task of the futures field. It was like that also in those days and this work has been carried out ever since.

As a matter of fact, it was the futures topics which were studied by several disciplines that evolved and were set as standard the soonest. For example, growth of the population is the subject of demography, statistics, sociology or socio-biology. In terms of dynamics and the future, however, it is only forecast of population that synthesises the results of specific areas of science and stabilises growth of the population as a subject of forecast. Furthermore, any forecast that considers processes in the growth of the population part of the subject of their research also redefines growth of the population in their own system of connections.

The development of other subjects of forecast was and is carried out in a similar manner. *It was the subject areas having become important in terms of social practice, paying regard also to the extent they are researched in a discipline, which became the subject of forecast the soonest.* Apart from the growth of the population, it was the development of science and technology, the productivity of the economy and changes in various economic phenomena, production, consumption, business cycles, raw material and energy sources, macro level societal topics, way of life, leisure time, social differences, burden on the environment that became subject of forecast the soonest. Various areas of futures research, special forecasts developed and became independent from them. Furthermore, these subject areas and subject determinations became the building elements of various social visions of the future and world models. Creation of visions of the future and modelling of the world evolved in the development of the positivist futures research paradigm in the 1970's. Making the interconnecting totality of various components the subject of research provided futures research with a character owing to which lots of scientists even today consider only this as the subject of the futures field and its analysis as futures research. In other words, *the subject of the futures field is research of the future of mankind or a larger human community.*

Forecast of various partial issues found their complex subject and the methodology related to it sooner indeed, and so they were translated into practice as applied science within a short time. On the contrary, later development of complex subjects of forecast appearing in the 1970's and 1980's in the world modelling and creating visions of the future was not so fast and successful, and further development of the paradigm and search for new paradigms was carried out in the futures field mainly in relation to them.

Regarding the subject of the futures field, it is by all means necessary to touch on the issue of *space and time*. In the futures field the interpretation of space and time is the most remarkable scope of issues of the subject area. The futures field is a science that studies changes that take place definitely in terms of the time dimension, but cannot disregard that changes happen in space. The futures field is a social science; therefore, it is an area of science that basically studies *social time and space*, but owing to its complex, multi or interdisciplinary nature it takes account of other kind of space and time dimensions, which exist in nature or are used in natural sciences.

As the subject of the futures research is the future that may be realised while moving ahead in time, therefore, *two kinds of approach to space* can be connected with this approach to time. One of the approaches asserts that *space is only a locality, place where social processes take place*. In this case only geographical space should be meant by space and considered important. Practically, this means that our preliminary information regarding the future always apply to some particular place, country, group of countries, or the world, i.e., to places, environment where man, human communities exist. In another interpretation *continuously changing dynamic space taking shape* – single space, separate space, juxtaposition, borders, dimensions, system of connections, narrowing and widening space, etc. – *is now organically connected with time, which is a determining feature of processes and movements in society* (Korompai, 1995). This approach represents intertwining of space-time, which is either separated from particular geographical space and assumes independent social space-time or appears as projected on a particular geographical space (Hideg, 2005/a and b). Preliminary information regarding the future move in clean social space-time when forecasts extrapolate the future of some social phenomenon, process. However, when they interpret the future of different social processes as the process of expansion, then geographical space can appear again, as an environment which is changing, to be changed through social processes or which can constitute restrictions in the future course of social processes.

Nevertheless, space and its dynamics are present in positivist scientific futures research only in a hidden form as a defeated but indispensable companion (Kiss, 2005/b). This is shown, on the one hand, by the name of the area of science – time dimension is more emphasised both in the name and practising of the area of science – and, on the other hand, by the scientific recognition and knowledge that the arrow of time has a prime role in our life in this world. The arrow of time means that space-time is a determining feature of all social processes but *social processes, events are dominated by one-way time*, which passes always from the past through the present to the future. Space is always a necessary condition of social, human existence, but it is time, or to be more precise, *it is the future that shapes social processes, provides them with sense and goal*. One of the reasons for the development of futures research was to express and serve this prime role of time, the arrow of time.

The goal of futures research according to the positivist paradigm is to obtain preliminary information of the formation of the future. The emphasis is on information, i.e., on the fact that we should know of the future that is going to be materialised later on before it is materialised. Mankind has always been keenly interested in knowledge of the future. Futures research tried to address this need by the tools and methods of science. Although in its positivist paradigm futures research considers information regarding the future conditional and provisional knowledge; yet, its goal is to obtain this kind of information. Thereby it emphasised the practice oriented aspect of the futures field since it is not simply

curious about the future but intends to supply decision-makers and society with information about the future. Thus the goal of futures research *is to reduce uncertainty and unexpectedness concerning the future, to explore probable future possibilities of changes and development and provide bases for social decisions.*

For this reason, in harmony with its world and future view, the subject and goal of its research, *the task of the futures research is to forecast the probable future of the relevant subject of forecast, the domain of probabilities of surprise-free futures.* It is for this task that it plans its own work, the process of making forecasts, which evolved also in this period while making forecasts. The process of making forecasts according to this paradigm consists of profound study of the past, obtaining necessary information, exploring the laws of development, determining the so-called development tendencies, extending them to the future and presenting the domain of probabilities of the future in a complex manner (Hideg, 2007/a).

As a matter of fact, each textbook and manual expounds professional information on the subject, goal and task of forecast in much more details. I do not intend to describe them in details. I have touched on the summary of key attributes of these components only owing to the logic of the paradigm.

2.2.2 Methodological considerations and application of methods

The typical futures methodologies and methods that developed in the 1970's and 1980's are also in harmony with the positivist approach to and theory of the future. It is possible to obtain knowledge of the future in advance because it takes shape in the genetic relation of the past and the present, and this relation can be researched by scientific methods. *The determining elements of the positivist futures research methodology* are complex handling of the subject of forecast, use of information of various disciplines, exploring possibilities of development tendencies and quality changes, presenting various futures and their conditions, making futures plausible according to science and risks related to the future probable, combined application of various types of methods, examining verification and reliability of forecasts and making production of forecasts continuous.

Complex handling of problems arises from determination of the subject of forecast. How is it possible to implement this theoretically important presumption methodologically? According to the positivist paradigm: by modelling. The model of the subject of forecast can be created relatively easily even if it is not possible to support all the aspects of the model by calculations or to get to its numerically expressed model or model system. However, it is necessary to create models because, owing to presumption of the complexity of the subject of forecast, it is not possible to borrow it from one of the special areas of science that studies all of its aspects. *Thus the model of the subject of forecasts must be every time created. This model must be dynamic* because the future states of the model are to be explored when making the forecasts (Hideg & Nováky, 1983). That is why the futures research relies on system theory and heuristic in the early phase of its development already (Nováky & Kiss, 1973), and this has contributed to the development of system modelling to a significant extent.

In accordance with the positivist paradigm, future models were characterised by building from subsystems and interpretation and presentation of dynamics which stated that *movement in time is heading for or fluctuating around balance or is cyclical.* This is true

also with regard to system dynamics modelling in spite of it having taken account of positive and negative feedback as well. It was just owing to this attitude that *Dennis Meadows* and his associates arrived at the conclusion that the dynamics of a system with limited resources will finally lead to the collapse of the system (*Meadows et al.*, 1972). Even by logistical attitude based models only the limits of growth, the expected levels of saturation can be forecast.

Attempts were also made at building connected model systems as well, but even with them the course of only one kind of growth track could be forecast safely (*Nováky ed.*, 1991). Whenever forecasters "intervened in" calibrated models, and changed any system of connections on the basis of various logical concepts, presumptions concerning the future, then the dynamics of the model system often "got confused", and did not bring any valuable results. As a matter of fact, this was also due to the insufficiency of the IT capacity of the period.

Model building was solved by futures research already in this period by making both numerical models and *verbal models* or by connecting the two types as closely as possible. Verbal models made it possible to do away with the limits of numerical models and call the attention to the end of changes of the given type. To put it more simply, futures researchers did not extend the explored development tendencies, did not pull the trends on in the total domain of time of the future to be forecast; they inferred logically what new development tendencies can take shape and why they can appear, instead.

In their early phase, making of the subject and model of forecast and adapting and developing various forecast methods relied on information of other areas of science; later on, however, in addition to it, *a knowledge base of the futures research of its own also developed in the form of methodological considerations and methodology*. So, the futures research relied on its scientific results and carried out their further development and translation into practice. This is true even if various subjective methods were present among methods of futures research from the outset. They were subjective to the extent that they aimed at goal-specific collection of the knowledge of experts operating in various fields. However, in the manner of collection and application of the results they made efforts to eliminate subjectivity. For example, it became a key criterion for selecting experts that the expert should have outstanding knowledge and his former expert's activity should be successful. Several phases of procedures for collecting specific expert's opinions were developed with a view to eliminating excessive opinions and making expert's opinions uniform; in other words, in order *to crystallise knowledge free from subjectivity*.

With respect to methods, the futures research drew on sciences, mainly on methodological sciences. The most important sources were various fields of mathematics, statistics and system theory. Furthermore, borrowing and further developing the quantitative and qualitative methods of social sciences, mainly economics, sociology were determining. *Method innovation was an important stage in the development of the futures research because that is what made it an independent science*. Such now generally accepted method innovation was the development of the Delphi, the scenario method, the system dynamics modelling, the interaction method, the target tree and importance tree methods. Method innovations were a new form of appearance of positivist practising of science even if they aimed at collecting and using subjective approaches to reality, as I have referred to it already.

Owing to the determinedness and uncertainty of the future, according to the positivist paradigm forecast is aimed at exploring development tendencies and making their continued existence probable. However, as a result of uncertainty and the complexity of the subject of forecast the future cannot be described in a simple form as an expected value. *The future can be shown only in its versions, variants.* From them one can select the most probable future but it usually occurs only when decision-making or planning required that. So, it is never possible to eliminate probability, *the probable nature of the future* from forecasts.

In addition to the positivist paradigm, the futures research was highly interested in the possibility of research of the formation of a qualitatively entirely different future. However, it was not able to cope with it within the given paradigm in spite of giving a reasonable answer to it acceptable by practice within the paradigm. *It employed indirect methods to explore different quality future, futures.* First, it ranked the possibility of a future different in quality from the present among the issues of long-term future (Kovács, 1970). Secondly, it tried to explore the limits of the continued existence of the development tendencies of the present. This was heavily aided by the appearance of logistical approach, employment of various logistical functions and forecasting information generated in relation to them. It was based on special futures information in order to connect logistical curves with each other one after the other, identify turning points and saturation levels and determine the commencement of a new logistical curve (Kovács, 1975). Thirdly, processes of scenario building and importance tree made it possible to connect precisely produced future related information under different presumptions. From them it is possible to create alternative future development paths and levels. I emphasise that it is an indirect way and that this solution does not really fit in with this approach because in the positivist attitude to science development tendencies can change only accidentally.

Forecasts can be and are to be verified by various methods and combinations of methods. Verification is an analysis to find out whether produced forecast information complies with the requirements of science at the current level of our knowledge, whether future alternatives describe possible and probable futures. Verification is an immanent part of forecasting. *Reliability of forecasts* is assessment of forecasts in terms of practical utilisation, complex valuation of the extent forecasts can provide bases for decisions. *Workability, prediction force of forecasts* is an analysis to find out whether forecasts cover and to what extent cover the domain of possibilities of the future and the realised future (Besenyi & Gidai & Nováky, 1982, Hideg, 1989).

2.2.3 Practical example for the positivist paradigm of futures field

To present the paradigm through an example is a basic idea arising from *Thomas Kuhn*. He considered it expedient because it is easier to understand the paradigm and follow its logic through example. Following *Thomas Kuhn's* approach, I describe one example for each futures paradigm.

To present the positivist paradigm of futures field, i.e. futures research I selected *The Year 2000 project* running in the US between 1965 and 1967 (Kahn & Wiener, 1967). This project is the most known, most referenced and criticised among futurists. This fact implies that the project embodies a kind of definite professional quality and point of reference. The topic, organisation and operation of the project properly express the cultural and social connections of the futures field becoming a science. Furthermore, the project

and the description of its findings contain the explanation of the components and aspects of the paradigm that are no longer set out in later research plans and reports made in the spirit of positivist paradigm because they are widely known presumption. *I present the project in terms of the description of its initial and operating circumstances and the components of futures paradigm matrix.*

The *Hudson Institute* was set up in 1965 with the objective to provide the US Government with state-of-the-art, scientifically based and politics-free information with regard to the possible future of the world. The Institute planned to satisfy this need within the frameworks of regularly performed interdisciplinary research. *These interdisciplinary researches intended to advance the development of the regular form of practising futures research serving social control purposes.* The setting up and planned operation of the Institute indicate the change that took place by the end of the cold war and with the co-existence and competition of the two world regimes in the 1970's. The Institute played an important role in recognising possibilities implied in new circumstances and working out a new future alternative contrary to war.

The first project of the Institute was The Year 2000, which was sponsored by the American Academy of Sciences and Arts and was chaired by sociologist *Daniel Bell*. In the organisation of research work, creating concepts and implementation an outstanding role was played by *Herman Kahn* and *Anthony Wiener*, founding members of the institute. Their names were later on closely associated with the concept, methodology and results of the project. *Herman Kahn* was originally a mathematician and physicist, while *Anthony Wiener* an economist and political scientist. They became known globally as futurists in relation to this project.

The world and future view represented by the project reflect characteristic features of western culture. Western culture highly appreciates knowledge, reasonability and practical utility embodied in the material culture. It considers the future a category of time in which it is possible for these cultural values to increase. The future is the terrain of human and social progress. That is what *Herman Kahn* and *Anthony Wiener* refer to when they define the future as a domain of neither prophecy, nor utopia but of scientifically conceivable and foreseeable surprise-free futures that can be made probable. The future is going to take shape through continuous changes from the past and the present; therefore, we can obtain information of it in the present already. The past-present-future are in causal relation with each other, which we can recognise in the form of trends and development tendencies. The laws and regularities of the flow of history set the limits of social choice. Laws cannot be changed but it is possible to adjust to them, and changes can be slowed down or accelerated. For this reason, the task of science and scientific research of the future is to recognise the laws that shape human future and the domain of probable future.

Futures researchers and their community carry out their researches as observers. Their duty is to explore development tendencies, recognise the logic of changes, and based thereon to make surprise-free futures probable. So futures researchers must rise above their own and political interests and must carry out their research as objectively as practically possible. Similar requirements are formulated towards other experts, researchers who take part in interdisciplinary futures research. To attain collective wisdom and reasonability, the project builds on the work of experts and futures researchers performed in community of researchers and on checking each other's work. Originally it was for these purposes that they further developed the Delphi method in the project, the method of checking concepts

concerning the future through checking expert's opinions. Futures researchers are needed because in the midst of permanent and accelerating changes it is only by their work, continuous research that society can obtain a picture of the future of society and can become able to control the future and influence it in their own interest.

In the project the subject of research was the changes that were probably going to take place throughout the world in the following 33 years up to 2000. They analysed complex processes in the form of various partial areas. They analysed historical trends that can be explored and connected with each other on the basis of the so-called macrohistory, expected new results of science and technology, quantitative historical trends on the basis of various indices of growth of the population and economic activity, the trends of international politics, the possibilities of nuclear war and the reality of fears extending to the beginning of the 21st century – for example, permanent economic stagnation and depression, new pan-European movements, new mass and elite movements – and the possibility of their realisation. The subject areas of the research inquiry logically follow from the world and future view embodied in the project. If there are laws in the course of history, and it is the history of human progress at the same time, then the important fields of progress must be made the subject of analysis. These important fields are culture, knowledge, technology, economy and various other forms of human activity. The project did not build the model of the subject of its research but researched each partial area in connection with each other. To combine various trends and explore connections between them, they worked out the method of scenario building.

The goal of the project was to produce preliminary information and as much and as good information as possible at the level of knowledge of the science of the period on the history of the following 33 years. This information should be rational, should determine the development tendencies that set the limits of possibilities in the future for social control to make decisions, should highlight the points, subject areas that trigger uncertainty of the future. The project contains plenty of calculation works; yet, results of calculations are used only to demonstrate the order of magnitude. Thereby they referred to the uncertainty that arises from different assessment and presumption of changes, rates of growth.

The tasks to be fulfilled and their nature were determined on the basis of the subject and goal of the project. *The main task was to explore various development tendencies and specify possible and probable connections between them.* Exploration of development tendencies was based on studying the past. They started to analyse the historical trends by studying the development of western culture over several centuries traced back to the Middle Ages, and then, on this basis they determined progress breaking through centuries and the forms of its appearance. The analysis of various data, time series was carried out from the 1900's to 1965 with regard to 165 countries of the world one by one and on various groups of countries as well. Time series analyses were performed not only for specific indices but also with respect to projecting the number of population and another indicator on each other. It was an especially notable analysis under the project which analysed changes in the GNP indicator plotted against changes in the number of population and extrapolated changes in the connection until 2000. The results of the examination were considered by the project and later on by other futures researchers as a tendency that is valid with respect to each society and changes in their future.¹⁵

¹⁵ This result of trend analysis found that on the basis of the 1965 data the level of the GNP per capita at the 1965 USD rate of exchange in the world was as follows: countries with 50-200 USD/person are in the pre-industrial phase of development; countries with 200-600 USD/person are in the transitory phase; countries

The results obtained from macrohistory and trend analysis were not simply extrapolated to the future but *scenarios were built in order to explore possible connections of quantitative and qualitative trends*. Scenarios were worked out individually or in team work. When a scenario was built by an individual expert, a team discussed it and decided its use within the project. *The results of scenarios were checked by involvement of experts and the Delphi method*. On the basis of the results of checked scenarios a final report was made, which presented the probable development of the world until 2000, including precedents, presumptions, uncertainties and reasons.

The project worked out and presented methodological principles and rules for applying methods in making forecasts that became widely accepted in the futures research. This was the project that gave the first solution on how it is possible to make the complex problem of the future of man examinable, researchable. Presuming dynamics and progress through continuous changes, it specified the scope of issues of the future to be studied. They are historical trends, development of science and technology, trends of the population and economy, rationalisation of international relations, gradual spreading of development trends throughout the world. The path to recognising development trends and tendencies lead through knowledge and research of the past and the present. The time span of forecast is always definitely shorter than the time span of looking back. The probable connections and combinations of various qualitative and quantitative trends must be explored in order to measure the development tendencies of the future. Both objective and subjective methods must be used and the results must be checked. In addition to extensive knowledge and causal and logical analyses, calculations must be made even if they cannot be regarded as expected values, only as orders of magnitude. A wide scope of objective and authentic experts must be involved in making forecasts. The path to the probable future leads through development of versions.

The Year 2000 project employed the *trend calculation, the Delphi and scenario building methods* connected with each other. The latter two methods have been widely accepted and used ever since in making forecasts, and not only among futures practitioners thinking in terms of the positivist paradigm. The results of the project, as *Herman Kahn* and *Anthony Wiener* believed, do not provide knowledge of the future but provide knowledge of trends. And early knowledge of trends enables us to recognise our own possibilities (*Kahn & Wiener, 1967, p. 409 and 410*). In other words, by using the results of this project politics and the government can recognise their own elbow room and can shape the future. The project provides provisional knowledge about the future but even in possession of this knowledge researchers of the future do not assume the duty and responsibility of policy and the government for the future. As the future is uncertain, its preliminary thematisation is only a framework for further research and debates. The “worthwhileness” and usability of research findings were quite clearly expressed by *Herman Kahn* and *Anthony Wiener* at the end of their book. They write that the man of western culture is the Faustian man who is longing for knowledge but a knowledge that he can use for manipulating nature and instrumentally for attaining his own sensual purposes.

with 600-1500 USD/person are in the phase of industrial society; and countries attaining the level 1500-4000 USD/person are in the phase of consumer society. In the following 33 years, the indicator might grow up to 20000 USD/person, presuming continuous development. The countries that get in the 4000-20000 USD/person band are in the phase of post-industrial development (*Kahn & Wiener, 1967 on the basis of the figure on p 146*).

Therefore the futures research practised in the project is part of the fate of Faustian man (*Kahn & Wiener, 1967, pp. 410-414*).

The Year 2000 project is an example of the existence of the positivist futures research paradigm even if it bears the peculiar features of its period that no longer exist even among futures researchers who work according to the positivist paradigm. One-way extension and continuity of development and progress is no longer presumed by futures practitioners. Instead of trends they study possible changes in the future through dynamic models. They handle objectivity more carefully since futures practitioners and experts are also parts of the world whose future they research. Also, they are aware of the fact that usable results of special areas of science are available in different approaches.

Presentation of the project also clearly shows *what important role determination or determinedness of the world and future view play both in research and the paradigm*. If the futurist makes a decision or follows a pattern on the basis of his studies, experience, etc. in this respect, it will fundamentally influence what answer he develops to the rest of the components of the paradigm during his research. I do not mean to say by this that the researcher of the future cannot learn and cannot revise his approach, only that it is more difficult to change an accepted and successfully applied problem solving form than the use of methods or transformation of the set of methods.

2.2.4 Professional matrix of the positivist futures research paradigm

Until the 1980's the futures field clarified and systematised its theoretical and scientific bases, methodology and set of methods. In a divided world, the futures field made use of the circumstances of détente between the East and the West and adjusting to the mainstream of science *gave a positivist answer to the question how the future should be researched*.

According to the positivist paradigm futures research is a scientific activity because with reproducible, repeatable, identical presumptions and methods identical results can be produced, from different presumptions alternative future information can be generated by identical and/or different methods. The existence of alternatives is necessary because the future is uncertain, the domain of possible futures can be described in the form of alternatives with different probabilities. However, these alternatives are variants to the extent that they present different rate of realisation of a course of development that represents identical cultural and social values.

The relation of forecasts to reality and their demonstration can be interpreted as a multi-step and continuous activity. Forecasts can be verified, their reliability and their ability to provide basis for decision making can be specified and checked within the time span of forecast. In possession of this information forecasts can be modified and further developed. When the future has been realised already, the prediction force of forecasts can be measured.

The product of the futures research is forecast. Forecasts are made up of "if...then..." type statements bearing probability with regard to the future that contain a group of statements, including both quality and quantity connections, focusing on future possibilities, bearing probability under complex space-time conditions. Forecasts estimate and contain not only the probability of the future and probable futures but also uncertainties disregarded and

arising from indetermination owing to the as yet unrealised state as well as risks concerning the future. In other words, *forecasts consist of a body of preliminary information that can be obtained of the future under the circumstances of limited rationality.* (See Table 4)

Table 4. *Matrix of the positivist futures research paradigm*

Components	Paradigm characteristics
World and future views	The future that is going to be realised later on, which is genetically related to the past and the present, the objective world can be known by observation and thinking
Researcher/research team's position	Objective observer
Subject of inquiry in the futures research	Scope of issues concerning the future of society and man within it, complexity and dynamics
Goal and task of the futures research	Obtain preliminary information about the future, forecast the domain of possibility of probable future
Methodological considerations	Complex handling of problems, dynamic modelling
Rules of methods application	Connected use of various processes and – objective and subjective – methods
“Worthwhileness” and the usefulness of futures results	Verification, reliability, workability

Source: Self-made

The approach to the future of futures research based on the positivist paradigm is characterised by placing the future into the future. This is solved as follows:

Past → Present → Making the futures probable in the future

The *blind spot* of the positivist futures research paradigm is *non-recognition of the futures that exist in the present* because it can interpret both the future and information of the future only with respect to the time that is going to come later on. It cannot handle the future shaping activity of man. Actually, it cannot do anything with how human activity can influence the future, whether selection from futures or shaping the future on the basis of the individual's own efforts, or how social values based on different cultures can influence the future and making forecasts has any significance. The positivist paradigm is able to handle only futures that are based on the positivist attitude to science and can be explored by scientific information and procedures. Therefore, it cannot give answers to the questions considered important by the prospective futures since those questions cannot be researched even theoretically within the frameworks of the positivist paradigm. Recognition of the blindness of the paradigm by the prospective futures did not generate any theoretical/methodological disputes within the futures research and did not result in any oppositions either since even the prospective futures was unable to answer the questions raised by it in that period. *What gave rise to examinations and disputes concerning the insufficiency of the paradigm was that one had to face the fact that scientific forecasts more and more frequently did not work.*

2.3 Crisis of paradigm and search for a way out in the 1990's

Until the 1980's *the futures field* clarified and systematised its theoretical and scientific bases, methodology and set of methods. Adjusting to the mainstream of science gave a *positivist answer to the question how the future should be researched*. As a result of that, at various levels of institutes, including national and international organisations, making scientifically based forecasts became a regular activity. In spite of successes, the futures field, exactly the futures research saw years of crisis in the 1990's because most of the forecasts made in the 1970's and 1980's did not work; futures researchers were shaken in their faith of the positivist paradigm of futures research. Having recognised this, futures researchers started self-revision, to look for a way out and outline new research perspectives.

2.3.1 Unworkability of forecasts, dissatisfaction of social practice

In the 1990's forecasts became problematic because instead of the forecast mostly consequence futures and their varieties, unexpected changes, new, unusual phenomena occurred. Without discussing the analysis of the workability and capability for providing bases for decisions of particular forecasts, I mention a few features only. In terms of the issue of paradigm, the emphasis is not placed on details but on the fact that forecasts work to a low extent and practice is dissatisfied with that.

Low rate of workability of forecasts is well shown by the fact that compared to what was forecast the focal points in world economy changed in a different manner, the socialist regime collapsed, the energy crisis created recurrently problematic situations. As new unforecast problems: digital gap, division of society in two, new epidemics, AIDS, forced migration, unexpected local wars, etc. appeared. With the nearing of the year 2000, forecasts were highlighted, as a result of which the world was increasingly facing the fact that forecasts would certainly not work. The myriad of forecasts and visions of the future regarding 2000 did not predict the evolving situation either in terms of their forecast indicators or qualitative expectations (Abonyi, 2000). For example, the vision of the future of Hungary regarding 2000 (Kovács, 1970) predicted economic growth of unbroken and high rate of increase; on the contrary, in the 1980's the course of domestic economic growth was broken already. Futures practitioners were critically affected by the fact that even the forecasts of The Year 2000 project, considered a professionally so significant product, were not fulfilled (Kahn & Wiener, 1967).

In addition to unworkability, it caused a problem that *forecasts often directed the attention of decision-makers towards futures that decision-makers could not consider futures to be followed in the decision-making situations of the period either at international or national level*. Let us think, for example, of the forecast of the Club of Rome that preferred zero growth (Meadows et al., 1972), or the normative vision of the future specified by sustainable development (*Our Common Future*, 1987). It was righteous for decision-makers and users of forecasts to feel that forecasts did not help them in making better decisions. Under such circumstances futures researchers and practitioners had to enter into lengthy and complicated explanations as to what the futures research actually is; what can be expected from forecasts; why forecasts are not fulfilled.

Within Hungary, such questions were raised concerning the change of regime in 1989. And at that time they were formulated highly critically and against futures research. One of the reasons for this was that in connection with the change of regime it was in our region where development was interrupted, development tendencies were broken, the gap-like difference between the present and the future appeared most spectacularly. The question was whether we foresaw the change of regime or whether we were able to see it and this kind of changes, shifts? These questions were raised first at the 1990 conference of the Group of Departments of the History of Philosophy of the Eötvös Loránd University (ELTE) and the Budapesti Könyvszemle (*Budapest Review of Books*) (*Láttuk-e hogy jön? (Whether Did We See It's Coming?)*, 1991). This conference brought almost every type of possible answers to the surface. There were opinions which asserted that the monolithic communist/socialist political regime did not allow this kind of forecast. Others explained the failure to foresee the shift of regime by professional weaknesses, underdeveloped state of national social sciences and forecast. An opinion was formulated at the level of the theory of science stating that only development tendencies can be foreseen, in theory it is not possible to foresee shifts scientifically. The 4th Hungarian Conference of Futures Research in 1993 also reacted to this scope of questions. It formulated the answer that domestic futures research indicated the necessity and direction of changes but, as a matter of fact, did not forecast the date and particular changes. This opinion, however, was not satisfactorily and convincingly supported by analyses and evaluations.

In the years of accelerating changes and increasingly apparent instability, societies responded differently to the predictive and decision supporting ability of forecasts. *Anti-forecast opinions increased, redundancy of forecasts was voiced; yet, there was a strong continued need for forecasts to indicate expected changes in advance, albeit for a short period only. At the same time, new questions were formulated on the side of practice that could not be answered on the basis of the way of thinking of the positivist paradigm, or were answered with arguments that practice could not accept. A few of the questions often raised at that time are as follows: Do we have any possibility to make decisions, to choose at all, or we are only drifting with the events? Can we influence the development of the future at all? Can we know in advance what we are not able to avoid? At what levels can we make decisions about the future, if we can decide it at all? How can we shape the future into an individual future of our own when we think that we are really responsible for our future? Who, what level of social institutes can have a role and what role in shaping the future? Is there still a reason for the existence of a future that is based on a single set of values; is it possible to create a uniform coherent vision of the future; or only thinking in terms of partial futures based on different set of values is possible in a world that becomes increasingly diverse?*

This confrontation revealed the fact *to futures researchers and practitioners* that neither the futures field or futures research, nor the forecasts are well communicated. Both laymen and decision-makers are uninformed, what they expect from the futures research is different from what it is able to provide. At the same time, it became clear that the way of operation of the world had changed as well. Instability, sudden changes disturb the course of life, the course of things. All these factors inspired futurists to carry out self-revision, think it over again what they research and how they analyse the future, what they actually undertake when they make forecasts. I think that *the situation of the futures research and forecasts in the 1990's, the reactions of futures researchers and users of forecasts typically indicate the circumstance when there is a crisis of paradigm and the way out from the crisis leads through changing way of thinking, through paradigm shift.*

2.3.2 Self-revision and search for a way out

In the 1990's practising of futures became increasingly characterised by self-reflection, collection, valuation and further development of theoretical and methodological experience. We can also say that this is a normal task of every scientific activity; there is nothing special about it; that is how science develops. However, from these evaluating and further developing researches it is possible to highlight researchers and works that not only further developed the field but looked for new interpretations, opened new directions in research and drove the practising of the futures field towards a new research perspective, paradigm. Self-revision and self-evaluation were closely connected with a survey of the development and the path taken by the futures field, classification of the approach to the future and forecast processes embodied in forecasts as well as taking account again of the possibilities of using forecasts (Hideg, 1992).

*Hal Linstone divided practising the futures field as a science in terms of its subject, the applied processes and the products into technical/analytical and organisational/social futures fields (Linstone, 1989). He specified the core of technical/analytical futures research stating that it makes forecasts for partial areas by extrapolation and using mainly mathematical/statistical methods. The organisational/social futures field researches changes in subject areas important in terms of social development and sums up their possible changes in scenarios. He asserts that technical/analytical futures research is actually a disciplinary forecast. *The new area of futures field is organisational/social futures research, which has a complex subject.* He emphasised the complexity of the subject of the futures field and development of a comprehensive approach in line with that to enable the futures field to fulfil new challenges. Although he did not categorically state that the futures field as a science cannot be really a positivist science, *Hal Linstone* referred to it by emphasising the interdisciplinary nature of futures research. On the other hand, *he did not confront the positivist approach to science, but proposed development of a multiple approach within it* by further specifying the aspects and procedures of making alternatives, by deeper understanding of uncertainty and making it easier to handle it, as well as by understanding individual and community choice, and by making the value content of futures problems and perspectives explicit. To this end, the futures field should further extend its interdisciplinarity as well.*

*In 1989 Wendel Bell and Jeffrey Olick adopted an epistemological approach to studying the future. It was in their 1989 article that it was stated for the first time that *the future cannot be recognized since it is not exist in the present time. Only reflexive knowledge can be obtained of it by making future ideas and presumptions subject of critique (Bell & Olick, 1989).**

This study is especially significant in terms of the issue of paradigm because it made it clear that the futures field cannot be researched and practised in a positivist manner. It is not possible to obtain preliminary information of the future through prediction, and not only owing to the non-existence of the future but also because the formation of the future is influenced and shaped by the activity, choice and supported values of man. Consequently, the subject of the futures field is similar to the subject of sociology and other social sciences. Pursuit of futures studies can be conceived only within social sciences. By this latter position they actually returned to the standpoint of sociologists/sociology formulated at the world conference of sociology in Varna in 1970, which stated that

research of the futures is a social science that studies the future of society (*Szelényi ed., 1973*). However, they stepped forward regarding the question what the specific attribute of information that can be obtained of the future is. *By emphasising reflectiveness of the information that can be obtained of the future they determined the core of the futures field as continuous criticism of views, concepts, presumptions concerning the future.*

Wendel Bell dedicated his book published in 1997 to the question what discipline the futures field as a social science should become and how it should be practised. In terms of our topic, his important thoughts are as follows:

- In accordance with its nature the future is a formation that belongs to man and society; therefore, it is closest to sociology but each science may be interested in the future. *Scientific study of the future of society requires extension of the rules, paradigm of studying sociology to futures issues as well.*
- The futures field should accept the position taken by sociology that *society is constructed by members of society by their activity and interactions*. So, people living in society and their groups are active, resolute, responsible and creative beings or formations whose future-oriented behaviour carries consequences with regard to their own life, social structures and cultures. Present behaviours are every time determined only partly by social and cultural backgrounds and the present local position of social actors. Another determining group of factors is what vision of the future they have, what, how, when and why they want to do, i.e., *their notions about the future are real forces of shaping society.*
- The work of the researchers of the future should be aimed at extending the domain of possibilities of future alternatives, advancing recognition of the consequences of acts of man, providing help and guidance for people to decide which possible futures they should prefer.
- The futures field as a science should stand on the ground of *critical realism* built on reflection and falsification and should apply its procedures. All of the methods and procedures developed in futures research can be employed in this renewing futures field but it is necessary to be aware of the fact that the futures field produces reflective and not completed, not complete knowledge of the future but partial, refutable and uncertain knowledge that can be falsified and can be made the subject of criticism, of which one can learn and thereby new knowledge, reflection can be obtained.
- *The futures field should undertake to show the values to be preferred in the future and specify the moral standards of the future to help actors of society to find their preferable future (Bell, 1997).*

The above important statements makes it clear that *Wendel Bell proposes critical realism to the futures field providing that the futures field as a science must also undertake normativeness*. He gives the following reasons for the latter: there are quasi universal human values that can be deduced from the survival of society and its efforts to attain physical and mental health. The futures field can explore these values and the futures that are in line with them. *Wendel Bell* refuses the post-modern and along with it cultural and ethical relativism. He does not propose them for the futures field either. He believes that

moving ahead on the path proposed by him the futures field can fulfil its purpose as a science and can become an important and useful source of knowledge for practice as well as a tool helping social learning.

Wendel Bell's comprehensive study has been the most thoroughly elaborated and most detailed theoretical and methodological work of the futures field so far. Although it was not made in order to create a paradigm, it undertook only to lay the new scientific foundations of the futures field; it provides the most complete explanation of a kind of rules of practising the futures field supported by references to literature, criticism and arguments. Perhaps that is why so many authors who share his views refer to him. There are definitely less references that contest these foundations or specific statements of *Wendel Bell*, whereas the futures field has not become uniform in the sense defined by Bell ever since. The reason for that might be that being a sociologist *Wendel Bell* was not able to translate the specified paradigm of sociology into the peculiar language of the futures field, into the formulation of its methodological questions and answers. The other reason might be that following the workshop rules of sociology can mean different ways of thinking since there were and are different paradigms and trends within sociology as well. However, in this respect *Wendel Bell* did not take any position.

Eleonora Masini, the venerable grande dame of the futures field held similar views as *Wendel Bell* to the extent that *she considers the futures field an interdisciplinary social science related to sociology*. She dedicated her book published in 1993 to the question why futures research must be called futures studies (*Masini*, 1993). She argued that futures research makes prognoses only with regard to the future that is probably going to occur. However, the future belongs to man, society and culture; therefore, social/cultural factors, human/community choice, acts, moral and responsibility play a determining role in its formation/shaping. Actually, *futures studies* must deal with these issues to be able to help selection of future by man and their communities and its implementation. She believes that researchers of the future must not only study the relations between futures and culture and society and the individual but must also teach people and their communities to be able to choose their future. *Eleonora Masini relying on the traditions of European hermeneutics, by bringing them forward to the futures field, specified the research perspective of futures studies as further development of prospective futures*. Compared to *Wendel Bell*, *Eleonora Masini* used and developed futures phraseology indeed and formulated her ideas more clearly: *the futures field should develop within the scope of thoughts of cultural and social constructivism*.

Jim Dator, another outstanding representative of the international futures field, founder and head of the school of Manoa shifted from futures research, which forecasts the future, to futures studies. In 1993 he wrote: „Futures studies is the last bastard child of positivism growing up in a postmodern age. It was conceived during the time people believed in a science (predictive and controlling) of the future. We know now that this is not possible (about anything, certainly about the future!) So we are struggling to find out what futures studies is, given the fact that so many people still want to be able to predict and control the future. If futures studies can know nothing about the future, what use is it? ... Similarly, we are interested in using the future as a resource to solve present problems or to enable us to use the resources of the present more effectively and responsibly. ... Finally, instead of predicting the future, futures studies helps people envision and invent the future not as though one were creating an inevitable blueprint, but in order to give a sense of direction and control (not the reality of such) on the assumption that soon after you start

heading towards your preferred future, you will experience new things, develop new ideas, about a new preferred future, and want to discard the old one. ” (Dator, 1993, p. 9) He also believes that *the futures research is the so-called futures studies*, i.e., studying various possible futures, but a cross-disciplinary, cross-cultural research that *studies not the future in general but only new futures taking shape*. For this reason the fundamental methodological question of futures studies focusing on futures taking shape is the so-called *emergent issues analysis* (Dator, 1996). The other task of the futures field is to spread and develop teaching of futures studies.

Jim Dator represented a new approach to the research of the future of the 1990's in two respects. Then and ever since he consistently took and has taken the position that futures studies is not a real interdisciplinary science but an applied and interdisciplinary and intercultural research. Futures studies must study possibilities that might come into being and might take shape. *By focusing on emergent issues he suggested an evolutionary way of thinking without fostering a turn towards the evolutionary paradigm*. He did that because he did not see a suitable perspective for futures studies in futures research becoming an interdisciplinary science. In his view, futures studies cannot produce prescriptive information with normative content as a positivist scientific discipline because it is practice oriented both in its purpose and subject of research. *Its social utility lies in teaching and help*. With respect to disciplinarity, normativeness and values *Jim Dator* did not and does not agree with *Wendel Bell's* approach (Dator, 1998). By emphasising the practice-oriented aspect of futures studies he represents an approach similar to that of *Eleonora Masini*. The research perspective outlined by *Jim Dator* was *the most characteristic appearance of opening towards evolutionary and post-modern thoughts in the futures field in the 1990's*.

Pentti Malaska discovered different kinds of typical way of thinking in practising the futures field. He distinguished utopian, anti-utopian, analogical methodologies as well as methodologies thinking in terms of systems, scenarios and evolution in practising futures research until then on the basis of the subject and applied methodological considerations of studying the future (Malaska, 1995). From among them utopias and anti-utopias are obviously not scientific products and do not represent scientific ways of thinking. However, the rest of them could indeed be observed in scientific futures research. Unfortunately, the typology he arrived at was static, and he discussed it only in a short article as it were as a precedent in thinking to prepare his own evolutionary way of thinking. He did not become immersed in exploring and describing the paradigmatic features of scientific research of the futures either, whereas his later works were characterised by the development and studying of the evolutionary paradigm.

His disciple, *Mika Mannermaa*, however, carried out researches with a paradigm approach to describe practises of futures research followed until then. He asserts that a descriptive, scenario building and evolutionary paradigm could be observed in the research of the future until the 1990's (Mannermaa, 1991). Although he did not make efforts to develop names in line with the paradigms currently used in social sciences and did not carry out comparative analyses either, the paradigms of the period can be nevertheless reconstructed from his way of thinking and description. The descriptive one can be taken as the equivalent of the positivist paradigm because it carries out presentation of the probable future mainly through exploring development tendencies and through deductions from the known to the yet unknown and not existing facts. On the contrary, the scenario paradigm focuses on the possibilities of the future, taking account of which versions of

future are selected, in what manner human/social choice is taken into consideration in shaping the future. In *Mika Mannermaa's* interpretation, the *evolutionary paradigm* can be an as yet unrealised but to be developed way of thinking of futures studies. His central thought is *stressing the openness of the future and evolutionary development, in other words, how the effects produced by the objective and subjective elements of complex social systems on each other generate new system conditions that can be related to future time*. As in that period the evolutionary paradigm was not a real paradigm of practising futures research yet but only a research plan pointing at the future, *Mika Mannermaa* did not expound the evolutionary paradigm in detail.

It is necessary to make special reference to the work carried out by *Ervin Laszlo and the researchers and thinkers forming a group around him, representing several areas of science (Robert Artigiani, Allan Combs, Vilmos Csányi, Pentti Malaska, Ignazio Masulli, Raine Eisler, David Loye, Peter Allen, Francisco Varela etc.) in the late 1980's and early 1990's in addressing and elaborating the evolutionary paradigm and holistic approach*. Their academic achievement is unavoidable in the appearance and application of the evolutionary paradigm in the futures field. Their work was not aimed at showing the evolutionary paradigm actively present in research practice or a part thereof through exploring the practice of futures research; they *carried out conscious paradigm development* instead, turning towards the new phenomena of scientific thinking with regard to outlining the possible futures of mankind and human society (*Laszlo, 1991/a and Laszlo ed., 1991/b*).

In the centre of the work of the research team stood the recognition that both sciences, especially natural sciences and societal practice started to realise that changes are not always continuous and complex phenomena do not develop towards equilibrium. Suddenly occurring changes taking new courses cannot be foreseen on the basis of the laws that grasp continuity because the systems that carry out shifts between courses are non-equilibrium systems. Chaos is the attribute of complex and self-developing systems. Under such circumstances how is it possible to study complex systems, their dynamics and how can we deal with their future? Looking for an answer to this question, they focused their research on *the options to extend the evolutionary principle and the development of the holistic approach in order to study the movement of complex phenomena*. By formulating the general evolutionary theory and by developing chaos and evolutionary models for the purposes of studying complex, non-equilibrium dynamics, they outlined a new attitude, approach to the world and research perspective that brought about the appearance and spreading of the evolutionary paradigm in several areas of science, including the futures field.

In terms of our topic, the significance of the interdisciplinary research team is important in two respects. It is important, on the one hand, because futures researchers also took part in its work. It is important, on the other hand, because of the achievement of the whole team in outlining a new, evolutionary perspective contributed to the appearance and development of a paradigm seed within the futures field that *provided a kind of form of interpretation and handling for the recognised openness of the future*, and exposed the futures field as an area of science that is able to collaborate with natural and social science researches and synthesise their results (*Hideg, 1992*).

Evolutionary ways of thinking emerged in the futures field by considering the impossibility of the predictive nature of the future. It called the attention to openness and

simultaneous determinedness and indeterminateness of the future, urged and outlined methodological renewal under the circumstances of fast changes, chaos and instability (Mannermaa, 1991, and 1995, Laszlo, 1991/a, Malaska, 1998, Hideg & Nováky, 1994, Nováky ed., 1995). It is important to note at this point that the referenced futures researchers *did not abandon the positivist futures research paradigm by totally refusing it but by recognising its restrictedness and inapplicability under changed circumstances*. That is why they set out that reliable forecasts can be made also by the positivist approach and procedures under circumstances of stability but in the period of instability new research approach and procedures must be developed (Hideg & Nováky, 1994).

Richard Slaughter, who appeared on the scene in futures field in the 1980's, *brought a new colour and attitude right from the outset*. He called the futures field addressing acquisition of preliminary knowledge of the future 'futures research', referring to the fact that this form of studying the future can comply with the classical requirements of science, i.e., the positivist approach to science. He distinguished the so-called *futures studies* from it, which addresses the overall description and specific complex questions of the future by adapting procedures used in social sciences, in the form of interdisciplinary researches. He emphasised that *studying the future is a new social science discipline*, whose methodological base is still undefined and needs to be further developed, but already (in 1989) it fulfils the role of scientific communication on the future (Slaughter, 1989). To improve it, he proposed to develop the so-called *critical futures studies*, which would regularly reflect on and critically analyse various thoughts and forecasts concerning the future and would help formation of goals and aspirations regarding the future and their integration into the innovation process of society. He represented the standpoint that the futures field contains values and includes exploration of the values of the future. *However, the future being realised is shaped not only by scientific research. Actually, it will be decided in the process of societal innovation in terms of what values, notions social forces shaping the future will form the future*. The forces that shape the future are diverse, and it is the social futures movements among them that are especially important for the futures field. He believed that critical futures studies should develop close relation, in addition to criticism and education, with various futures movements and should be able to influence the formation of the future.

In their main lines *Richard Slaughter's* thoughts corresponded with the approach of *Wendell Bell, Jeffrey Olick, Eleonora Masini, and Jim Dator*. The difference lies in the fact that as early as that *Richard Slaughter* attributed great significance to the recognition that *the future is shaped by thoughts concerning the future and actors, however, the futures field can study and further develop only thoughts concerning the future and can influence the future shaping thoughts of social actors through them*. This recognition resulted in paradigm forming consequences in the further development of the futures field.

Sohail Inayatullah studied the pursuit of futures research in the 1980's setting out from the philosophical approach to the future and the nature of information that can be obtained of the future. He defined three types of approach to the future and information of the future: predictive/empirical, cultural/interpretative and critical/post-structural. In his view, the predictive/empirical futures research embodies a positivist attitude to science, and the cultural/interpretative embodies a cultural constructivist approach. However, the critical/post-structural approach to the future builds from post-modern thought. In his interpretation, the latter trend in the futures field is the up-to-date form of dealing with the future. *Sohail Inayatullah* set out from the fact that in contemporary societies the future

takes shape in free societal discourse that stands above structures; therefore, science, including the futures field, is only one of the actors of shaping the future. He brings this thought forward not only in the direction of actors as *Richard Slaughter*, but towards forms of knowledge as well. He emphasised that other, non-scientific thoughts play an equal role in the formation of the future, construction of the future. To be a part of constructing the social reality of the future, the futures field must not only criticise futures thoughts but must also make the social present, the form of operation of society the subject of criticism. In the course of that, the futures field must get down to cultural bases, world views, myths and metaphors, deep layers of society through deconstruction and must help to bring up new futures thoughts and futures goals from there. By that *Sohail Inayatullah* also presumed that the deep layer of cultures is able to develop indeed (*Inayatullah, 1990*).

The critical approach of *Sohail Inayatullah* cannot be considered identical with the reflective critical activity formulated by *Wendel Bell* and *Jeffrey Olick* because he emphasised the criticism of not only the futures notions that exist in the present. With respect to criticism he did not agree with *Richard Slaughter* either because in his interpretation the exploration of the total social reality of the present was part of criticism. However, he agreed with *Richard Slaughter* regarding the point that critical futures studies can be only one of the actors of the formation of thoughts concerning the future.

The approach of both *Slaughter* and *Inayatullah* and the specified futures theory and methodological results and research directions complement each other very well. *Richard Slaughter* recognised the future shaping role of various social actors and the critical role of the futures studies that helps and collaborates with actors. And *Sohail Inayatullah* considered that the issues of the future can be addressed at a scientific level by deconstruction of notions concerning the future and deconstruction of the operation of societies connected with each other. Both of them held the view that the future and foresight are entities that belong to the human world, which can be studied, can be made the subject of criticism and can be further developed. Both of them emphasise that the possible futures worked out by the futures field – in spite of being constructions, futures researchers' constructions – can be constructions of reality only by being integrated into the reality constructing process of society, to use the words of *Richard Slaughter* into the transformation cycle of society. Thereby they opened the research perspective for the futures field that *turned the attention of futurists towards connecting notions concerning the future with social practice*.

2.3.3 *New paradigm perspectives in the 1990's*

The typologies that appeared in futures literature in the early 1990's show that *a determining part of the past and the present of that time of the futures field was futures research practised in accordance with the positivist paradigm*. Each quoted futures researcher referred to the positivist futures research, whereas they addressed it by different names. With regard to outlining the directions of updating and further developing futures research, they set out from the insufficiency and tough criticism of futures research carried out with positivist approach. Except for *Hal Linstone*, all futures researchers took the position for superseding positivism.

The efforts to systematise the futures field and the notions determining new approaches, research directions that have been surveyed in this paper point out what

theoretical problems the futures field had to face and in what theoretical/methodological directions it looked for solutions.

The theoretical and methodological researches gaining strength in the 1990's specified the weaknesses of the futures field and the areas of working out better, more effective answers in the following futures problems:

- If futures research does not place the emphasis on exploring the expected and/or the most probable future, then *how big is and what determines the domain of possible futures to be explored or having been explored?* The classical answer to this question is that it is the probability distribution of the domain of the future that must or can be determined. However, practice showed that owing to sudden changes the formation of the new present can be outside this domain.
- *Under the circumstances of instability, interruptedness and shift how is it possible to forecast?* The positivist futures methodology did not give an answer to that. Given that it is a science, the futures field must reply to this that under such circumstances it is not possible to forecast, only to guess shifts and changes. But then the futures field should again waive the status of being a science.
- *What is the role of man, the individual in shaping the future?* The answer of futures research based on the positivist paradigm to the question is that the individual can explore their possible futures (through futures research) and can choose one for the realisation of which he should work. Is this question so easy to answer indeed or one should turn towards giving a more complex answer?
- *What is the role of values in the futures field and in exploring possible futures?* If the futures field is a science, then it must make values explicit, i.e., it must show each possible future together with their value content. With regard to existing values this requirement can be fulfilled; however, in this manner the futures field cannot know and cannot say anything as to what makes values change. Although this can be excluded from the area of futures research but thereby the domain of explorable possible futures is narrowed. Nearing the end of the 20th century, the future-generating role of the change of values assumed great significance. Therefore, the question to be answered can be more explicitly put as follows: *how can the futures field preserve its existence as a science when the subject of its analysis is both values and the future shaping role of the change of values.*
- *What is the role of the possible futures explored by futures research in shaping the future of man and society?* What does the futures field as a science and as one of the entities that shape social practice need to focus on? If the futures field cannot "say", forecast the future that is going to occur, then it must deal with possible futures, notions concerning the future and the attitude of people and their social institutes to the future. But then the futures field will not construct the social/human future directly but only as one of the actors of construction.

In the 1990's the appearance of new approaches and newly laid theoretical foundations showed the development of trends in the futures field (Hideg, 1992). The

futures field responded sensitively to the problems raised by practice, translated them into the language of the theory and methodology of futures research. By self-revision and raising different ideas about how to further develop practising of the futures field it accelerated it, made it more colourful and more widely accepted. In this process of its renewal, the futures field, in addition to using its own experience, turned to the general evolution theory, post-modern ideas and joined the process of shaping their futures theory and drew on new scientific interpretations and procedures of handling instability, chaos, evolution (Hideg, 1998/a).

The futures field of the 1990's responded sensitively to social instability, the increased significance of the human factor and culture in the formation of the future, different needs of various social actors, future shaping forces. For this reason, it became important for it to further extend the education of futures field, develop the future oriented approach of man in the street, to create and build relations with various institutes and movements of society.

A common feature of the new theoretical/methodological research directions outlined by the analysed studies is the effort to *search for and find the directions and forms of reflection and self-reflection that can be practiced in the futures field.* This search appeared also within the found positivist paradigm (in Hal Linstone's standpoint); on the other hand, by emphasising the cultural/social/human aspects of the future (through Wendel Bell, Eleonora Masini) it started to move towards new directions. The new directions, research perspectives conceived the pursuit of futures studies as follows, it will either:

- turn towards studying evolution, emergence, becoming something by concentrating on significant social changes and the possibility of shifts, while directing its attention to complex social phenomena that carry dynamics by or without presuming the evolutionary approach (Jim Dator, Pentti Malaska, Mika Mannermaa, Ervin Laszlo etc.), or
- will turn towards the sight of reality and foresight of social actors – people, social groups and institutes; and by its new information acquired through their critical study (deconstruction) will join the transformation cycle of society, the construction of cultural/social/human reality (Richard Slaughter, Sohail Inayatullah). (See Table 5)

Table 5. *Paradigm shaping research perspectives in the futures field of the 1990's*

Research perspectives	Paradigm shaping role	Paradigm perspective
Multiple approach (<i>Hal Linstone</i>)	Adjustment within the positivist paradigm and further development in the midst of new circumstances	Staying with the positivist paradigm
Turning towards reflection and self-reflection (<i>Wendel Bell and Jeffrey Olick, Eleonora Masini</i>)	Interpretation and re-interpretation of the future in various contexts	Placing the futures field under the paradigms of social science/sociology, opening towards critical realism and social/cultural constructivism

Emergence, evolutionary shifts (<i>Jim Dator, Pentti Malaska, Ervin Laszlo etc.</i>)	Turning towards interpretation of possible futures different from the present and development tendencies	Evolutionary research perspective of the futures field
Future shaping role of social actors (<i>Richard Slaughter, Sohail Inayatullah</i>)	Find the subject of research existing in the present, criticism/deconstruction, participation in constructing the human/social future	The critical/constructivist research perspective of the futures field

Source: Self-made

3 New paradigms in the futures field

In the 1990's and the years following the turn of the Millennium, the futures field became highly active again. Theoretical debates, views expounding different standpoints were somewhat thrust into the background; at the same time, forecast projects elaborating and solving the realisation of specific research perspectives, methodological and method developments came to the front. *New paradigms have developed from those of the above researches that were able to react simultaneously to the shift to the postmodern age and the spreading of the thought of post-normal science.* The shift to the postmodern age¹⁶ has brought strengthening of globalization and at the same time appreciation of locality. Both of them involve growth of the freedom of action of social actors, stakeholders and increase in value of the future in the present (Kiss, 2005/a). Postmodern currents of thought and the concept of post-normal science focused on social utility and practicability of scientific results through revaluating the social role of science in view of the fact that science is a participant in constructing the human/social future (Lyotard, 1993, Funtowicz & Ravetz, 1993 and 1994).

The futures field reacted to the new circumstances and social needs by the recognition that even if it cannot forecast the future, it is able to help the activity of social actors, stakeholders¹⁷ to form independent or group futures thoughts in the event that it calls the attention to possibilities, risks by studying the futures taking shape in the present, and/or contributes by its research findings to the development of futures thought of actors, social groups and realisation of their positive future. The evolutionary and critical futures studies research perspectives managed to find the new scientific methodology and form of

¹⁶ Postmodern thoughts are important in the futures field because they helped to recognise the option to interpret the future in a different manner and to understand the future shaping role of locality and agency related to it (Hideg (ed.), 1998). This positive role of the postmodern is admitted even by its severest critics. E.g. Alan Sokal and Jean Bricmont in their famous book 'Fashionable Nonsense: Postmodern Intellectuals' Abuse of Science' sum up the achievement of the postmodern phenomenon and the possibilities for surpassing it: "It seems to us that postmodernism, whatever usefulness it originally had as a corrective to hardened orthodoxies, has lived this out and is now running its natural course. ... What will come after postmodernism? One possibility is a backlash leading to some form of dogmatism, mysticism (e.g. New Age), or religious fundamentalism. ... A second possibility is that intellectuals will be reluctant (at least for a decade or two) to attempt any thoroughgoing critique of the existing social order, and will either become its servile advocate – as some formerly leftist French intellectuals did after 1968 – or retreat from political engagement entirely. Our hopes, however, go in a different direction: the emergence of an intellectual culture that would be rationalist but not dogmatic, scientifically minded but not scientific, open-minded but not frivolous, and politically progressive but not sectarian. But this, of course, is not a hope, and perhaps only a dream." (Sokal & Bricmont, 1999, pp 210 and 211) One should not be afraid of postmodern thought. The recognitions that help to make progress in scientific research of society must be used. However, postmodern misinterpretations, the logic of expounding thoughts etc. must be made the subject of criticism. Excessive relativism, irrationalism and nihilism must be every time refused both by researches that analyse society and the futures field.

¹⁷ Actors are individuals, communities, institutes acting in society. Stakeholders are actors who take part in the operation of a functional system and think about its future, too.

practising science for the new social task through developing their own paradigm. (See Table 6)

Table 6. *Environmental connections of the new paradigms for future field*

Cultural – social environment	Science	Futures field
Shift to the postmodern age: - permanent instability and new, emergent phenomena becoming frequent - increase in value of globalization and localisation - increase in freedom of action of social actors - increase in value of present time futures, futures concepts	Recognition of post-normal science: - social utility and expedience of scientific results become important - science is participant in constructing the human/social future - problem-orientedness, reflexivity and self-reflexivity - production of new knowledge comes to the front	The futures field becomes futures studies in terms of its two new paradigms: Development of - evolutionary futures studies and - critical futures studies Both of them are aimed at scientific research of present time futures.

Source: Self-made

In this chapter I build and present the professional matrix of evolutionary and critical futures studies paradigms.

3.1 The evolutionary paradigm

The representatives of the scope of thought of evolutionary futures studies assert that practising the positivist futures research is not satisfactory because its subject is simplified and its theory, applied methodology and methods do not enable it to explore changing reality and its future conditions. What does futures field analyse, what future does it have to analyse when far-reaching changes are taking place? The evolutionary futures studies gives the answer to this question that *a future that is open, determined and indetermined at the same time*¹⁸, and allows room for human action. The uncertainty of the future is evolutionary because its risk is survival of human society.

3.1.1 World and future view, subject of inquiry, goal and task

The approach to reality of the evolutionary futures studies is basically determined by the so-called *general evolution theory*, hereinafter referred to as GET. GET is synthesisation of the scientific results of the 20th century that concentrates on change, development and transformation, becoming something. By collecting the relevant

¹⁸ Indeterminedness of the future should be understood in the present, i.e., it is only partially determined in the present yet. By the time it has come, the future will have been determined already. In this respect the evolutionary paradigm of futures studies is in harmony with the up-to-date scientific approach to determinism (See E. Szabó, 2004).

scientific findings *it creates the hypothesis of a scientific world view* that enables us to continue to research our permanently changing world in its context and with its approach (Jantsch, 1980, Prigogine, 1989, Prigogine & Stengers, 1985, Csányi, 1988, 1997 and 1999, Laszlo, 1991/a and 1991/b, Laszlo et al., 1993, Sardar & Ravetz, 1994, Allen & Torrens, 2005/a, Leydesdorff, 2001, Artigiani, 2005).

The core of GET is evolution. The concept of evolution arises from the Latin word *evolvere*. It means to ‘unroll, open, unfold’. However, apart from biology, they did not attribute any significance to this term in natural sciences. Nevertheless, from the second half of the 20th century physics and other sciences also consider it important, although it is regarded by many only as a “rag sack” into which it is possible to sweep changes that are different from those that the positivist science is able to describe. If we want to give a positive, up-to-date and scientifically applicable interpretation of the term, then *evolution* means only a certain type of changes, specifically those that *are statistically irreversible and lead to unfolding and recurrence of time and space in an organised structure*. Evolution is a progressive change moving on and continuous in time but not necessarily continual and linear, which leads from the commencement of the cosmos through present states to the future. *It is a general phenomenon but not universal* because completely accidental changes and changes reversible in time do not belong to its scope.

According to GET, the *Universe consists of systems with levels of various organisations*, in which evolution is quite frequent. The cosmological fact of the visible Universe is *openness and existence far from equilibrium*, in which the existence of a macroscopic world peopled by “observers” is necessary. For this reason observation and cognizance are fundamental forms of manifestation of space and time.

The root of existence far from equilibrium is *chance and irreversibility*. Chance is a real quality of instable systems of which new irreversibility can develop. Irreversibility is not universal but plays a general and important part in time being inscribed in the material in the early phase of the Universe and in other later complex systems.

Our world contains the ability of self-organisation – of creation and self-development of systems of various levels. Evolutionary systems consist of components and interactions between them. A special group of interactions constitute the functions of the system. These interactions are generated between components that influence the probability of the genesis of each other. The network of functions makes the system an organisation. Self-organising/emergent systems arise in a particular space and time and are permanently changing. One type of the movement of the systems is replication, i.e., producing a replica of themselves. This reproduction is controlled by the replicative function of systems carrying replication patterns. The system is in the state of order when its replication is undisturbed. If any disorder arises in it, then the system will start to fluctuate. Disorders can be evoked by new impulses arriving from the environment of the system or by possibilities of replication errors existing in the system. The system is *self-developing if it is able to correct replication errors or change its replication pattern*. The movement of this latter type is accompanied by increasing fluctuation, and after having arrived at the point of branching – bifurcation – the reorganisation of the total system will start. From this reorganisation, a new level of organisation will arise through spreading of the new replication pattern - dissipation. These changes are irreversible. If the complexity, structuredness and richness of functions of the system increases, then the new level of organisation will be more developed than the former was.

The ability the system to develop is the largest when it is in the state of the change of regime between the subcritical and the critical, i.e., antichaos and chaos. *Chaos and antichaos* – efforts of the evolutionary system to attain order, reaching high rate of orderliness – *are two different attributes of the dynamic self-organising system*. Chaos changes the system qualitatively and antichaos ensures survival of orderliness through fluctuations. In the course of chaos structural disorder arises in the system, while during antichaos or order only small, correctible orders occur. The development of chaos is due to positive feedbacks, while antichaos or order is helped by the operation of negative feedbacks¹⁹ (Nováky ed., 1995).

Man is an inherent part of the Universe, *human culture and society have developed by self-development and in the so-called coevolutionary processes*, in the course of which human natural/biological systems were organised into complex social large systems (Csányi, 1997). *In this manner both in its formation and further development human society is an organic part of the general process of evolution. Society is an open system maintaining permanent relation and interaction with its environment*. However, new impulses arriving from the external environment – nature – exert their impact in society, culture through changes in internal interactions, and society responds to environmental impacts with their help, mediation. *Its responses can be adaptive, self-realising and proactive. Self-development of the society is generated also by interactions between its part systems* – between the human system (needs, values, knowledge, ingenuity of man and their communities) and the physical system (technology and economy) (Malaska, 1991).

Society is the output of the joint activity of interactively acting, thinking and communicating people, which reacts to external environmental changes and is able to further develop, transform itself. It attains its self-development and functional diversity – the process of becoming a more complex system – by the fact that each man and their communities can take part as observers and active participants both in forming new changes and their relevant selection. However, human/cultural/social reflectivity and reflective discourse will always remain contingent and refutable; yet, it can be always started again and so it is continuous.

The space-time of open complex and self-organising systems is complex. Space-time is not an inherent trait but an entity that is permanently constructed. The space-time of self-organising social systems preserves its real elements, while the *social information sphere evolved in self-development and for self-development/self-improvement has become the independent mode of existence of the so-called imaginary space-time*. This imaginary space-time is getting more and more graspable through fast spreading and use of new technologies. What are determining in this space-time is not the place and the arrow of time but stream and simultaneity or approximate simultaneity. As a matter of fact, this has always characterised human thoughts but with former technologies they could be connected only occasionally and with significant differences in real time. Now continuity

¹⁹ The chaos of dynamic self-organising systems is not identical with deterministic and mechanical chaos. In studying the stability of societal phenomena and processes, by chaos they mean qualities that imply excessive fluctuations, deviances and discontinuity of society, while by antichaos they mean the stable, normal operation of a kind of social order, truth regime. This chaos and antichaos cannot be calculated, although the chaotic character of certain system indicators or their numerically expressed models can be examined by mathematical apparatus (Fokasz ed., 2003).

and simultaneity start to become reality, what is more, assume global dimensions. This *virtual or cyberspace* (Gibson, 1984) is an information landscape that is not restricted to three-dimensions, violates all principles of real, regular space because it is possible to move freely in it and shape it in all directions of space-time. This space is existing; it becomes visible and perceivable with the help of various information technology projection procedures. The space-time of reversibility, travel in space-time, navigation, getting somewhere, game or accidental roaming existing in ceaseless motion, transformation into each other exists not only in its reality for its own sake but is connected with physical space-time by innumerable threads. On the one hand, it derives its information sources from there and, on the other hand, streams and swirls taking place in the cyberspace also react to and are reconnected with the movement of real systems in regular space-time. *This process of connecting and reconnecting is interactivity, which in terms of its results is evolutionary movement in regular space-time and along the arrow of time* (Hideg, 2005/b).

Living in the imaginary space-time does not leave man and society unchanged. Through interactivity this space-time shapes the individual, human community and the entire society (Haraway, 1991). It enables individuals and their communities to become independent of the real situation of existence, regular space-time and shape a new individual and communities in the imaginary space-time as well as multiply their presence there. Thereby local community levels and levels over them, what is more the global level start to exist and take shape in permanent movement and mutual interaction. That is why communication and its new instruments become important because they make the existence of this imaginary space-time possible. On the other hand, everyday activity will be permanently conditional upon interpretation, reflection and valuation and deliberating over the question: through what actions, activities specific possibilities of the imaginary space-time can be and should be transferred to regular space-time, or in what form and with what consequences they permeate into that area. *This is a feature of great significance of complex space-time also in terms of evolutionary futures studies because it can make the activities concerning the future and formation of the future carried out by man and social communities continuous, permanent and present indeed. Therefore, the futures field as a special activity must study the future in a manner where it regards man and human momentums as one of the determining components in its formation and shaping from the first.*

This dynamics of complex space-time, as a matter of fact, contains, on the one hand, continuous existence of various possibilities and futures, and, on the other hand, their arrangement in evolutionary patterns along the arrow of time. The regular and the imaginary space-time can live an independent life, can exist independently, but their independence can be only relative because they could not exist without being flown into each other. Actually, it is the most specific feature of the movement of social complexities that their modes of existence in regular and imaginary space-time flow into each other. The particular space and time is always a kind of implementation of the complex space-time, although it is not all the same in what form this particular realisation takes place. Its organising principle is also evolution, which is a plausible, permanently moving order, pattern, causal chain as well.

Thus, evolutionary futures studies holds the view that the fundamental questions of the future can be solved, explained within the interpretation of the generally interpreted concept of evolution and its changing pattern. By the general and extended interpretation

of evolution, it points out that the arrow of time exists, but it is shaped by the variability of local space-times through certain elements of the imaginary space-time being integrated into the arrow of time as well. The arrow of time indicates that man with his ties to the physical, natural world is able to perceive time only in this manner. The imaginary space-time is the terrain of futures thoughts taking shape. On the one hand, futures thoughts embrace the real and possible connections of the past-present-future in the given present, and, on the other hand, are open to the future because they contain several kinds of possibilities of the future.

GET is not Social Darwinism, which projects peculiar features of biological evolution on social/cultural systems, but demonstration of the circumstance that man is an observer and acting participant in the world and the consequences that this position of man might involve. The evolutionary concept of GET is a concept having a theoretical status because it focuses observation, systematises observation of phenomena, their interpretation and expansion by thinking from a certain point of view. GET is not cosmology but heuristic for developing new research questions. (*Leydesdorff, 2001 and 2000*).

As a result of its heuristic nature, it is a theory that constitutes the subject of social discourse even today, which is also developing, changing (*Poli, 2009*), has innumerable unsolved problems, and different answers are formed regarding its interpretation. However, they are not discussed in this paper because the only aspect of GET that is important for us here and now is that *it provides an approach to the world or a world view on the basis of which new research questions can be formulated in futures studies*. GET is suitable for that because *the category of evolution is aimed at the future from the start, and at a future in the formation of which the observer and actively participating man has a determining role*.

In this world view the subject of inquiry in futures field is the evolution of so-called emergent complexities, i.e., various complexities that contain the individual, man (*Mannermaa, 1991*). Consequently, it is complexities of which man and society are organic parts that are important to the futures field as social science. Man takes part in complexities not only as a biological but also as psycho-social being. Evolution of the active, sensing, thinking human quality creating/constituting various social organisations and culture is the real subject of evolutionary futures studies.

The task of evolutionary futures studies is to explore and interpret evolutionary changes and their pattern and to consider the human futures and roles that are possible in it. *Evolutionary patterns and possible futures can be no longer forecast in the traditional sense* because they are fundamentally influenced by chance, human/cultural values, attitudes and knowledge and their changes. *However, the subject area can be addressed on the basis of the evolutionary approach within the frameworks of evolutionary futures studies*. In this case we present *evolutionary patterns and possibilities* rather than forecast in the classical sense (*Hideg, 1998/a*).

The behaviour of open, self-organising systems cannot be forecast also because their changes take shape in the interaction of partial systems. As evolutionary futures studies covers systems that always contain the observing and actively participating man, therefore, human observation and reflection, change of shape coming into being in individual perception might contribute to the construction of another level of the system

in the complex network in the event that this reflective level is communicated again or is tried in practice that shapes reality. (Allen & Torrens, 2005/b). *For this reason, the task of evolutionary futures studies is to produce futures that can be communicated and are evolutionarily possible.*

3.1.2 Methodological principles and application of methods

For the purposes of its new approach and solution of its tasks, the evolutionary futures studies has developed its methodology. In the course of that it drew on GET, social researches, renewed old futures research procedures and developed new ones. The development of its methods is still in progress.

By focusing on the interpretation of evolution, *it considers multiple analysis of the evolutionary pattern of the past, the present and the future its major task.* For the future imagined in the present can bring about not only the continuation of development tendencies but also decline and quantitatively new directions of development, paths of evolution. The evolutionary approach can be illustrated in outline by Figure 4.

The possibility of quantitatively different futures opens in society in the period of instability. At that time the development of bifurcation²⁰ mechanisms also become possible; their types are as follows:

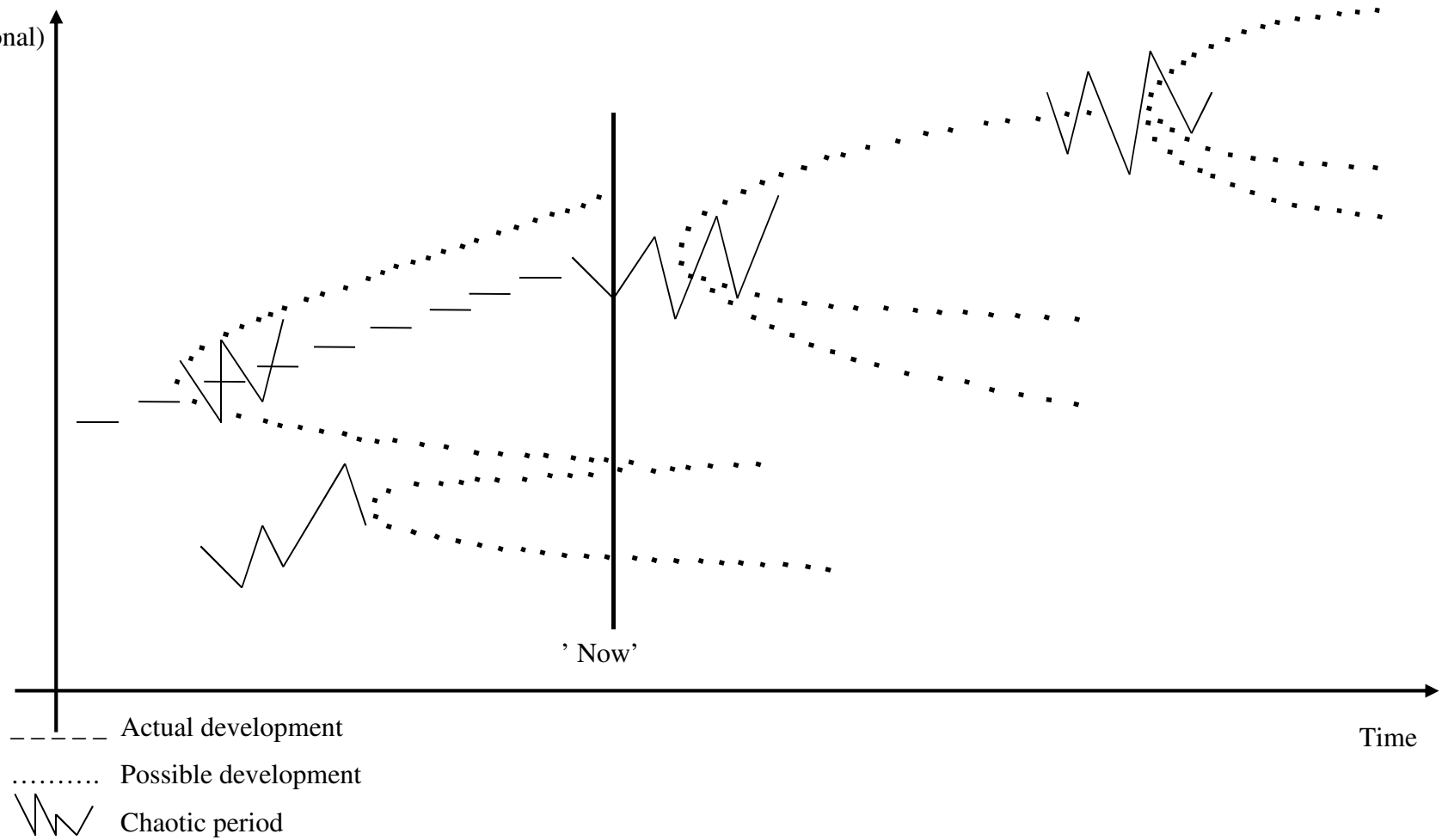
- T bifurcation (launched by technological development),
- C bifurcation (launched by internal or external political conflicts),
- E bifurcation (generated by social/economic crises) (Laszlo, 1991/b).

In evolutionary futures studies, mapping the *alternative futures possibilities triggered by T bifurcation* is the most elaborated also methodologically because exploration of societal futures alternatives offered by science and technological progress, information society, interactive society, knowledge-based society has a long past; new principles and directions of science and technology take shape by predetermined intentions and goals. Furthermore, the futures field embedded in Western civilisation reflects to changes in technical knowledge quite sensitively. Evolutionary futures studies continues this direction of research. Its methodological innovation can be identified in the fact that maps not only the possible social consequences of the selected new scientific and technological progress but *also studies how the new knowledge and technology can affect man and his cultural/social values. It looks for the answer to the question whether new technical/technological knowledge can be acceptable, applicable if it violates or changes our picture created of human nature and how the new knowledge can produce its effect on the relation between society and nature.* The point of the scenarios worked out in this manner is under what social control and developed rules it is possible to use the new techniques and technologies in a way that is worthy of man and spares natural

²⁰ The evolutionary paradigm uses bifurcation in the sense of *branching* and not in the sense of appearance of two possibilities. Its use of the terminology is in harmony with the mathematical and economics analysis interpretation which states that "...broadly speaking the term bifurcation describes a qualitative change in the orbit structure of a dynamical system (a flow or map), as one or more of parameters on which it depends is changed slightly. For example, we have a bifurcation when, owing to a variation in those parameters, the number or the stability properties of fixed points (or limit cycles) of the system change." (Medio, 1992. p 60)

Figure 4. Evolutionary development

'Level of development'
(multi-dimensional)



--- Actual development

..... Possible development

∩∩∩ Chaotic period

Source: *Mannermaa*, 1991, p.365

environment. Scenarios are made primarily in terms of the expected development of artificial intelligence, nanotechnology and biotechnology, and focus on the dynamics of mutual connections of new scientific/technological possibilities and human nature. These scenarios are evolutionary scenarios because *they deliberate over changes occurring in the biological and cultural evolution of man, and also because they show that man living today in social evolution (not only researchers and developers) does have an option and moral responsibility for the future* (Kurzweil, 1999 and 2006, Leslie, 1996, Fukuyama, 2003).

A good example for the evolutionary approach forecasting of *C bifurcation* (transformations launched by internal or external political conflicts) is the procedure worked out by *Homer-Dixon* and his team for making "rough" scenarios (*Homer-Dixon*, 1999). The team analysed if environmental stress can be the essential cause of violent conflicts. For the purposes of the research *they constructed verbal/logical complex dynamic system diagrams that detail possible strong and weak as well as direct and indirect interactions between environmental stress and its social consequences. They support specific possible interaction groups by case studies.* They highlight the role and long term impacts of human/social intervention – adaptation and ingenuity – in the development of both environmental stress and social conflicts. *The evolutionary patterns of the development of conflicts explored in the research – so-called "rough scenarios" – do not forecast the development of conflicts and do not provide any formula for avoiding conflicts in the future; yet, follow-up of the processes of evolution having arisen up to now from new aspects might provide the basis for pursuing further and more in-depth local researches, which now allow planning of the targeted community level adaptive or proactive decisions as well.* As the new context of research is follow-up of the development of complex conflict processes, the elaborated procedure together with the hypothesis of its possible further development enriches the methodology of evolutionary futures studies.

In handling *E bifurcation* (shifts generated by social/economic crises), the emergent issues analysis is a central question. It can be aimed at *exploring the seeds of changes or receiving and interpreting weak signals and constructing possible futures that can be developed from them.*

Research of seeds of changes and weak signals in evolutionary futures studies clearly indicate the turn that has taken place in judging the role of trends. Evolutionary futures studies does not regard trends as a factor that determines the direction and course of changes with respect to the future²². Trends are broken, new trends develop, but at the time of

²² This standpoint of evolutionary futures studies researchers that places the present in the course of history corresponds with the approach adopted also by historians and researchers of the economy. For example, *Immanuel Wallerstein* asserts that since 1989 the world system has changed its activity so it may have been arrived in the era of uncertainty. Exploration of trends and cycles and summarising of them could be impossible or those may also be meaningless methodologically. (*Wallerstein*, 2000) *Tamás Szentes* states the following: "Although quite obviously a new period has started in world economy since the 1990's, its characteristic features or prospective outcome can be hardly outlined or even presumed yet, especially in view of the so far extremely contradictory tendencies, what is more, in many respects chaotic conditions." (*Szentes*, 1992, p 13) With regard to the evolution of the complex world system *Vilmos Csányi* argues in favour of the following: "The present state of cultural evolution is characterised by a peculiar transition. ... It is typical of component systems in a stable state that they maintain their continuous existence by replication of the components, and replication processes are under strict harmonisation. This cannot be stated at all yet about the States that live on the Earth. In the exponential growth of the population, unregulated production of new and increasingly efficient ideas, objects, rapid destruction of the live environment and emergence of deep social and political crises, the definite signs of instability can be recognised. ... It is certain that recognition of global problems and efforts taken to solve them will increase in the future. These new problems cannot be

foresight they cannot be recognised yet. However, the seeds and signs of change can be recognised, and possible futures can be produced by building on them. Methodological procedures are still highly undefined and are under development; therefore, I shall show the methodology being shaped through examples.

In a research *Éva Hideg, Erzsébet Nováky and András Vág* undertook to show how it is possible to explore complex, evolutionary alternatives of social development after the change of regime and under instable and environmental and internal conditions. Hungary offers an excellent terrain for such an analysis and enables us to present our new methodological deliberations and applicable methods through a case study (*Hideg & Nováky & Vág, 2007*). We set out from the need to work out a bilateral approach and its connected application because under the given conditions neither an approach relying on objective, statistical data and fact finding analyses, nor subjective, individual or social groups' or a futures research team's futures concepts would lead to any result. The reason for that is that, albeit, *we have the opportunity to shape the future, our opportunities are not unlimited.*

We wanted to find out whether in the process of continuous transformations starting with the change of regime it is possible to see any points, phenomena that might as seeds of change bring the home society to a new course of development. To this end, first, *we analysed the time series of social index numbers to find out if they are stable or instable.* After that, *we gathered the expectations of the opinion leader groups of the home society regarding the future by questionnaire interviews.* We carried out processing by focusing both on equal and similar and different opinions. Then, on the basis of the two kinds of information source, within *workshops* consisting of expert futures practitioners we examined in what areas what changes can be identified, and how various potentially possible changes can be connected. *From the map of possible changes formulated as expectations we interpreted two possible futures alternatives. We considered both alternatives equally possible because the circumstances were instable and it was not possible to make the futures of the seeds of changes probable at the time of the examination but it was possible to interpret them.* The worked out procedure for making development alternative can be both repeated and reflected upon.

In the research of weak signals the emphasis is placed on how it is possible to perceive, interpret signals arriving from the external and internal environment and how complex system responses can be developed by reacting to them. To this end, they use the findings of research of so-called complex adaptive systems and perception and interpretation of weak signals in the foresight²³ process. Research of weak signals is based

comprehended or solved within the frameworks of old societal paradigms. There is a need to focus on up-to-date system approach, which has been worked out in its bases already and to build the new type of learning mechanisms that are indispensable for the rapid transformation of the systems of ideas of today's society ...") (Csányi, 1988, pp 214, 215 and 217.) The 2007 empirical analysis of *Dániel Kehl and Béla Sipos* also supports the fact that long-term cycles (regularities) cannot be demonstrated everywhere either. E.g., they cannot be discovered in the economic time series of China (*Kehl & Sipos, 2007*). The situation of the change of age and the necessity to develop new roads for solving societal problems provide sufficient grounds for enabling the futures field to handle the breaking of trends as a fundamental quality of our age, to search for the causes of breaking and the factors of renewal by following paradigmatically new paths of futures field.

²³ Originally, foresight – human foresight – is not a category of evolutionary futures studies, but now it is also used by evolutionary futures studies for the subjective construction of futures thoughts or for expressing the fact that development of futures thoughts is carried out by integrating knowledge, values and expectations

on the presumption that peculiarities of signals, indications arriving from the environment that seem to be accidental might be the signals of new futures. These signals should be not only observed – environmental screening – but attempts should be also made to assign a meaning to them. If this interpretation is successful, then it will be possible to construct new, possibly evolving future possibilities from these meanings in the form of workshops that make use of individual knowledge, experience and ingenuity. The methodology of research of weak signals is underdeveloped yet, but it is a good thing that having appeared in the practices of corporate management it implies spreading of the evolutionary approach (Ilmola & Kuusi, 2006, Hiltunen, 2006 and 2008, Marc, 2007). Another sign of the operation and spreading of the evolutionary futures studies paradigm is the thought of the so-called responsive foresight in organisational futures studies, which aims at organisation level evolution of the mechanism of reacting to environmental and social challenges (Mendoca et al., 2004).

The afore-mentioned research projects have brought new results in the methodology of constructing alternatives – evolutionary patterns – that *can exist* in some way in *our present knowledge, innovations, world view* and at the same time can be plausible in the future. The new procedures for working out alternatives are aimed not at exploring the development tendencies of the future that is going to be realised and making them probable as in the positivist futures research but at *showing the openness of the future that is presumed to be open also theoretically in terms of the role of both chance and the human factor*. As they are about futures that can exist in the present, *we can call them foresight, to be more precise, evolutionary foresights as well* (Hideg, 2004).

The evolutionary futures studies continues to apply methods that have become generally accepted in the futures field so far but uses them within its new contexts. In line with its holistic approach it subordinates them to the exploration of the dynamic pattern of evolution (Nováky, 2005). The evolutionary futures studies renewed primarily the method of scenario building. Evolutionary scenarios contain the network of plausible strong and weak interactions. They are made in order to *present possible patterns that can be found in the systems of interactions in evolution* rather than to explore the probable outcomes of possible events as in the positivist paradigm.

The evolutionary futures studies *has made the application of evolutionary models extensive* while being subordinated to scenario building. The social science evolutionary models related to the sphere of thought of GET *constitute a peculiar family of models that describe dynamics and emergence*. Their common attributes are the following:

- Evolutionary changes do not take place in social/economic phenomena but are created by the activity of actors of social/economic phenomena.
- The actors of social/economic phenomena are entities that are in various situations, have various courses of life, foresight and strategy.
- These entities/actors carry out activity in a changing environment. Their activity is environmental screening, foresight, strategy development and decision, on the one hand, and specific activity (production, exchange, etc.), on the other.
- Actors carry out activity under uncertainty. Their activity is rational, provided that they strive for survival and/or improvement of their situation.

into a system. Regarding the competition between the evolutionary and the critical paradigm, I shall return to this peculiar use of the term in section 4.2.1.

- They are not entirely rational because they should know the future in advance. As they cannot know the future in advance, they can have only presumptions, expectations regarding it. Owing to that, they cannot make optimising decisions and cannot strive for optimisation either. Their activity can be controlled by routine, forward looking thinking, creation of new things as well as renewal.
- Their concepts and activities are evaluated, ranked and awarded on the market and in public on various forums. In this process of being evaluated and measured by society and the economy, certain actions, forms of behaviour gain advantage and can spread at group level.
- Time dimension is a constituting element of models. Succession, passing of time generates iterative steps; yet, in a given iteration the events and possibilities of the preceding and forthcoming time (the past and the future) determine the features of the current time (the present) jointly.
- By models it is possible to simulate the events of the past, the processes that have already run their course. On the basis of the theoretical backgrounds, by models one can simulate possibilities that have not taken place yet through changing environmental features, rules of behaviour of social entities, etc.
- As evolutionary modelling is also simulation modelling, formalised models are required to contain quantities that can be observed, measured and checked in reality. Thereby the trap of abstract formalism having an end in itself can be avoided.
- There is always a verbal model or system of concepts behind formalised evolutionary models which explains, interprets the construction, operation and expected results of the model. Theory and formalisation usually appear together and help each other. The reason for that is that the evolutionary modelling is not a generally accepted modelling procedure yet but a series of experiments for better understanding reality.
- Evolutionary algorithms and multi-agent models represent a peculiar group of evolutionary models because they are built of social genes and agents that change and act in interaction with each other and their changes are described by algorithms – exactly specified presumptions. Simulations realise evolutionary changes – mutation, selection, adaptation, survival, dying out. The process of simulation shows the patterns that can develop from the joint behaviour of social genes or agents. They are suitable for helping to understand the behaviour of complex systems. As specific simulations demonstrate changes in time, they can be used for studying specific aspects of the formation of the future as well (*Hideg ed.*, 2001/a and b, *Vág*, 2005 and 2007).

Furthermore, evolutionary futures studies has started to apply and develop special target futures workshops and adapt other methods used in social research – making surveys, using a wide range of mathematical/statistical procedures for data analysis, making special case studies, controlled comparison of cases, follow-up of processes, observation of participants, etc. *However, it uses these methods as tools linked to evolutionary models.*

3.1.3 Practical example for the evolutionary futures paradigm

As a practical example, I have chosen the research made public in the book entitled *Collapse by Jared Diamond (Diamond, 2005)*. I have chosen this research because it clearly demonstrates the huge changes that the evolutionary futures studies has accomplished in the futures field. *Jared Diamond* was one of the excellent researchers of GET, who

authentically represents both GET and its appearance in the futures field. The subject of his research – the dynamics of the relations between environmental deterioration and the collapse and successful survival of civilisations – is one of the today’s popular research topics.

The world and future view of the research is determined by the presumption that there is a great evolutionary uncertainty in the history of mankind. In every age, society must fight for survival. The course of history does not have general laws, development tendencies but the evolutionary patterns of changes and problem solving can be recognised. Regarding collapses *Jared Diamond* writes: “Those past collapses tended to follow somewhat similar courses constituting variations on a theme.” (*Diamond*, 2005, p 6) This *dynamic pattern can be always explored again and again* depending on for what problem and goal we interrogate history. *History is the storehouse of lessons learned* because one can retrieve thoughts and points of reference for man and decision-makers of the current present that help to increase their chances for survival, to form their future more consciously based on information. *Concepts concerning the future must be developed every time by currently existing societies, people.*

The dynamic patterns of history are constituted by various factors – conditions of natural environment, vulnerability of the environment, neighbourhood relations, growth of the population, cultural values, social establishment, knowledge and ingenuity, quality of social and individual decisions, forward looking thoughts, etc. – *jointly*. Concepts developed about the future and the activities carried out in order to realise it as well as their absence are factors that shape the pattern. Dynamic patterns can be explored by science – evolutionary futures studies as well – if it connects and reanalyses the accumulated knowledge of various areas of science. However, the result cannot be summed up in a dynamic world model because our world has not become uniform in spite of globalisation. Therefore, it is expedient to choose the solution of updating the explored evolutionary patterns in line with current specific situations in space-time. *This requires a new phase in which those concerned carry out updating regarding their situation and work out their own concepts about the future.* *Jared Diamond* discusses this solution at length with regard to the problem of Montana. He calls the attention to the fact that despite lessons that can be learned from history the ecological problems of Montana are similar to the problems of former historical situations but are also significantly different from them. That is also why it is not possible to develop a solution from lessons of history, from general solutions, which fits in with specific situations.

The approach to the world and the future represented by Jared Diamond is fundamentally different from the one represented by Herman Kahn and Anthony Wiener. Both researches go back to macrohistory; however, they interpret and use it entirely differently. *Herman Kahn* and *Anthony Wiener* still presume development tendencies and progress, and assume following the developed Western world to be a world tendency. *Jared Diamond* already thinks in terms of evolutionary patterns, and presumes the future as a new constituting element of the evolutionary pattern, which cannot be forecast. Yet, the formation of the new pattern can be helped by expedient researches and supported by scientific results.

In his book *Jared Diamond* describes in great details in what capacity he carries out his researches. *He regards himself as a participating observer* who as a private person is directly interested in the future of Montana; on the other hand, as a scientist and

researcher he has researched human and cultural evolution in other respects already, and so he is interested and competent in the future of mankind as well. In his original profession he is a biologist, therefore, he is well-versed in environmental issues and environmental protection issues. He has worked at plenty of places all over the world; so he can find his way very well in environmental and cultural differences. During his rich course of life he has become familiar with various kinds of sciences and has been able to build their findings into a single body of results in his researches²⁴. He has carried out researches on the topic in question as a university lecturer, therefore, he is not committed to any interest group.

The *goal* of the research of collapse is to look for an answer to the question why human civilisations and societies collapsed in the course of history; why they did not see and were unable to avoid the danger. This research goal is not abstract curiosity about the course of history but *it is interesting now and in terms of addressing the issues of the future as well*. Destruction of the environment might carry threatening consequences even today but now it is no longer the destruction of isolated civilisations but of the entire mankind that it threatens with. Can mankind avoid this destruction? Can the chance of survival be enhanced by becoming familiar with historical experiences and using them in the formation of the future? Looking for an answer also to these historical questions, *Jared Diamond* gave a positive answer to the current questions as well – it is possible to avoid global collapse.

The task of the research was multi-layered. Although *Jared Diamond* analysed the historical patterns of collapses triggered by destruction of the environment, he, nevertheless, did not move only along historical time. Because patterns are crystallised when they are repeated in time. To identify this fact, *he had to find and analyse social/civilisation collapses from different ages*. He examined each collapse in details through complex exploration in order to obtain evolutionary patterns from them. To this end, *he gathered different kinds and detailed information* from the area of geography, ethnography, archaeology, cultural anthropology, history and with respect to today's societies from the area of sociology, political sciences, economics, the futures field, etc. In addition to detailed case study level researches, he carried out *comparative analysis* to enable demonstration of similarities and differences as well as evolutionary patterns.

For this reason the *subject* of the research was the collapse of civilisations, societies in the course of history where destruction of the environment also played an important role. To study collapse, *Jared Diamond* worked out a *five-factor theoretical model*, according to which the evolutionary alternatives of both collapse and successful survival depend on the rate and kind of environmental destruction, climate change, hostile and/or collaborating neighbours and the responses given by society to environmental problems. It was this model and its testing that guided the entire research work in elaborating case studies, carrying out comparative analyses, presenting evolutionary patterns and learning lessons from them.

²⁴ *Jared Diamond* started to study the human/societal/cultural evolution in relation to the examination of the roots of human sexuality, then, he researched the evolutionary path of man, and after that he analysed the progress of human societies and differences in their paths of development. In the course of his researches he developed his peculiar methodology and contributed to working out the general theory of evolution and proving its usability. His other well-known books are for example *The Rise and Fall of the Third Chimpanzee: How Our Animal Heritage Affects the Way We Live* (*Diamond*, 1991), *Guns, Germs, and Steels: the Fates of Human Societies* (*Diamond*, 1997).

His methodology is characterised by *complexity and holistic*. The five-factor model itself implies that *Jared Diamond* makes it dependent on factors of different nature and their connections when, where and what collapse occurs. Presentation of various factors and their connections was based on the results of several areas of science. In the presentation and analysis of specific historical cases, events, he laid great emphasis on challenges and social responses, the capacity to change the values that organise life, human ingenuity and foresight or their absence. In addition to collapses, he analysed successful survival in order to test his basic model through that. The holistic approach can be discerned in the comparative analysis and the interpretation of its results. Common features can be found in case studies individual in space and time only by looking for them from an aspect that is outside or beyond them. This aspect for *Jared Diamond* is the validity of the five-factor model in each case study. In learning lessons from history, he took account of to what extent today's problems are different from the problems of historical case studies.

The research of collapse is not quite varied in the *application of methods*. The main methods were verbal model building and logical analysis and making and use of case studies. Case studies abound in secondary use of numerical information and quantitative analysis results. *Jared Diamond* applied the comparative method for analysing case studies. In the presentation of the problem of Montana he employed personal interviews and used his own experience as well.

The result of the research is the collection of evolutionarily plausible scenarios of collapses because specific case studies present the variations of particular realisations according to one kind of model. However, the lessons learned from them provide aspects and new knowledge by which new and hopefully successful survival scenarios can be made. Thereby *Jared Diamond left the future open, but presented a model, frame of thinking supported by historical case studies that can be probably used by specific societies and communities to face challenges and solve their own environmental problems*. In other words, the research findings are reflections on a complex range of problems of cultural/social evolution that prompt scientists to continue thinking about these issues.

Jared Diamond added a new colour to working out evolutionarily plausible scenarios by showing how it is possible methodologically to address a particular futures problem in a manner that spans the past, the present and the future; how it is possible by reflection to develop a new approach, frame of interpretation; and how it is possible to generate discourse on the open future while leaving the future open towards new attitudes. Furthermore, as a matter of fact, his research results can be utilised also in the usual manner where a particular region, country or community, accepting this approach, works out their own evolutionarily plausible scenarios and/or formulates the vision of the future of their successful survival and the actions to be taken by them to ensure their future.

3.1.4 The professional matrix of the evolutionary futures studies paradigm

Evolutionary futures studies focuses on the complexity of the future and its simultaneously determined and undetermined character. Using GET as an approach to the world and heuristic, from the connected points of view of the observer and the acting participator, it examines the subject of the research, including the human factor, holistically. Applying the generalised concept/metaphor of evolution to the movement of self-developing, evolving social complexities, it studies the new domain of possibilities of

the future in various contexts. *Therefore it defines the domain of possibilities of the future arranged into evolutionary patterns.* It gets away from the positivist paradigm because it does not consider forecasting of the plausible future possible under the circumstances of instability. As a result of its point of view, it is not possible to obtain preliminary information about the future. All knowledge taken to refer to the future is knowledge in the present, which can be merely reflective, and which can be falsified only partly, but can be made the subject of new reflections. As the researcher of evolutionary futures is also an acting participator of the future that is going to take shape, the ethical questions of the future and responsibility for the future have become one of the most emphasised areas of researches.

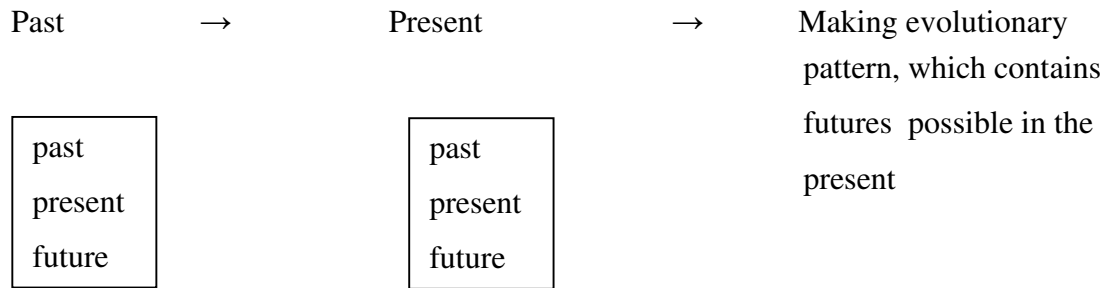
The evolutionary futures studies has *a hypothetical approach to the future* to the extent that it considers it equally possible to conceive the evolution of rising and declining or disaster futures. Within a given subject area and space-time, it considers it possible to develop scientifically based approaches to the domain of possibilities of the futures, alternative futures and the processes that take place in them. *However, it preserves the openness of the future with all of its research results* because the future cannot be known in advance in terms of either events or human/social reactions and actions. That is exactly why it is necessary to research the future through studying possibilities in the future. (See Table 7)

Table 7. *Matrix of the evolutionary futures studies paradigm*

Components	Paradigm characteristics
World and future view	The world and the future is dynamically complex; the future is determined and undetermined; it includes the human factor; exploration of evolutionarily plausible futures by knowledge, production of new knowledge and reflection
Researcher/researcher team's position	Participating observer
Subject of inquiry in the futures field	Scope of issues concerning the future of man and society, self-organisation, emergence and complex dynamics, which include the human factor
The goal and task of futures field	Reflective interpretations and theories on plausible futures and placing them into social communication
Methodological considerations	Holistic approach, thinking in terms of evolutionary patterns
Rules for methods application	Connected application of subjective procedures and evolutionary models
"Worthwhileness", and usefulness of futures results	Placement into falsification process, reflecting on the issues reflected upon, trial in practice, possibility to continue research in particular space-time

Source: Self-made

The approach to the future of evolutionary futures studies is characterised by *turning the past and the future into present*. This is solved in the following way:



The *blind spot* of the paradigm arises from the fact that it is not determined by the paradigm how big the role of the human factor is in consciously shaping the future and enduring future changes, and what makes the two kinds of role change in evolutionary patterns. In other words, it cannot be determined within the paradigm when man and human communities are active participants and when passive observers and suffering subjects, and at what rate of combination the two statuses are present in studying the future of specific complexities. For this reason within the paradigm it is *not possible to answer the question why and how the human factor can change its two kinds of status in complexities*. Owing to that, feedback of actorial future shaping thoughts to the evolutionary pattern cannot take place.

3.2 The critical paradigm

The critical futures studies is a peculiar form of the critical paradigm²⁵ of social science researches. The critical futures studies also considers the approach to the future

²⁵ It might be questionable to define the critical paradigm as an independent paradigm since critical activity has to be a creative part of all scientific activities. I agree with that and also think that critical activity has an unavoidable role within every paradigm. It is critical activity that ensures that the given research perspective can develop, is able to operate efficiently and its borders and restrictions are revealed. However, what works in the critical paradigm is not the above criticism but the one that is based on the fact that man continuously makes the changes in his environment, his own activity, goals, information, the knowledge he manages to obtain of his world and their effects the subject of criticism, i.e., perception, deliberation and evaluation. In other words, criticism contains permanent attention of man paid to his environment, himself and his community, his reflections on observations, experiences, information and his elaborated responses to them (Kincheloe & McLaren, 1994 and Guba & Lincoln, 1994). It is the many ways and forms how *the critical activity carried out and operating in society is studied scientifically* that is summed up by the critical paradigm. This critical approach satisfies the requirements that an independent paradigm is to meet if the components of the paradigm matrix can be defined with a content that is typical of it and in a manner that is consistent with regard to each of them, and it meets the requirement of the weak interpretation of immeasurability/incommensurability.

The critical paradigm is based on the *approach to the world or reality* that societal reality is a humanly and interactively constructed objective reality of subjective origin. In society and the formation of their world people are participants and observers at the same time. The *subject* of the critical paradigm is studying the critical activity carried out and operating in society, in which the *researcher* is a participating observer as well. The *methodology* of criticism is deconstruction and reconstruction. During deconstruction the societal reality to be analysed is deconstructed into objective conditions, human strategies, interests and values, and the diversity of reality depending on the context is presented. In the course of that the mechanisms that sustain the system and the system defects as well as human interests and values related to them are explored. During reconstruction the societal reality now understood in terms of its human side is reconstructed and the formation of possible and feasible adjustment, corrective and system renewing goals, concepts, changes and

embodied in practicing the positivist futures research problematic. *It holds the view that an approach to the future that is aimed only at the future which is going to be realised later*

mechanisms concerning the future can be explored. As social theory and social sciences do not have a crisis and transformation theory (Hideg, 2001/a. pp 56-58), critical researches serve theoretical and practical purposes at the same time. In terms of *methods* they employ data and document analyses; critical researches that analyse the present, aiming at gaining "in vivo" knowledge, employ direct observation, survey, dialogue and discourse with participants, stakeholders, case study techniques. *The "worthwhileness", the goodness of research results* can be only partly verified; therefore, they are qualified by understanding, logical consistence, controllability and transparency. As the critical knowledge obtained from the analysis of the present is only knowledge that is taking shape yet, it is one of the phases or the first phase of the production of the new knowledge and information; therefore, its possible further development and utilisation is also necessary for it being qualified as scientific research result.

The critical paradigm complies with the criteria of *immeasurability or incommensurability* as well. When the critical paradigm is compared with other scientific paradigms, it is possible to recognise the characteristic feature of the research perspective that makes it different from every other paradigm. (i) The approach to the world of the critical paradigm is realist; at the same time, it is not societal facts that it considers important as the positivist paradigm but the role of man in forming and renewing the societal reality. The paradigm focuses on the latter in its research subject. (ii) Compared to social theories and sociology with constructivist approach, it again represents a different approach and research subject. Sociological social activity theories and researches examine various "normal", recurring and expedient human activities, forms of problem solving. On the contrary, the critical paradigm makes the human factors and forms of social renewal the subject of analysis. Although the theory of social communication based on participation formally places critical activity in the communication process of problem solving but eventually it does not regard it as its special subject with regard to agency either. For example, *Ózséb Horányi* writes the following: "Finally, the learning of the agent can be a procedure in which the processes resulting in the above mentioned explicit learning run not only conventional courses but also inventive and innovative courses containing creative steps. As a matter of fact, the steps can be destructive as well. However, their detailed description is beyond the possible frameworks of this discussion." (Horányi, 2007. p 255) (iii) Compared to the critical paradigm, the so-called complex world theory system handles the role of the human factor in a different manner as well (Lévai, 2006). This theory states that the human factor is important to the extent that the lots of individual and locally rational decisions result in emergence at the level of the system. However, system level emergent phenomena now have laws that serve survival of the system and to which every actor has to adjust. Nevertheless, on the basis thereof it is not possible to interpret and explain the changes in the system or its transition, transformation into a new system and explore the laws of the transformations of the social system either. The theory lacks the kind of interpretation and consideration of emergence also at system level that takes place in the human factor in the changes in its consciousness, adaptability and renewing capacity upon the effect of the processes and circumstances influencing it. It is exactly this aspect, the emergence taking place at the level of societal actors about which the critical paradigm can provide new information and from which it can obtain new knowledge. As social sciences do not have a transformation theory that could explain social transformations in a form where both objective factors and societal actors have their own place and role, therefore, in periods when a change of age is taking place the research perspective of the critical paradigm plays an especially important part. This can be stated even if the critical paradigm is not able to explore laws yet, since science has not been able to follow up any period of change of social system yet through conscious observation. The change of age character of our era has been recognised, in addition to futures researchers and practitioners of the critical paradigm, by the representatives of several areas of science (for example, *Immanuel Wallerstein* historian, *Tamás Szentes* economist, *Vilmos Csányi* ethologist) (Wallerstein, 1999, Szentes, 1992, Csányi, 1988). (iiii) The critical paradigm is different from the evolutionary paradigm of futures studies as well. The main difference between them is that the evolutionary paradigm studies not only the renewing role of the human factor but also the evolution of society, which depends, in addition to the human factor, on embedment of human society in nature and on the dynamic interactions between them.

The critical paradigm is included in social research paradigms as an independent paradigm (Guba & Lincoln, 1994 and Voros, 2008). The history of the paradigm began with the traditions of Hegel and Marx and became widely known through the academic achievements of the Frankfurt School and Jürgen Habermas (Kellner, 1992). Undoubtedly, it is closely related to postmodern criticism but critical researches heavily criticise not only positivism but also postmodern theories. (See e.g., Habermas, 1984, Kellner & Best, 1991 literatures!) The critical paradigm appears in sociology, historiography, communication research and the futures field.

on and obtaining preliminary information about it is doomed to failure. Futures research insists on this restricted and one-sided approach to the future only for the sake of being regarded as a real science. However, owing to this it gives up *interpreting and handling the future in its reality that belongs to man.* For this reason, the *critical futures studies* concentrates on expounding these special qualities of the future. In the course of that, *critical futures studies is guided by the intention to show a new approach to the future, and by its approach and methodology in harmony with that to create relation between practising futures studies and the formation of the futures thoughts of social actors.*

3.2.1 World and future view, subject of inquiry, goal and task

The approach to the world of critical futures studies is characterised by the human point of view. As man has an approach to the future, the future is always tied to man and society. It presumes that survival, continued existence of societies depends on how specific individuals perceive the future; how they are able to participate and cooperate in their communities' interpretation of the future. In the perception and interpretation of the future people mobilise their entire mental capacities; so, in addition to their knowledge provided by science, they use their experience, capacity to learn, intuitions, moral considerations and emotions as well. The future is embedded in man's mental capacity at individual level, but it is also shaped by ideologies, worldviews, religions that determine culture (Sardar, 1993, Masini & Sasson ed., 1994). Subjective mental contents permeate into the future that is developed at the level of group/society, but the future being formed at group level can produce an impact that shapes worldview, ideology and religious belief as well (Slaughter, 1998 and 2004). Knowledge formed of the future, being aware of the future is a multi-layered knowledge of various natures, constructed reflectively and in societal communication, which is never complete, can be always reflected upon and communicated again.

The future that is continuously constructed and interpreted as being aware of the future exists and functions in the extended present. Therefore, according to the critical futures studies the future can be interpreted not only as a future that is going to be realised later on as time moves ahead but also in the way as *it exists in the present, more specifically in thoughts, non-consciously and emotionally as well.* This future affects the present and is an organic part of rules of life. It is not only a special form of cognitive interpretation but it is also a non-conscious, instinctive and emotional relation (optimism, pessimism, confidence or fear). *This future existing in the present is actually the most developed form of human foresight.* Foresight is a human capacity, competence which protects man from harms and makes his activity continuous and undisturbed. Foresight is rooted in the structure of the human brain and is a special form of manifestation of the capacity of explorative, psychic imagination and the principle of causal necessity. Foresight is driven to move by the unstoppable uncertainty existing due to the uncertain nature of biological life, existence. It develops and can be developed through the process of learning. At the present level of the development of man, thinking of the future and awareness of the future can be no longer regarded as an isolated form of thinking. For example, everyday foresight has become an organic part of daily life. According to Slaughter's definition, "... foresight is a deliberate process of expanding awareness and understanding through futures scanning and the clarification of emerging situations." (Slaughter, 1995. p XVII). However, man is also a social, group animal (Csányi, 1999); therefore, his foresight extends to his group. That is what makes it possible to interpret foresight also at group level and for community

foresights to be actually formed through various social/cultural/communication mechanisms.

Critical futures studies also distinguishes various time horizons, succession of the past, the present and the future. However, in interpretation these time horizons exist in the present as well. In their existence in the present, the past is the condition of history, achieved results and identities; the present is the terrain of understanding, perception, facts and activities; and the future is scheduling of requirements, expectations, objectives, plans and future activities. Time horizons in the present exist in the brain, the cognitive interpretation and the psyche, but not only in their isolation but also in their permanent interaction. The past affects the present through interpretation and can be an escape from the present. The future shapes the present by anticipation, and can be also a form of escaping from the present. In the consciousness and the psyche, time horizons are permanently connected, fluctuating and permeating into each other. *On the one hand, the present is the restricted time category of “the here and now”, and, on the other hand, it appears in the consciousness as an “extended present”, which is able to integrate and update the past, the present and the future simultaneously into itself.* The latter present also has a historically changing length of time, which is at our present civilisation level approximately 200 years. This length of time embraces the simultaneous present-awareness of the generation relation between grandparents, parents, the individual, his/her children and grandchildren (Boulding, 1988). *It is in this extended present where human foresight functions.*

The function of human foresight is to survive, continue to live, carry on existence. To make decisions on and organise the activities necessary for carrying on existence, not only the experience preserved in the memory but also expectations, goals and intentions as well as confidence and fear that appear in foresight are used at the level of a healthy individual. During permanent observation of, deliberation over the environment both *the memory and foresight operate and contribute simultaneously to making decisions.* Use of the extended present is advantageous because it connects one with a wider context of life, compares “the here and now” simultaneously with the past and the future. It urges one to conceptualise the causes and the consequences together but prevents long-term patterns of history and causality from becoming firmly rooted and so makes it easier to adapt to the future. *Therefore, the subject of critical futures studies is this future interpreted as human foresight, which is the present at the same time but as an extended present. Its task is, on the one hand, to understand human foresight both at individual and community level, and, on the other hand, to further develop this foresight activity, to catalyse the process of social level foresight.*

By focusing on the unity of man’s existence in the present time and man’s future-orientation, critical futures studies emphasises the importance and real existence of the complex human space-time (Hideg, 2005/b). It is in this space-time where evaluation, deliberation, preparation for changes, making changes, communication and activity become stable. This space-time of mankind is also a new evolutionary result, without which present and future societies cannot live. The approach of critical futures studies to space-time differs from the approach of evolutionary futures studies to space-time to the extent that critical futures studies handles imaginary time not in its relative independence and isolation but *as an inseparable part of social complex space-time.* This complex social space-time can be interpreted as a pulsating field (Gáspár, 2005). By this approach to space-time it expresses the postmodern thought that it is the so-called third sphere, the

symbolical sphere, which is neither real, nor imaginary but the prevailing quality of the two interacting with each other, that practically exists and socially becomes and can be made an institution. As society is a human construction, societal space-time is socially constructed as well (*Giddens, 1987, Kiss, 2005/b*).

For this reason, the futures field that puts human foresight in the centre departs from the approach of the positivist futures research which states that it is able to provide preliminary information about the future in forecasts. Critical futures studies considers this impossible, and undertakes merely to explore interpret, compare, reflect upon, critically analyse the futures contents that exist in the present and give help to develop foresight competencies of individuals and social institutes. It is owing to its connection with and critical attitude to human foresight that this *futures studies calls itself critical futures studies or simply foresight*.

It gives the following reason for its coming into being and development: in the age of the present fast and in-depth changes, when information technology revolution, communication technologies rapidly develop and spread, the conditions of human existence become problematic in the four-dimension world of realities; the preconditions, constraints and inducements that start the process of foresight becoming a social level activity and a new level of institution have taken shape. The positivist futures research is unable to react to this new situation because it does not take notice of individual foresight and regards the practising of the futures field as a privilege of special interest groups. *Critical futures studies conceives social foresight in a democratic form by taking efforts to integrate individual foresight in an increasingly comprehensive manner into the entire process of community, institute/social level foresight and by making it the organic part of societal/social innovation.*

Critical futures studies does not intend to exclude futures researchers from this future constructing process but in its view their task is not to forecast the future but to reflect, criticise, develop participative approach and procedures and fulfil the role of facilitator in the social foresight process. By undertaking this social role, it urges the individual and decision-makers to participate, select and act with responsibility, and the futures researchers and critical futures studies to assume responsibility, generate the social learning process and improve its efficiency (*Bell, 1998, Nováky, 2006/a*).

3.2.2 Methodological principles and application of methods

One of the central categories of critical futures studies is *criticism*, which does not mean only criticising but contains the scope of approaches and tools by which the total potential of practicing the futures field can be implemented. This trend derives the critical attitude from several sources – the philosophies of structuralism, poststructuralism and postmodernism (*Inayatullah, 1998, Kiss, 1998/a and b*).

It is a fundamental point in its critical approach that the social space-time is a historical and social construction; therefore, the current social reality can be deconstructed, discussed, reflected upon and constructed again (*Fuller & Loogma, 2009*). Traditions, cognitive patterns and ways of thinking are partial and their validity in space-time is restricted; consequently, the existing social/economic systems and even *the social arrow of time, development itself can be stated as problems* and their internal contradictions can be explored. By them it is possible to construct social reality again and update it in a way.

The possible, the plausible and the desirable are always categories that can be interpreted only within a "truth regime", value system, worldview. However, value systems, worldviews are also historical/social constructions.

The first scene of constructing the future social reality is the so-called *poststructural discourse, the social discourse*, in which linguistic communication plays a prominent role, although other forms of communication – for example, images, drawings, films, multimedia – can carry the future (Slaughter, 1993). In discourses of various community level, new quality futures having new truth regimes can be constructed by making the present as a peculiar period of historical development notable, by exploring meta-problems of the present from surface problems to interpretations, values, paradigms, worldviews, by comparing, analysing them, by discussing various interpretations (Inayatullah, 2005). This discourse does not only serve understanding but it is also the process of creating the future, which is not neutral in terms of values because it is based on the special way of understanding reality by the communication community that implements free discourse. In the course of that, it is possible to formulate the vision of the future of the preferred relation to the world – future visioning or wishful thinking – which may contain idealisation, designs, plans and projects.

The next scene of constructing the future is *joining the process of societal/social innovation*, making desirable visions of the future legitimate and transposing them into reality. In the social innovation process, by its criticism and environmental screening the critical futures studies points out why and to what extent society's current goals and visions of the future and expectations do not meet human, social challenges. By this criticism it generates discourse on the future and by its various methods it presents and/or helps society to find and implement desirable futures. By the category of the societal/social innovation process and by defining the various activities concerning the future that operates in it, it represents the dynamic existence of social complex space-time and the continuous feedback stream of its various aspects, segments.

To this end, critical futures studies must have deep and multi-layered information about society and its movements. In Richard Slaughter's view, this can be achieved by the approach of the so-called *social architecture metaphor* (Slaughter, 1995). This metaphor is based on the example of the good architect. The good architect is one who knows the visible and invisible parts of the building very well, is able to synthesise this information and implement it in a particular building. On the analogy of the above, the *social architecture approach* means connecting the following three levels of knowledge jointly, with regard to one society, community: the surface structures of society (language, symbols, customs, laws and institutions); the determining structures of society (cultural norms, presumptions, ethical/moral patterns), the paradigms and worldviews behind them (interpretations of reality, nature and the human/social nature).

Sohail Inayatullah proposes to apply his *causal layered analysis (CLA)* procedure for the exploration and criticism of thought, emotional, unconscious contents existing in society concerning the future that is taking shape (Inayatullah ed., 2004). He set out from the presumption that concepts about the future are as much layered as society; therefore, it is necessary to research each layer and mutual relations between layers. The first layer is the level of surface, the so-called litany; the second one is the layer of social (social, political, cultural and historical) factors; the third one is the layer of worldviews; the fourth one is the layer of myths and metaphors. The first two layers can be analysed very well by

employing a wide range of quantitative methods. The third layer contains social/cultural patterns, which can be explored by in-depth historical and cultural studies. In the research of the level of myths and metaphors, the unconscious and emotional dimensions related to the future and time can be shown. The relations between specific levels can be demonstrated in the research process through connections and feedbacks. The research process is deconstruction because it is aimed at the interpretation and understanding of existing approaches to the future; at the same time, it can be a part of the learning process, if its results are communicated, reflected upon within the circle of those concerned. In this manner, criticism of the CLA procedure and its results may contribute to further developing approaches to the future.

In view of the fact that critical futures studies presumes man's future-consciousness, the analysis of the future orientation of people and various social institutions has developed as a new subject area of the futures studies within this paradigm. *Erzsébet Nováky, Éva Hideg and István Kappéter* developed the category of future orientation and its measurability in the middle of the 1990's (*Nováky & Hideg & Kappéter, 1994*). They defined future orientation as a human attitude that makes it possible that thinking should be determined not only by the events of the past and the present but also by ceaseless reflecting upon circumstances and expectations. This future orientation is influenced by the individual's biological, psychic/psychological and social/cultural features.

Future orientation is a multi-dimensional category. On the one hand, it contains awareness of future time, thinking about the future and the manner how it is done. The circumstance that we think of the future with fear or hope does not only add a colour to our thoughts concerning the future but also influences what we dare and what we do not dare to do for the sake of the future, and what expectations we have towards the future. It also belongs to the scope of thinking about the future that in our view to what extent we are able to influence the future or to what extent circumstances independent of us determine our future. On the other hand, even conceiving the range of activities to be carried out for the sake of the future constitutes an organic element of future orientation, a part of which we perform as routine activities already (savings, taking out insurance policies, etc.); another part of them we conceive and select expediently for the purposes of consciously influencing the future (for example, learning, building relations). Thirdly, the relation to the future includes expectations and requirements regarding the future. Such thoughts develop in people whenever they deal with the future only superficially or when they do not think that they will actually do something for the future. Observation and examination of expectations was an important activity before the development of critical futures studies already but it has been set in the more comprehensive and complex category of future orientation in the context of critical futures studies.

Future orientation is also a phenomenon of space-time. The duration of relation to the future changes also in time, especially in the midst of great social changes, and in addition to the individual's own future, it includes issues concerning the future of the family, relatives, place of living, various social groups that belong to the individual, the nation and now mankind.

Future orientation is a category that *can be examined empirically as well*. For example, by a questionnaire survey information can be obtained of specific components of future orientation and their space-time content. We can get a picture how individuals' biological/psychological qualities, social/economic standing, highest level of schooling,

education, worldview, etc. produce an impact on their future orientation, what characterises a future-oriented and a future-shocked person, who/people in what social/economic standing represent the social group of future-oriented or future-shocked persons in a given society or community (*Hideg & Nováky*, 1998/a and 1998/b, and 2008, *Gidley & Inayatullah ed.*, 2002).

Analysis of future orientation has become a generally accepted and multi-purpose research activity within practising critical futures studies. It is employed for exploring the relation of individuals, social groups, institutions to the future (See, e.g., *Tonn & Hemrick & Conrad*, 2006, *Gidley & Inayatullah ed.*, 2002 and *Nováky & Kristóf ed.*, 2000, *Nováky & Hideg*, 1998, and *Hideg & Nováky*, 2000, 2010), or for self-reflective evaluation of forecasting activities²⁶ (*Popper et al.*, 2007).

Research of future orientation is not only a source of new and complex empirical information and knowledge about the relation of man and society to the future, but can also provide new criteria for futures researchers for criticising social foresights, visions of the future, and for organising workshops meant to improve future orientation of people, social groups. For example, the findings of researches of the relation of young people to the future can be sources for outlining alternatives of social visions (*Nováky, ed.* 2010). Knowledge of the future orientation of specific groups might help to select stakeholders and choose the subject areas and procedures of workshops.

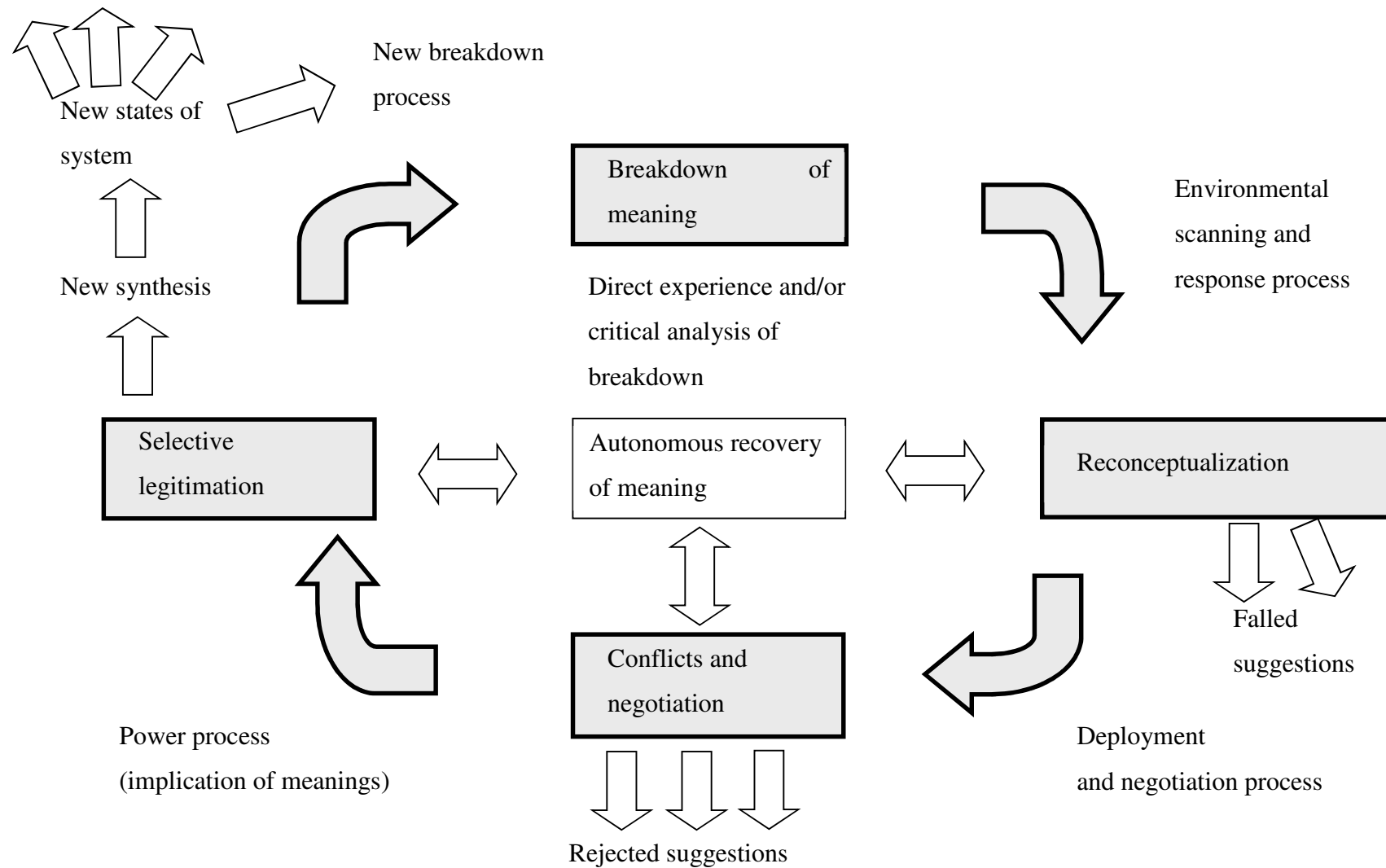
Another central topic of critical futures studies shaping and re-shaping/transformation of futures thoughts. In this case, the future is interpreted as action of the present, i.e., the emphasis is laid on why, how concepts regarding the future of the community are developed. To this end, critical futures studies uses the so-called *transformation cycle* as a framework of interpretation. (See Figure 5)

The transformation cycle demonstrates formation and renewal of community level foresights, the social construction at the level of our present development and in a democratically operating society. Critical futures studies can take part in each phase of the cycle but the cycle can operate without it as well. On the other hand, critical futures studies follows this cycle in its own activity. Critical futures studies attributes great importance to education and learning because in the transformation cycle of futures thoughts it is people who must develop new and new futures interpretations to ensure ceaseless survival and operation of the cycle.

The scheme of the transformation cycle forms the basis of methodological development. Here I present three procedure groups briefly that connect the futures researcher's critical activity with the concepts of concerned parties (stakeholders, student groups, lay civilians) about the future in the formation of thoughts about the future. One of the procedures aims to connect community level future shaping thoughts of stakeholders; the other one aims to develop and implement the anticipatory learning process of a

²⁶ Under the project entitled "Monitoring Foresight activities in Europe and fostering their European dimension" (2004-2008), the theoretical, methodological background and applied methods of futures field making activities carried out all over the world were explored and analysed and the special European features of futures field were determined. To this end, in a questionnaire survey they gathered information among others on futures researchers' approach and relation to the future (*Popper et al.*, 2007).

Figure5. Schematic outline of the transformative cycle



Source: *Slaughter*, 1989, p.458

community; the third one aims to connect lay civilians into the future shaping political decision-making process.

A kind of procedure of connecting community level future shaping thoughts of stakeholders was worked out first by *Éva Hideg* and *Erzsébet Nováky* in the middle of the 1990's in the exploration of the possible futures of national education and vocational training. This foresight activity set out from the fact that the futures researcher (with the assistance of experts), on the one hand, explores the characteristic features of the path taken so far by national education and vocational training and changeability of development tendencies, and, on the other hand, takes account of the challenges that education and vocational training is facing. However, the futures researcher does not work out possible futures independently but involves those concerned, stakeholders in the process. We expected stakeholders to be able to present the situation of education and vocational training, its future desirable for them and necessary changes – owing to their position – from another aspect than the futures researchers and the experts.

In the first phase of the work, which was carried out within the frameworks of the vocational training for young people component of the World Bank program entitled 'Human resources development', the stakeholders involved were a representative sample of the teachers of the vocational training schools that took part in the World Bank program, the employers and domestic population (*Hideg ed.*, 1995). In the second phase of the work (under the assignment of the National Institute for Vocational Training), when the goal was to work out the national concept of the future, the range of the stakeholders involved was representative samples of teachers of vocational training schools, employers, students and their parents (*Hideg & Nováky*, 1998/b). Stakeholders were joined in the foresight work by Delphi procedure, questionnaire interview and under a workshop.

The futures research team processed and systematised the futures information gathered in this manner, i.e., arranged them into alternative futures concepts and their variations. Feedback on these systems of thought concerning the future was returned by the team in the form of workshop to the development team of teachers of particular subjects in the first round, and to the expert team of the National Institute of Vocational Training in the second round. And it took account of the results of these workshops in the development of the final research findings (*Hideg & Nováky & Kristóf*, 2013).

A procedure for developing and implementing the anticipatory learning process of a community was worked out by *Sohail Inayatullah* (*Inayatullah*, 2006). This so-called *anticipatory action learning procedure* also combines expert's and/or expert futures researcher's work and the learning process organised in a series of stakeholder workshops in order to develop common concepts about the future. The procedure contains the following steps: in the first step, the critical futures studies researcher carries out explorative research to map connections between the past, the present and the future; then, carries out CLA analysis to explore deep layers of the future. After that, workshops are held in order for a given community, having become familiar with futures researcher's/experts' concepts about the future, to arrive at formulating their own futures concept(s) and tasks during a learning process. The anticipatory learning process means not only understanding possible futures and selection from them but also *placing the future in the team's own context*. This "action learning", which spans analysing, critical and re-interpretation and discourse phases, also means commonly assumable creation of one's own futures (*Inayatullah*, 2005 and 2006). In the procedure, the work of the critical futures studies

researcher is exploration, analysis, criticism, leading workshops, and summing up, documenting the final results.

The elements of the procedure developed by *Sohail Inayatullah* and workshop education have been employed and practised for a long time in futures studies education (*Dator ed.*, 2002). It is *Sohail Inayatullah's* achievement that he integrated various steps and methods into a system. Nevertheless, we cannot consider the procedure a standard methodology. As the procedure seeks to develop the common future of a particular, relatively homogenous group, the group can be really expected to arrive at conceiving the common future. However, my experience in futures studies education shows that even at the level of student groups a common concept about the future accepted by everyone is not frequently developed. The reason for that is not only constraints of time of the syllabus but also the fact that each participant conceives different futures concept because they have different information background, social/cultural bases etc. and their readiness to cooperate is different as well.

The third procedure group *seeks to implement lay persons' participation in social/community level future formation/decision-making*. These procedures set the aim of solving only a part task, i.e., how it is possible to involve – in addition to experts, futures researchers and stakeholders – concerned actors who are not experts or play no part in the decision-making process in the development of futures concepts. It is a common quality of the procedures that they intend to involve lay persons in the formation of futures concepts and/or preparation for decision-making in the form of either public Delphi (*Nováky*, 2006/b) or future exploring workshops where practically anticipatory action learning is carried out (*Stevenson*, 2006).

All three procedures clearly demonstrate even at their current level of maturity that critical futures studies does not only consist of criticising, deconstruction but also actively takes part in constructing the future by development of methodological procedures and methods.

The method development and adaptation of the critical futures studies is closely related to its new area of research, the research of the relation to the future, and to the methodological procedures of developing community level futures concepts. For this reason, critical futures studies holds the view that the main direction of method development is not turning results into numbers and calculation procedures within the scope of quantitative methods but *extension of the range of verbal/qualitative communication methods*. It has developed the futures workshop technique usable for various purposes, for collecting lay persons' thoughts, ideas about the future, the public Delphi, the Futures Wheel and the Story Telling methods, the Syncon, the Charrette methods, the Future Search Conference etc. (*Nováky*, 2005), and in a wide scope it employs survey techniques to study the relation to the future and case study techniques to present the methodological experience of specific new or further developed methodological procedures.

3.2.3 Practical example for the critical futures paradigm

The selected example is the foresight activity, constituting a part of the research aimed at the development of the concept and implementation possibilities of the national

network of regional vocational examination centres in Hungary²⁶, which was carried out in 2006 under the assignment of the National Institute for Vocational Training and under my leadership (*Bartus & Hideg ed.*, 2007). The subject of the foresight was development of the concept regarding the network of regional vocational examination centres. I have chosen this research for numerous reasons. This research addresses a foresight task raised in a particular space-time by social practice, which is typical in critical futures studies. As the research was led by me, I know its theoretical/methodological solutions and difficulties from inside. This knowledge of the research from inside is more important in critical futures studies than in futures field of another genre, with another paradigm. In the case of both the positivist futures research and evolutionary futures studies the subject area and subject of the research can be usually widely known to everybody because they cover a great, overall problem of the future. On the contrary, critical futures studies mostly addresses particular foresight issues that are important for a specific social group or institute. The research to be presented as an example was an action-oriented participative foresight activity.

The approach to the world and the future reflected in the foresight research can be summed up as follows: social processes can be transformed and driven into a new channel on the basis of futures concepts expediently worked out with the participation of those concerned. *Futures thoughts (foresights) must contain solution/solutions for the problems of the present that can be accepted in the present and by society.* As a lot of experts, stakeholders and concerned parties took part in the research, this approach to the world and the future can be considered only the lowest common multiple of the participants' thinking in view of the fact that those who undertook participation did accept this approach.

The status of the futures researcher – research leader – was *observer participating* in the research. She was a participator in the development of the research plan and the synthesising works carried out during the research. She was an observer in carrying out her own research part task and in collecting, processing and analysing the opinions of the other participants.

The goal of the foresight research was to work out the concept and forms of operation of a network of regional vocational examination centres that *is professionally justified and socially acceptable and/or supportable under domestic circumstances and in terms of the future.*

The subject of the research was renewal and possibilities of transformation for the vocational examination system. As the concept of the network of regional vocational examination centres also represented an entirely new examination system in vocational examination, we connected stakeholders' ideas with the experts' more extensive information and evaluation regarding vocational examination systems. *We researched the following subject areas in the process of foresight:*

²⁶ The institute consultant of the research entitled "Making a feasibility study for a network of regional examination centres" no. 53 413 FKA-KT 4/2006 was *Zsolt Bartus*, the research leader was *Éva Hideg*. (As of 1 January 2007, the National Institute of Vocational Training was transformed into the National Institute of Vocational and Adult Education.)

- social and professional goals, circumstances and experience of examination system development projects carried out in Member States of the European Union,
- critical analysis of national vocational examination practices with regard to the years between 2000 and 2005,
- ideas, concepts of the actors concerned in and determining the operation of national vocational examination, so-called stakeholders – examiner teachers and chairpersons of boards of examination, regional training centres and chambers (Hungarian Chamber of Agriculture, Hungarian Chamber of Commerce and Industry) and employers' representation organisations (Confederation of Hungarian Employers and Industrialists (MGYOSZ)) – that intend to improve, develop the examination system.

The research of the first subject area and formulation of the consequences that could be drawn from them was carried out by *research experts* (futures researchers, vocational training researchers) working towards the development of the national network of regional vocational examination centres. The second subject area was addressed by both experts and stakeholders. In the third subject area *various functional actors of the national vocational examination system, the stakeholders* expounded their opinion and ideas. *The stakeholders involved in the research assist in various phases of providing and using vocational examination services.* We contacted stakeholders or their representatives who have extensive examination experience, take part in the process of developing and awarding vocational qualifications taking account of labour market needs and aspects, might be mostly interested in improving the national vocational examination system, and were ready to fulfil the tasks within short notice.

We involved *stakeholders in the research* because we wanted to know how stakeholders can connect their expertise, examination experience and ideas concerning the improvement of vocational examination practices with the thought of the network of regional vocational examination centres already heard and known at the level of general statements. What regional examination system concepts the concerned entities can outline, which fit in with the present domestic conditions and at the same time can represent the expedient, possible and acceptable alteration of vocational examination. Based on these ideas conceptualised in view of the special situation, function and approach, *we intended to develop realisable alternatives that are professional, are linked to the reality of the conditions prevailing in the country and to forces that want changes.*

We invited the experts of stakeholder groups to write a study. We requested two kinds of studies. We asked for smaller – 10-15 page – studies from 1 invited examiner teacher of a particular subject and/or the chairperson of the board of examiners of each of the 21 vocation groups. We asked for longer and more overall studies from 1 expert of each of the regional training centres, chambers and MGYOSZ, presuming that they have a different duty in vocational examinations than teachers and chairpersons of boards, and have a wider view of the relation of the national vocational examination system and the qualifications provided by it to the economy and the labour market.

In both types of the studies, the invited stakeholders were allowed to expound their opinion and choose their subject area freely. To ensure that stakeholders should think also in terms of the scope of issues deemed important by us and write about them, we attached a brief sketch to the invitation. We chose this *partly controlled response* to enable us to

certainly receive answers to the scope of issues deemed important by us and to test the importance and appropriateness of the subject areas defined according to our preliminary ideas, and, at the same time, to enable us to collect the evaluations and concepts of experts well-versed in vocational examination practices regarding other matters and aspects.

We did not choose the several round Delphi method or collection of information combined with workshops frequently used in critical futures studies because the time available for implementing the research would not have made it possible. We solved feedback on the collected, processed and utilised information by inviting the authors of the studies to *the one-day debate and workshop* organised on the first version of the synthesis, allowing them to express their opinion and participate in the workshop. The first version of the synthesis was received in advance by all invited parties.

In the small and large studies made by stakeholders, we asked for answers and professionally based opinions and concepts regarding the following *scope of issues*:

- What are the present main problems and tasks to be solved of national vocational examination practices in general and concerning specific vocation groups?
- Can these tasks be solved or not within the frameworks of the present examination system?
- What immediate and long-term advantages/disadvantages would a new regionally organised institute specialised in examinations – the network of regional examination centres – represent?
- In what organisational system, geographical space, in what number can the new examination institute be created and operated?

We processed the completed studies *by comparative analysis*. With regard to each scope of issues, we identified and selected identical and similar as well as different opinions and approaches. We carried out the content analysis of the latter to find out whether different opinions represent alternative approaches to vocational examination, or they are linked to the characteristic features of the vocation group, special stakeholders' interests? Owing to that, *we did not only look for majority opinions but also systematised the possibilities and proposals for alterations different from them*.

From the notions of involved stakeholders we arrived at *a total of 7 regional examination system concepts*. In accordance with our preliminary expectations, we received concepts that expressed an approach arising from the situation of specific stakeholders; so they carried partial and specific interests, efforts. In the course of our synthesising work, we utilised the notions by fitting stakeholders' conceptions to the expert evaluations that were formulated on the basis of a wider horizon and raising a wider question during the research. *Therefore, the final concept was not identical with either the experts' concept or the conception formulated by stakeholders*.

- Another reason for this is that in the synthesis we tried to find in the various notions
- common seeds and elements,
 - the connecting points regarding which specific notions can supplement, enrich each other,
 - the sources of conflicts for which we must find forms of solution during the synthesising work.

In the aforesaid subject area, our researches were aimed at looking for the reasons – in view of various approaches – on the basis of which it is reasonable to intervene into the present course of the processes of national production of vocational information and to give it a new direction with respect to measuring and acknowledging vocational knowledge. Therefore, we explored the goals and reasons arising from the integration into the European Union, we looked around in the Member States of the European Union to find out why, on the basis of what reasons they change their vocational examination systems. We analysed the situation of obtaining qualifications and vocational examination practices that can be observed in home society and economy, the notions about changes/alterations that can be discerned from their criticism on the basis of the evaluation and concepts of both the expert researchers and stakeholders of vocational examination. *By this two-directional approach, our aim was to point out that it is not only the possibility/constraint of integration into the European Union but also the conditions of Hungary and the evaluation of the situation by stakeholders and their positive answer to changes/alteration that makes it justified to renew the national vocational examination system and develop the network of regional vocational examination centres.* If external possibilities/constraints and national expectations meet or can be connected, then there are greater chances for institutional changes of vocational training to become the catalysts of national organic development.

A determining form of the synthesis work was *workshop*. This was carried out by a narrower expert team, the five-member *foresight team*²⁷. During *synthesising workshops*, we worked out the concept of the new national network of vocational examination centres and its operating models; we defined the scope of issues regarding which we came across different interpretations; we looked for the framework of interpretation in which we handled and answered the questions arising from differences in approach, while fitting them into a consistent system.

The concept of the network of regional vocational examination centres and the possible forms of its implementation developed through the series of futures workshops of the foresight team were forwarded by us in the form of a matter for debate *to a wider scope of experts and stakeholders* as well²⁸, who continued work on the concept and possible forms of implementation within the frameworks of a *one-day debate and workshop*. Widening the scope of participants was justified by the fact that the developed examination system concept meant to provide a role to state administration, the corporate sphere and employees' interest representation organisations as well. By taking account also of the critical comments and proposals on further development made at the one-day debate and workshop, the final standpoint of the foresight team and the final report of the research were formed.

The results of the research took shape in three feasible examination system concepts. This implies that *the experts and stakeholders were not able to arrive at a consensus yet, and were not able to formulate the desirable common future yet*; so it will be possible to reach the stage of reconstruction of the vocational examination system

²⁷ Participants of the foresight team were Zsolt Bartus, Éva Hideg, Mrs Szabó Dr. Éva Berki, Antal Szilágyi and János Szilágyi. The team was led by Éva Hideg.

²⁸ The one-day debate and workshop was attended, in addition to the participants of the research, by the experts of the Ministry of Labour, the human resources experts of large companies, the representatives of vocational interest representation bodies other than chambers and of various trade unions.

through further researches and social/political debates. It was part of the research results that stakeholders had learned how to make foresights and most of them were able to remain active participants throughout the process.

The course of the research shows that *the methodology of the research was characterised by expedient use of various methods and procedures*. Situation analysis, critical situation evaluations, making of researcher's and stakeholders' studies looking forward and backward, secondary content analysis, comparative analysis, narrower and wider scope futures workshops were all employed.

The criteria of the "goodness" of the research results in the development of futures concepts by critical futures studies were professional control, transparency, making results public, possibilities for further development and practical utilisation. In this research we ensured them by having the expert studies reviewed by consultant editors, returning the first results of the synthesis to the experts and stakeholders for feedback. We took account of the results of the extensive professional debate and workshop in finalising the synthesis. We published the research findings in a book in Hungarian and English (*Bartus & Hideg ed, 2007, Bartus & Hideg et al., 2007*). We forwarded the book in Hungarian to all participants of the research and the book in English to the foreign partner institutes of NSZFI (*National Institute of Vocational and Adult Education*). We gave a report on the research at professional and futures studies conferences.

The research results cannot be considered final among others because *in the research we did not take account of the opinion and notions of the wide range of examinees and parties ordering the examination*. We think that it will be expedient to involve them in a following research phase. A possible form of their involvement can be presentation of the vocational examination centre concept and the models of its possible implementation and operation to various ranges of examinees, would-be examinees and users in workshops where participants "test" each model and express what they accept and what and why they would change. In addition to live workshops, it would be reasonable to operate an online interactive site within a determined period to allow use of the opinions and proposals for changes of a scope of the population as wide as possible in the transformation of the vocational examination system. We believe that *involvement of the parties that use vocational examination services may play an important part in the follow-up of the research results – for example, in the process of a pilot program and/or in detailed planning*.

Practical utilisation of the research findings was made possible by the fact that *we cooperated with the National Institute of Vocational Training throughout the process of the research*. The objective of the Institute by this research was to develop a professionally based and socially acceptable approach to the transformation of the national vocational examination system, obtain ammunition for laying the foundations of its further research subject areas and, by its approach and notions made transparent, to contribute to the works carried out in similar subject areas under the National Development Plan II. The Institute financed, accepted and uses the research results; further research of the subject area is taking shape.

3.2.4 The professional matrix of the critical futures studies paradigm

Critical futures studies focuses on the future existing in the present, the human foresight in its research. It sets out from the fact that this human capacity is an evolutionary quality and therefore it works in every man. Man deals with the future with his total mental capacity; therefore, his thinking concerning the future takes shape not only in purely conscious and rational thoughts but also in emotions, faiths and beliefs. On the other hand, man is an animal that lives in community; therefore, he is able to deal with the future of his own as well as of his communities. This latter subject area is what critical futures studies is really interested in, i.e., how community level futures concepts and common notions about the future develop, can be developed or transformed.

Critical futures studies places futures field in the transformation cycle of community level futures concepts. The task of critical futures studies is, on the one hand, to criticise community futures concepts, and, on the other hand, to develop procedures by which it can join the formation of community level futures concepts. In the course of this work, the critical futures studies researcher does not make forecasts but organises and helps a foresight procedure. It considers its procedures and the futures concepts developed by them good and useful if they are transparent, controllable and repeatable, they are accepted by communities, they are deemed by other communities as procedures that can be reflected upon and they do reflect upon them; in other words, when *the social discourse on the future operates freely, continuously, openly as a social learning process*. Thus, critical futures studies has an existing subject – human thoughts concerning the future – which is examined by the critical futures studies researcher as a participating observer by using and further developing the techniques and procedures of the individual and society that exist and are developed in the formation of concepts and ideas. (See Table 8)

Table 8. *Matrix of the critical futures studies paradigm*

Components	Paradigm characteristics
World and future view	The human world is constructed by man; the future is part of the world of man, is a thought, emotion, faith, belief existing in the present, continuously constructed by people and their communication interactions, which influences the activity of the present; it can be interpreted, reflected upon, developed by learning
Researcher/research team's position	Participating observer
Subject of inquiry in futures field	Relation of people and their groups to the future, development of notions and relations regarding the future of communities
Goal and task of futures field	Participation in the social transformation cycle, help development of community level futures concepts
Methodological considerations	Criticism and in-context communicative simulation of the transformation cycle
Rules for methods application	Connected application of subjective procedures

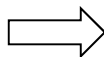
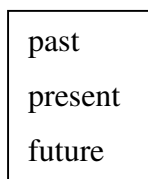
"Worthwhileness", and usefulness of futures results	Becoming the subject of social discourse, transparency, controllability, repeatability and community level acceptance, reflecting on the issues reflected upon
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Source: Self-made

Critical futures studies has and does not have a current approach to the future. It has one because it has taken shape in innumerable practically developed futures concepts, studies about the future, results of various workshops. It does not have one because it arises from its essence that it is not the task of the futures researcher to work out expectations, visions and strategies concerning the future. The futures researcher as a participating observer – by his/her analysis and criticism – can influence thinking about the future, develops and can employ procedures in order to work out various future shaping thoughts. However, from these criticisms and workshop products highly different in terms of subject area, space and time it is not possible to synthesise a kind of futures concept; the only thing one can state is that each of them is motivated by surpassing and transformation of the conditions of the industrial age. The need for such a synthesis does not even arise within the scope of critical futures studies researchers because they agree that the age of grand narratives has terminated. The critical futures studies practitioners do not have a current approach to the future but an action program that comprises continuous critical activity, development of critical procedures and approaches as well as the methodology of participative foresights.

The approach to the future of critical futures studies is characterised by *turning the future that integrates the past and the future with itself into present*. This is solved in the following way:

The presence of the future in actors'/stakeholders' mental action and reaction



Participation of critical futures studies in creating actors'/stakeholder groups' acceptable /desirable future in the present

the actors' experienced situation in life

The blind spot of the paradigm can be discovered in two respects. One of the sources of the blind spot is that critical futures studies, concentrating only on deconstructing and reconstructing futures thoughts, does not deem that it is the subject of its research how specific actors'/stakeholder groups' approach to the future shapes other actors'/stakeholder groups' approach to the future. The other source of the blind spot is that according to the paradigm the impact produced by acceptable/desirable futures concepts on other facts, for example human biological, cultural and environmental factors) that shape the future may not constitute the subject of research either.

4 Dynamic and comparative analysis of paradigms in futures field

4.1 Meta-analysis of paradigm dynamics

4.1.1 Characteristic features of the paradigm shift

In Chapter 2 and Chapter 3 we have seen that so far three paradigms have developed in the history of the futures field. The positivist paradigm – the futures research – came into being in the process when the futures field became a science. However, the other two paradigms – the evolutionary and the critical paradigms – took shape in the further development process of the futures field in the 1990's and the years of the turn of the Millennium. First, I show that *the two new paradigms came into existence by a paradigm shift during which the content of each component of the professional matrix of the futures field has changed compared to the content of the positivist professional matrix.*

The most striking and largest-scale changes occurred in the approach to the world and the future, the status of the futures researcher and his/her community, and in the “worthwhileness” and possibilities of social utilisation of the results of the futures field.

The positivist paradigm for futures field presumes about the future that it will take shape as continuation of the past and the present. This future is fundamentally determined but can be influenced by social activity. *The futures research can explore the futures that arise from the continuity of time and determinism and will probably follow.* On the contrary, both new paradigms assume that for the futures field the future exists primarily in the present as we can conceive the future here and now. This future is tied to man and culture. Futures thoughts are constructed by human societal actors. Human societal actors are those who can realise their futures thoughts in the future that comes into being in time. *However, the futures studies can study only the actors' futures thoughts and/or already realised futures, their evolutionary patterns, and by its results can help to improve the actors' futures thoughts.*

The new paradigms are connected with postmodern currents of thought (Hedge ed., 1998). These currents of thought strengthened the resolution of the futures field that it is possible to undertake new responses to the new challenges and the paradigm shift. As postmodern currents of thought do not offer a uniform philosophy or theory – since their essence is that the age of grand narratives has terminated – and often represent a retrograde or nihilist approach, therefore, the new paradigms cannot be linked to specific postmodern approaches either. It is the evolutionary paradigm that is connected most closely with a system of thoughts, GET, but it considers it heuristic. Having a pragmatic attitude, the critical paradigm cannot be linked to any of the postmodern systems of ideas. For the time being, it is sufficient for it to look for the points of reference, views in postmodern currents of thought that are the most suitable for it to solve its practical problems. The most important points of reference are *the symbolical sphere as the subject of scientific research, appreciation of local narratives, continuous and evolutionary development of knowledge in the societal learning process.*

Following from the changed world and future view, *the future remains open in spite of futures studies practiced in accordance with the new paradigms*. The openness of the future is more striking in the paradigm for evolutionary futures studies because evolutionary futures researchers emphasise that they undertake to show only plausible futures. In the critical paradigm, it is openness to further criticism and the possibility of conceiving acceptable/desirable futures again or further that guarantees the openness of the future. On the contrary, according to the positivist paradigm the future/futures remains/remains open only within a narrow domain that can be defined by probabilities. Nevertheless, the representatives of the new paradigms hold the view that this domain of the possibilities of the future cannot be defined at all. For this reason, their approach is indeed paradigm shifting.

The status of futures researchers has also changed in the new paradigms. While futures researchers in the positivist paradigm research the formation of the future that will follow through reality as *objective observers*, they operate in the new paradigms as *participating observers*, and carry out examinations in the symbolical sphere. Their participation is inherent because futures researchers are also part of a given culture and society and thereby of the formation of futures thoughts. Furthermore, futures researchers are also concerned in the development of futures thoughts when they study the futures thoughts of specific societal actors/stakeholders or when they employ procedures – workshop, team work – in which they are also collaborating parties. Futures researchers can research as observers in accordance with the new paradigms when they observe changes, or process the information collected about them by calculations, objective methods, or gather information about the futures thoughts of others. *Thereby the futures field has become an activity that reacts sensitively to the context of the observer, the observed and the observation*.

As a result of changes in the approach to the world and the future and in the status of futures researchers, the products of futures field and their utilisation in society have become also different through the paradigm shift. In the positivist paradigm futures researchers forecast scientifically based and plausible futures, which could be used by decision-makers for influencing the processes of the formation of the future. The possible and acceptable/desirable futures made in accordance with the two new paradigms *can be used only for further futures exploring and shaping work and as the subject of further societal discourse*. Therefore, the explored/constructed futures thoughts only indirectly have to do with the formation of the future to follow. The criteria of their goodness, reliability is also different from those of plausible futures worked out in the positivist paradigm. While in the two new paradigms criteria can be defined and required only for qualifying and the form of development of new futures thoughts, *in the positivist paradigm forecast plausible futures can be linked to the realised future as well*. It was exactly the impossibility to perform this strict and contradictory criterion and its different interpretation by futures practitioners and users that triggered the paradigm crisis.

The changes occurred in the presumed approach to the world and the future, the status of futures researchers and the quality and societal utilisation of futures products have provided a radically different approach, context for futures practices. Owing to that, significant deviations have evolved in the goal, subject, tasks and methodology of futures activity as well. While the main objective of the positivist paradigm is to explore development tendencies, the evolutionary futures studies is to present evolutionary

patterns and the critical futures studies is to criticise and develop foresights of societal actors/stakeholders. In the positivist futures research the subject of research is the reality of past-present-future, whereas in the new paradigms it is interpretation or reinterpretation and conceiving of changes/alterations. The positivist paradigm uses methods, combinations of methods suitable for studying simple dynamics that follow the arrow of time. On the contrary, the evolutionary paradigm prefers procedures that explore complex dynamics with connections and feedbacks in time. The critical paradigm employs and develops only the procedures of societal discourse in order to develop new quality futures thoughts arising from complex dynamics.

The positivist paradigm extrapolates only rational futures. It presumes that society or the individual always selects and acts rationally, or at least the resultant of societal acts will be rational. Then it will have to face the fact that the futures shown by it is not followed or selected by society and are not realised. If in turn it directs its attention to the cultural/social medium, the relation, expectations of people and their social institutes towards the future, then it will be compelled to be confronted with the restrictedness of scientific rationality, the joint, future influencing, shaping role of conscious and non-conscious relations to the future. *If it regards them as future shaping factors and intends to take account of them methodologically in making forecasts, then thereby it will cross the borders of the positivist paradigm again.*

As the content of each component of the paradigm matrix of the futures research has changed in the development of the new paradigms, *the paradigm shift having taken place in the futures field carries the characteristic features defined by Kuhn.* The most shocking change with the greatest impact in the paradigm shift was the change in futures researchers' approach to the world and the future, which can be closely linked to external criticism addressed to the futures research and changes in social needs for futures field. The depth of the paradigm shift is supported by the alteration of the terms used for futures research. While the English term in the literature for futures field practiced in accordance with the positivist paradigm is *futures research*, the futures field that complies with the new paradigms is called *futures studies*. (The Hungarian term for futures research 'jövökutatás' has not followed this change, which implies that the paradigm shift does not change the scientific quality of the futures field only the form of practising it.)

The paradigm shift helped the futures field to more accurately, more clearly define the approach, subject, form and social utilisation by which it studies the future. Thereby the undertaking of the futures field as a science has become more rational, reasonable and more suitable for the changed cultural/societal circumstances.

The paradigm shift of the futures field has also deviated from the paradigm shift as interpreted by Kuhn. Kuhn represented the view that in the paradigm shift the new paradigm would replace the old one and after that researches would be carried out in accordance with the new paradigm. The paradigm shift in the futures field has taken place *by not one but two new paradigms replacing the old positivist paradigm, while futures research is continued to be practiced in accordance with the positivist paradigm as well.* I shall discuss further analysis of this peculiarity in section 4.2.1.

4.1.2 Changes in the interdisciplinarity of the futures field

The lifeblood of the futures field is interdisciplinarity. Right from the outset, futures research defined itself also as an interdisciplinary area of science. The reason for this is that the future is a complex phenomenon in which almost every discipline can be interested; at the same time, the futures field is the area of science that undertakes systematic development of scientific theories and methodologies that serve to study the complexity of the future.

In the positivist paradigm the future developing from the past and the present can be researched on the basis of the information accumulated in disciplines and with scientific methodological solutions if futures research concentrates on *systematically connecting various areas belonging to each other in the presumed formation of the future.* By extending the positivist approach to the world to the future, the movement of time from the past through the present to the future and placement of the future in the dimension of the time to follow became emphatic.

From natural sciences and social sciences, which want to become similar to them, *the positivist paradigm of futures research adopted the fundamental methodological principle that the yet unknown and not realised future can be deduced from the known.* The future is shaped by laws, rules of probability even if the interest of futures research is aimed at the future of society or the future related to the life of man and society. Conclusions regarding the future cannot be drawn as simply as in the area of natural sciences, but scientific futures hypotheses can be developed in futures research by building the reality exploring and dynamic models of specific areas of science into complex models (for example, *Nováky ed.*, 1991). The other procedure is to build system dynamics models mapping the complexity of reality and developed in futures research, world models (for example, *Meadows et al.*, 1972), for which state-of-the-art information and knowledge and methodological solutions of sciences are used.

The models usable in the futures field can be verbal and quantified. The point is that they should reflect the objective factual and methodological knowledge accumulated in special areas of science. Classical futures research built the consideration of expert's knowledge into this fundamental approach. Subjective, expert's information is required because the positivist science can study only facts, but the futures research must have information about elements that have not become the subject of scientific analysis yet because they are just developing or being transformed. Experts have information in this respect but their knowledge in its original form is subjective. To make this information future model building information, expert's information must be cleaned of subjectivity. Keeping this in view, the positivist futures research developed the extensive storehouse of its subjective methods by borrowing, acceptance and independent development.

Through the positivist paradigm the futures research became an independent interdisciplinary area of science in which it connected scientific knowledge and expert's information cleaned of subjectivity on the basis of its own methodological system. Connecting the objective and subjective methodologies on the basis of objectivity made it possible to present the uncertainty of the complex future in the present in variations and with various rates of probability, to work out futures concepts in a transparent, repeatable and controllable form and in harmony with scientific way of thinking and scientific results.

Interdisciplinarity of the positivist paradigm of futures research was successful because it was worked out with the participation of philosophers of science, practitioners of natural and technical sciences, economics and sociology. Lots of them have become futures researchers and have practiced this area of science ever since.

The two new paradigms of the futures field have preserved the interdisciplinary character of futures research, although they have considerably transformed it. Both paradigms, laying the emphasis on the future shaping role of the human factor, were conducive to further and increased integration of social and human sciences into the futures field. Focusing on the role of culture that determines society, the individual and science, both paradigms interpret the future as a construction of human thought. That is why now an important part is played in the production of the future as a construction of thought by the interpretation, reinterpretation of connections between the past, the present and the future – feedback of the future to the interpretation of the past and the present – by exploration, criticism and further development of futures thoughts. Thereby the emphasis was shifted to social and human science interdisciplinarity. Invariably, it has remained typical for the practitioners of various areas of science to rush into the area of futures studies; what is more, this is the main source of their recruitment and growth of their group.

The *evolutionary paradigm*, stressing the openness and human construction of cultural evolution, *solves studying of complex dynamic patterns in various contexts by building models that are able to integrate information of various areas of science.* It is typical of model building that it is aimed at representing the dynamic interactions of the past, the present and the future. The models study, e.g., the forms of appearance of instability, their connections and changes in their dynamic quality, the scope of issues of emergence, possible social responses to environmental changes, the consequences of the competition and collaboration between actors/stakeholders. In the examinations, modelling *tries to achieve interdisciplinarity of the widest range with respect to use of scientific information*, while it subordinates it to its own examination criteria and the methodology of its paradigm. *The methodology of its paradigm is imbued with the scientific way of thinking that is no longer positivist but evolutionary.* Information is always valid in a restricted form and is never complete; current information is every time formed by cultural/societal values and expectations; information has to be reproduced and developed continuously. That is why evolutionary patterns and/or scenarios show the futures that are possible only in the given context and at the current stage of science. An important part was and is played in the development of the evolutionary paradigm by philosophers of science and society, evolution researchers, scientists who model open and complex/adaptive systems and scientists who come from the area of sociology, political sciences, cultural anthropology, ethnography, management sciences.

The *critical paradigm came into being* in order to develop the acceptable and/or desirable futures thoughts of social groups, communities and place them in the transformation cycle of society. It represents the approach that the future of society is created by societal actors/stakeholders who have foresight. The knowledge of the future as any human knowledge is a changeable social construction embedded in culture that reflects on the observed, the observer and the circumstances of observation simultaneously. The knowledge of acceptable/desirable future is also open because it can be continuously reshaped, extended and developed. *The new interdisciplinarity of the*

paradigm lies in the fact that it concentrates only on production of new knowledge concerning the future by connecting various kinds of knowledge of the future – scientific, empirical knowledge of the future, anticipations, fears shaped in the mind of individuals – in a manner that generates new knowledge of the future. What it connects is not entirely scientific knowledge but the process of connection – as it is solved by critical futures studies through its special methodology – is a scientific procedure.

The critical paradigm borrows, transforms and links knowledge connection and development procedures from sociology, the humanities, theory and research of learning, theory and research of communication, science of politics, researches in political sciences and psychology etc. The critical paradigm, turning towards hermeneutics, survey techniques and communication procedures, transformed them into the analysis of future-orientation, causal layered analysis or so-called futures workshop. From theoretically based procedures of societal learning and societal communication it developed anticipatory action learning, action-oriented and participative foresight procedures pursued with the participation of stakeholders and/or lay civilians. Its procedures are transparent, repeatable, controllable, comparable and can be reflected upon. However, the *interdisciplinarity* of the critical paradigm *is restricted to the areas of social and human sciences and the development of verbal/qualitative methods and procedures and their connection.*

We should notice the new characteristic features of the period following the paradigm shift: *the futures field operates not only as a renewed interdisciplinary science but can also be more and more linked with other interdisciplinary researches and sciences.* In this respect it is the so-called organisational foresight that excels: it stresses that it is a part of futures studies, while it is also connected with management sciences.²⁹

It implies the formation of *research relations between futures studies and psychology* that both of the two new paradigms of futures studies attribute a determining role to the human factor in the development, formation of futures thoughts. The relation and approach of the individual to the future is the link that represents the possibility of interdisciplinary researches between the futures field and psychology.³⁰

²⁹ The following descriptions of organisational foresight and related statements imply the dual ties of organisational foresight. *Miguel Cunha* asserts that organisational foresight is practicing foresight at organisational level. It is a learning procedure in which participants create their visions of the future. It focuses on the present because under rapidly changing and instable circumstances the future cannot be forecast, whereas in the course of strategic dialogues and collective adaptive learning processes it is possible to develop thinking about the future in an organisation (*Cunha*, 2004). (See also *Costanzo*, 2004, *Karp*, 2004, *Tsoukas & Shepherd*, 2004, *Daheim & Uez*, 2006, *Bishop & Hines*, 2007 and *Gáspár*, 2008). *Sandro Mendoca et al.* propose to supplement strategic management with wild cards management (*Mendoca et al.*, 2004). Wild cards management addresses the issues of perception and interpretation of weak signals and development of improvisation skills of the organisation. *Athi Salo et al.* operate with the new term of the so-called *responsive foresight* to enable the organisation/sector to develop all kinds of its knowledge jointly in order to be a successful survivor (*Salo & Könnöla & Hjelt*, 2004). The goal of responsive foresight is to generate new knowledge, i.e., to reduce dependence on paths at the level of both participants and the community (*Könnöla*, 2005).

³⁰ *Mihály Csíkszentmihályi*, e.g., considers it one of the new areas of research of psychology taking shape that it will have great significance in the future also for the individual that he/she can assume and can bear responsibility for his/her own future and the future of his/her communities and creations and nature that is in relation to him/her, and that his/her acts should be not only useful but also ethical and aesthetical. To this end, the individual should both know about and believe in the future and should identify with the assumed

Collaboration between *futures studies and computer sciences* is taking shape in the development of online forms of futures methods and procedures, development and operation of online forecast/foresight processes. These connections are in an initial phase yet but indicate the evolution of a new interdisciplinary research area where the futures field with all of its three paradigms is one of the collaborating areas.³¹

4.1.3 The futures field becoming a post-normal science

The futures field became an independent science as a positivist, normal science in the 1970's and 1980's. It was on the basis of the criteria of science dominating in that period – having a real subject; production of objective information by employing scientific methods; verifiability of new information – that it determined the subject of scientific futures research, its theoretical/methodological bases, procedures and rules of verification. *In terms of the positivist paradigm, the future is a latently existing reality of which objective, verifiable preliminary information possessing probability can be produced in the process of making forecasts.*

Futures research practiced in accordance with the positivist paradigm *became a basic and applied science* because it solved its theoretical/methodological problems through fulfilling fundamentally particular forecast tasks. Basic researches were carried out when with respect to a specific field there was a need to work out the theoretical background, subject, goal, methodology, rules and process of employing methods of forecasts including defined points and procedures of control. Clear basic research results took shape in methodological guidebooks and other publications covering mainly partial areas to enable applicators to base their forecasts on them. That is how it is possible to standardise scientific/technical, economic, corporate, population forecast etc. methodologies, and then, through their synthesis, the futures textbooks and books containing the positivist paradigm. The positivist paradigm did not become a rigid system because it further developed its methodology and methods by adjusting them to the new problems and circumstances of reality, and extended the possibility to practice futures research to new areas. Such areas were social forecasts, environmental forecasts, long-term complex forecasts and world modelling etc. Futures research is pursued in the positivist paradigm fundamentally in the form and with characteristic features of normal science because it has one paradigm and as a result of the independence of science it works in accordance with its own internal laws.

future (Csíkszentmihályi, 2007). István Kappéter also details the areas of connections between psychology and the futures field and the tasks that psychology can fulfil in the formation of the future (Kappéter, 2003).

³¹ A leading role is played in the domestic futures field in working out computer and online forms of futures methods and procedures, for example, by Béla Sipos and his fellow researchers (Kiss & Kruzslicz & Sipos & Szentmiklósi, 1997), in the development of evolutionary forecast algorithms and their online use by László Pitlik and his research team (<http://miau.gau.hu>), in online multiagent modelling by Uri Wilensky's team (<http://ccl.norwester.edu/netlogo>). Examples for working out online and partly online forecasts/foresights are provided by Jerome Glenn's Millennium project (www.millennium-project.org), the interactive climate model developed by Ben Metthews's team (www.climate.jcm) and the partially online foresight of Éva Hideg, Erzsébet Nováky and András Vág (Hideg & Nováky & Vág, 2007) and another one was also developed by Éva Hideg, Erzsébet Nováky and Péter Alács recently (Hideg & Nováky & Alács, 2014).

The futures field has become an up-to-date and post-normal science through the paradigm shift. I prove this statement by showing how the two new paradigms have contributed to the qualities of post-normal science having developed and having become recognisable also in the futures field.

On the basis of the summary made by *Silvio Funtowitz* and *Jerome Ravetz*, *post-normal science* is a form of operation of science having become typical by the turn of the Millennium which is characterised by the following (*Funtowitz & Ravetz, 1993, Ravetz, 2004*):

- Post-normal science develops in areas that research issues closely related to practice where uncertainty of information is much higher than in other researches.
- Post-normal science takes account of user's aspects to a much higher extent than basic researches further away from practice because research findings affect users' circumstances in life, interests and values. For this reason, such research results have to be evaluated also in terms of the so-called extended peer review, users' usability aspects as well.
- Post-normal science develops through problem-oriented researches, owing to which such researches are sensitive to problems, reflective and self-reflective in problem solving.
- Post-normal science is characterised not only by multi- or interdisciplinarity but also by the connection of theoretical and practical knowledge.

Both in its evolution and operation within the positivist paradigm, futures research complied with the first criterion because it researched issues closely related to practice. Its purely scientific interest in studying the future was every time inspired by the need for practical application. However, within the positivist paradigm and form of operation of a normal science it presumed that scientific knowledge obtained about the future is the primary and best quality knowledge of the future. Therefore, regarding practical forecast issues this scientific futures knowledge (presumption) system and methodology must be applied even if we are aware of the fact that the future and our knowledge about the future is uncertain, and only restricted rationality can be valid with regard to preliminary information about the future. In this respect the two new futures paradigms have brought the turn that uncertainty of the future is evolutionary, it is not possible to reduce the uncertainty of the future even by scientific forecast and foresight, the only aim that can be set is making this uncertainty manageable for man and society. Therefore, futures studies pursued in accordance with the new paradigms regards the future as a construction of human thought that exists in the current present. *The future approached in this manner is open and will remain open within fulfilment of tasks in accordance with both paradigms.* For this reason, the evolutionary paradigm undertakes only to map, study and restudy evolutionary patterns as possible futures or solutions of problems. The critical paradigm leaves also acceptable/desirable futures open to new criticism and reconsideration. The central issue of studying both the possible and acceptable/desirable futures is facing the uncertainty and risks of the future.

Taking account of user's aspects belongs to the core of futures studies carried out in accordance with both paradigms. Both of the new paradigms *consider the scope of issues of cultural/social/human values an organic part of the future*; therefore, they regard them as changing, changeable elements in their researches. None of the futures

studies practised in accordance with any of the new paradigms is postmodern in the sense that they do not consider all cultural/social/human values good from the first because they handle values in the contexts determined by the paradigms. The evolutionary paradigm addresses the problem of values as one of the components of futures patterns and the critical paradigm as the main shaper of futures thoughts. It follows also from this that *there are always different kinds of futures and they embody different kinds of values.*

Furthermore, the evolutionary paradigm considers user's aspects so much important that it deems it is necessary even paradigmatically to carry out further societal discourse about the future or another research phase involving users to enable them to develop their own futures concept. The critical paradigm reckons from the first with the fact that users themselves develop their own and jointly assumable/assumed futures thoughts through taking part in participative procedures. Both standpoints are a possible form of the solution of the so-called extended peer review in futures studies.

With respect to sensitivity to problems, reflectivity and self-reflection, the paradigm shift has brought significant changes in the futures field. Although the process of the futures field becoming a science was also urged by sensitivity of science to practical problems, the positivist futures paradigm represented a kind of scientific synthesis rather than the development of a new and independent form of problem solving for handling the future. Futures research practiced in accordance with the positivist paradigm was also sensitive to problems and was self-reflective to the extent that it came out of the paradigm crisis by looking for the directions of its further development and by developments. It was the paradigm shift that turned the futures field into a science continuously perceiving problems and reflecting upon practical problems also by further developing itself, whose self-development and self-improvement are "programmed" into its *modus operandi* from the outset.

In the paradigm shift, self-reflection of the futures field was aimed at criticising and correcting inadequacy of the positivist paradigm. The new approach to the future and handling the future in the form of the two paradigms arose from connecting sensitivity to problems with self-reflection. *Simultaneous researches and reflecting upon the research of each other* carried out in terms of the two new paradigms made it possible to generate creative tension within the scientific practices of the futures field, which assumes a form of motion in the competition of paradigms. (I shall discuss the competition between paradigms in details in section 4.2.1.) Practicing the futures field in accordance with the two paradigms enabled the futures field to take account of the needs of changing societal practice with greater sensitivity and higher degree of freedom and to *respond to them reflectively*. This has been also conducive to the scientific futures studies having become more and more widely known, *to the two new paradigms having spread at an accelerating rate in futures studies and to foresight techniques having become widely known and acknowledged new futures practice.*

The paradigm shift has reinforced the interdisciplinary quality of scientific futures studies by *adapting and integrating the results and procedures of other areas of science in the special approaches of futures studies*. The evolutionary paradigm has maintained the relation with a wide range of special sciences, while it has strengthened and deepened its ties with social sciences. On the contrary, the critical paradigm has developed close relations with associate social sciences and human sciences.

Although both of the paradigms refused futures research practiced in accordance with the positivist paradigm, they use the information, experience accumulated by it through integrating them into their own approach; they employ certain procedures and methods of the positivist paradigm in a further developed form. The process of the futures field becoming a normal science and then a post-normal science has extended and deepened the information obtained about the nature of the future, the possibilities of influencing and shaping the future and the connection of the future with the present and human activity. It has been conducive to the activities addressing the issues of the future having become widespread, diverse and increasingly conscious in contemporary societies.

The paradigm shift and the new paradigms have not been able to renew the futures field in connecting theoretical and practical futures knowledge (Hideg, 2007/b). The evolutionary paradigm, responding to practical problems, produces new, mostly theoretical information and develops new methods, mainly modelling techniques. On the other hand, the critical paradigm can efficiently participate in solving practical futures problems through its participative procedures. In the course of the competition between the two paradigms, important aspects are thrust into the background: such as (i) processing of the experience and knowledge of forecast and foresight techniques pursued in practice, which enrich theoretical and methodological knowledge; and (ii) utilisation of evolutionary theoretical/methodological futures knowledge in solving practical forecast and foresight tasks. Therefore, building close relations between theory/methodology and practice of different futures fields is one of the important tasks in further developing the futures field.

4.2 Comparative meta-analysis of paradigms

4.2.1 Alternativeness and competition of the new paradigms

As the two new paradigms of the futures field are taking shape and working at the same time and their initial presumptions and problems are common but they react to them differently and work out different ways of responses, *the evolutionary and the critical paradigms represent alternative and competing paradigms within contemporary futures studies.* I support this statement by the comparative analysis of the two new paradigms.

Both of the two new paradigms have developed a fundamentally identical standpoint with respect to their approach to the world and the future, the status and tasks of futures researchers and the social utilisation of futures studies. Both of the paradigms have developed a new standpoint about the future by adopting the approach in which the future is tied to man, culture and society. The future is constructed and shaped by societal actors. It is the future that exists in the present that is important because futures thoughts serve as a compass for the actions of societal actors/stakeholders. In evolutionary sense, the future is open, and futures thoughts can be further developed, transformed. Futures researchers can study futures thoughts as participating observers and can help formation and development of the futures thoughts of societal actors /stakeholders.

If futures researchers have agreed in the approach to the world and the future, the status of futures researchers in research and the social role of futures studies, then a new paradigm could have developed. The reason why this is not what has happened is that futures researchers have worked out considerably different answers to the rest of the components of the paradigm matrix – the goal, task and methodology of research. These

different answers apply to performance of the futures activity; therefore, *the two new paradigms can be regarded as alternative solutions of a group of research tasks.*

If we want to see behind the differences in the approach to performance of futures activity, then *it will be necessary to take account of minor deviations* that can be identified in the approach to the world and the future and in judging the status and tasks of futures researchers and social utilisation of futures studies.

It is true that both paradigms came into being as discovery of the future that exists in the present but the evolutionary paradigm, in addition to that, knows about real-time time dimensions and realised future as well. In the analysis of the evolutionary patterns of societal reality and the presentation of possible futures it actually uses the connections between and shapability of the complex dynamics of the past, the present and the future. On the contrary, the critical paradigm regards the complex dynamics of time as a quality that human foresight possesses from the first. Therefore, the critical paradigm studies human foresight and possible ways for its correction rather than complex dynamics. It follows from this that the two paradigms use different methodology: while *the evolutionary paradigm considers evolutionary patterns cognitive interpretation, the critical paradigm handles human foresight as generally construed human interpretation, which is imbued with intention and emotions concerning the future.*

In both paradigms a determining role is fulfilled by man, the individual as an actor/stakeholder of society. In the evolutionary paradigm man plays an important part as one of the components of the developing societal/cultural complexities. When the evolutionary futures researcher studies their evolutionary movement, he/she gains information about the values, goals and activities as well as changes of man and their social institutes. That is why new values and goals of the social periphery or locally emerging new seeds of values and needs or the intellectuals' activity that produces new values are important. This information is a part of the cognitive mapping of the changing societal reality. In contrast with that, the critical paradigm focuses only on the relation and approach to the future of the individual and their groups and aims to develop it in a common learning process. As a matter of fact, this requires a different methodology than the studying of the patterns. The evolutionary paradigm also deems the futures thoughts of societal actors/stakeholders and their development to be important but it can only contribute to it by showing evolutionary patterns. Within a following research phase within the paradigm, which is not worked out yet, it might help in forming futures concepts to be implemented in particular space-time and by actors/stakeholders.

It also follows from the fact that man is in a different position in the two paradigms that *the two paradigms have a somewhat different approach to the operation of society*, to be more precise, to social democracy and the futures researchers' task and social function. The evolutionary paradigm thinks in terms of indirect democracy because it focuses its attention on institutionalised knowledge, information and futures concepts to enable the futures researcher to show various possible futures. On the contrary, the critical paradigm deals with foresights, expectations towards the future and their development, by presuming participative democracy and the individual's conscious future building activity. By his/her activity the evolutionary futures researcher represents a kind of institutionalised knowledge about the future based on scientific examinations. Whereas the critical futures researcher acts as the facilitator of the development of various foresights, expectations and anticipations. He/she explores and criticises the approach to

the future of societal actors/stakeholders as a task subordinated to his/her facilitator's activity. The evolutionary paradigm also reckons with responsible participative democracy but only as an element that is desirable at the level of the particular time and locality. On the other hand, the critical paradigm emphasises that people, groups of societal actors/stakeholders must deal with their future independently and with responsibility. In other words, the evolutionary futures researcher first produces scientific futures knowledge and then collaborates with local actors/stakeholders in working out and further developing their futures concepts, and/or local actors/stakeholders can carry out this task by themselves. The critical futures researcher helps the formation and further development of the futures concepts of local actors/stakeholders by his/her criticism and procedures that induce learning.

If we compare the *fundamental methodological principles* of the two paradigms, then differences dominate. The evolutionary paradigm is strongly linked to new scientific approaches and research trends. The evolutionary paradigm is related to GET, because it finds that the connection between various time horizons – the past, the present and the future – has up-to-date fundamentals in this new scientific approach. That is why its methodology focuses on working out the methods of studying and social procedures of becoming something, formation/development and human/societal responses to challenges. It is on these bases that it deems that it can address the issues of the future as an up-to-date science. Whereas the critical paradigm tries to develop its understanding, construing approach to the future and methodology by setting out from practice. To this end, it turns towards postmodern philosophy and theory of science and new subject areas of social sciences – societal learning and theory of communication, action research, etc. – but it does not borrow any approach; based on its pragmatic attitude it selects and grasps elements from them and together with actors/stakeholders assumes a pioneer role in working towards futures constructions, instead.

In terms of methodology and applicable methods, both new paradigms have strikingly different solutions. The evolutionary paradigm prefers modelling of complex dynamics of society and its quantitative and qualitative techniques, while the critical paradigm prefers societal/poststructural discourse and the techniques developed for simulating it.

The current approach to the future of both paradigms shows postmodern qualities because they think in terms of several futures. By showing several kinds of futures, the evolutionary paradigm stresses the openness and uncertainty of the future but *presumes and is confident that the world will be rearranged and a new order – a new element of the evolutionary pattern – will take shape, even if it comes into being merely in the diversity of its variants.* The current approach to the future of the critical paradigm that exists in mosaics represents not only the openness and uncertainty of the future but also the fact that *the future will be various and mosaic-like in its realisation.*

As both paradigms are taking shape and operating in the same period, they compete with each other (Hideg, 1998/b). This competition is clearly shown by the fact that research projects are getting increasingly separated in terms of the paradigm they are committed to. This commitment is mostly expressed by the views that the researchers hold in specific projects regarding the following issues: whether or not the future can be foreseen; whether the relevant project seeks to present futures possibilities or find answers to the methodological questions of the development of assumable/desirable

futures. Both paradigms have developed their peculiar terminology, which makes them identifiable in specific research projects. Furthermore, numerous projects organised around methodological issues within specific paradigms support the reasons for their research goal and task by proposing an approach that is scientifically more well-founded than the other paradigm, or seek answers to questions that the futures field has not been able to answer yet.

Nevertheless, there are so-called *mirror projects*. They are based on the alternativeness of the new paradigms. They are researches that interpret a particular term of the other paradigm in accordance with the paradigm they adhere to and try to work out a new methodology for the new interpretation. A wide range of mirror projects arise from the fact that the term 'foresight' was originally employed by the critical paradigm, but now it is generally accepted in the evolutionary paradigm, stressing that the aim is to present possibilities, evolutionary patterns, i.e., to make evolutionary foresight rather than to make forecasts. Mirror projects are quite frequent in the research of emergence, formation and so-called weak signals (Hideg, 2006). These two terms applied originally by the evolutionary paradigm are construed, used and developed also by projects that belong in other respects to the critical paradigm. By placing the categories in the societal learning and communication process they seek answers to the question how new information is formed in the inter-subjective communication or how weak signals can generate new information (Loveridge, 1998, Hideg, 2006, Küttim, 2006), or how the media generates manipulative signals in the communication process and how they affect, e.g., the hype cycle and foresight of new technologies (Rip, 2002).

The competition between the new paradigms is taking place both in theoretical/methodological researches and practical applications. This is implied by the efforts of the evolutionary futures studies to reach the stage of particular practical applications with regard to particular questions about the future (e.g., sustainability, climate change) as well³². Whereas the critical futures studies seeks to find theoretical support outside the futures field for its foresight procedure generally used in exploration of the desirable future of societal actor/stakeholder groups³³. Both research trends work independently towards making their own paradigm complete from theory to practical application as the only proper form of dealing with the future. This competition urges the future field to develop its approach, methodology and correct its methods. As a result of the competition, *each paradigm has become more specified and precise and more identifiable by users as well as non-futures researchers.* The competition has made it clear that *there is a need for both paradigms* because they focus on different future shaping factors and processes.

The competition of paradigms has given rise to unproductive forms and harmful side effects as well. Unproductivity of the competition of paradigms is implied by the fact that scientific communication between futures researchers committed to relevant paradigms often becomes one-sided through the debate between them being confined to the topic of the unsuitability and unusability of the other paradigm, i.e., researchers of

³² See, for example, the Java Climate Model, which is based on IPCC reports (www.climate.be/jcm), or the rough scenarios of GEO4 proposed for specifying local issues in particular terms (www.unep.org/geo/).

³³ A good survey of researches to provide theoretical bases for the foresight procedure is supplied by the special thematic edition of the Futures entitled Futures Methodologies (Futures, 2009. 41, 2, ed. Laurent Mermet, Ted Fuller and Ruud van der Helm).

each paradigm fail to communicate on the merits. *Communication disorders prevent competing paradigms from being developed by being criticised by each other.* This causes disorders especially in the connected development of futures theory and practice when one of the competing paradigms adds mostly to theoretical/methodological information, while the other one enriches mostly the practical/methodological knowledge. *It is also communication disorder between the paradigms that lies behind the now observable weak relation or quite often lack of any relation between the futures theory and practice (Hideg, 2007/b).*

In addition to the communication disorder, now there are *new efforts to become separate and independent* taken by *foresight activity adjusted to serving a kind of demand of the political/institutional decision-making process* through regarding solely the procedure developed by it as a legitimate and authentic foresight, while it does not consider itself part of the futures field (*Country Specific Practical Guides to Regional Foresight, 2002, Keenan & Miles & Koi-Ova, 2003, Havas, 2003*). The efforts to become independent taken by the so-called autonomous (*Keenan, 2006, Keenan et al., 2006*) or practice foresight (*Hideg, 2007/b*) do not represent any problem because a settled peculiar foresight practice³⁴ capable of further developing itself could become independent as a trend or school within the futures field or the critical futures studies since it uses basically the tools of the futures field. It causes problem by doubting legitimacy of other kinds of foresight practices instead of adopting a critical attitude towards them. *The futures field might get rid of the harmful forms and effects of the competition between paradigms by operating its self-reflectivity linked to its reflectivity, i.e., it should be self-reflective through reflecting not only on itself and the other paradigm but also on changing needs of practice.*

4.2.2 Set of paradigms of the future field

The development of the futures field so far has resulted in three paradigms. *The three paradigms allow scientific solution of three kinds of futures tasks* subject to what societal needs each paradigm responds to and by what scientific apparatus they can satisfy them.

The positivist paradigm recognised the societal need *for gaining preliminary information about the future, which is important to social governance and its institutions.* The positivist paradigm determined the form how this need can be satisfied by scientific tools. This paradigm asserts that by focusing on futures that will probably follow, development tendencies can be explored and can be extrapolated by making them conditionally probable.

The evolutionary and critical paradigms responded to the societal demand that *societal actors want to shape their future in the globalised and postmodern world (Kiss, 2005/a).* Social instability and growth of actorial freedom highlighted the existence of the future in the present, the issue of exploration of possible and acceptable/desirable futures. The evolutionary paradigm, by studying complexly construed possible futures, gives help to actors by exploring evolutionary patterns to develop their futures concepts. The critical paradigm provides direct help to societal actors/stakeholders and their groups for shaping

³⁴ The thought and methodology of autonomous foresight interpreted outside the futures field can be found in the literature of technological and regional foresight and institutional foresight.

their concepts about acceptable/desirable futures. The form of this help is the societal/poststructural discourse techniques developed by the critical paradigm and arranging them in a foresight process that follows users' purposes.

The three paradigms together constitute a set of paradigms by which the futures field can solve three kinds of practical forecast and foresight tasks. The positivist paradigm can be used well for forecasting stable, short term and partial processes that can be changed by human activity with difficulties or very slowly. Whereas the two new paradigms can help to construct the future of instable processes that can be shaped by human activity.

Each of the paradigms constituting the set of paradigms both differs from and is similar to the rest of the paradigms. Their similarity is rooted in the fact that they are built from identical paradigm components. Similarities can be identified when *we compare the range of interpretation – the range of domain – of each paradigm component in terms of the various paradigms. The common areas that can be found in the range of interpretation carry the similarities. The ranges of interpretation also have different parts, which add to the difference of the paradigms.* Even in the exploration of similarities we should not forget that the set of values, interpretations – the range of codomain – that belong to the range of interpretation of various paradigm components are different since each of them is a constituent part of a different paradigm! In what follows, however, I shall focus on the ranges of interpretation of paradigm components.

In terms of the approach to the future, *the positivist paradigm interprets the future taken to refer to the future* as it is taking shape from the past and the present. Both the evolutionary and the critical paradigms interpret the future in the present. *By taking the future to refer to the present the two new paradigms further widened the range of interpretation of the approach to the future.* However, the evolutionary paradigm does that without forgetting about the succession of the past, the present and the future in real time, i.e., the connection of the future to the future time. In the evolutionary pattern and in its studying, the events of the past, the present and the future are interpreted in the present and are turned into present but the arrow of time is built into it. In contrast with that, the critical paradigm focuses only on the formation of the present of the future. *With respect to the range of interpretation of the approach to the future, the common part of the positivist and the evolutionary paradigms is the future in the future. The common range of interpretation of the evolutionary and the critical paradigms is the future in the present.*

Concerning the status of the futures researcher, the positivist paradigm asserts that the futures researcher is an objective observer, while the two new paradigms regard them as participating observer. *The observer's status is common in all the three paradigms but the participant's status is added to it in the new paradigms. In this manner the new paradigms extended the researcher's status, function compared to that of the positivist paradigm.*

The ranges of interpretation of the research subject, goal and task do not contain any common parts. The subject of research in the positivist paradigm is taking development tendencies to refer to the future, while the evolutionary paradigm focuses on evolutionary patterns taken to refer to the present, and the critical paradigm is concerned in the development of the future of actors/stakeholders desirable in the present. *Nevertheless, it might occur as a special case that the three different research subjects*

have a common partial set. This might arise when the desirable future/futures of actors/stakeholders appears/appear in the domain of the possible futures set by the evolutionary pattern as well, furthermore, if these acceptable/desirable futures can be also probable futures or the other way round. The possible futures implied in the evolutionary patterns and the acceptable/desirable futures of societal actors/stakeholders can be connected easier than acceptable/desirable futures and probable futures. The former ones are of a same kind because they are based on the ‘present of the future’ approach to the future. However, the latter ones are categories of different approaches to the future – the future in the present and the future in the future. The possible futures implied in the evolutionary patterns and the acceptable/desirable futures of societal actors/stakeholders can represent research subject, goal and tasks that can be, in theory, “connected in line” because they are based on fundamentally identical approach to the future. This theoretical option is indicated by the concept of the evolutionary paradigm that seeks to connect exploration of evolutionary patterns in a new research phase to examinations in particular space-time.³⁵

With respect to methodology, all the three paradigms have common ranges of interpretation. The positivist paradigm is the methodology of modelling simple dynamics, while the evolutionary paradigm is the methodology of modelling complex dynamics; therefore, modelling is the main methodological procedure in both of them. The evolutionary paradigm further widened the range of interpretation of the methodology of modelling compared to the positivist paradigm. The critical paradigm opened a new domain of methodology by creating the methodology of societal/poststructural discourse. The common part in the range of interpretation of the methodology of the positivist and the critical paradigms is that both of them can use experts. However, the critical paradigm deems that its main task is to involve, in addition to experts, various actors/stakeholders. There are common parts in the range of interpretation of methodology of the evolutionary and the critical paradigms because both of them attribute a determining function to future shaping role of actors/stakeholders. This common part is applicability of scenario building techniques in researches carried out in accordance with both paradigms.

With respect to the range of interpretation of social utility, similarities can be found in all the three paradigms. *A common element in all the three is utilisation of futures research results in providing scientific bases for community and professional policy decisions.* In addition to that, the two new paradigms have opened new fields of utilisation – forming futures concepts of various level social institutions, actors/stakeholders. With respect to goodness of research results, the positivist paradigm is guided by the positivist criteria of science, while the two new paradigms adjust to the post-normal criteria of science. In this respect the evolution of the two new paradigms has widened the range of interpretation.

There are fewer similarities between the positivist and the new paradigms than between the two new paradigms. The new paradigms are similar mostly in terms of their

³⁵ E.g., GEO4 makes the future of the global environment dependent on the rough scenario of four types of possible social reactions to environmental problems. It expects specific regions, societies and their actors to shape their possible and/or acceptable/desirable future within the frameworks of further local researches led and/or helped by futures researchers (www.unep.org/GEO/geo4/). The Java Climate Model quoted above is an interactive model that enables users to carry out model experiments and form possible and/or desirable futures on the basis of their own data series and presumptions (www.climate.be/jcm).

approach to the future, assessment of the status of researchers and social utility of research results since they were created in response to the same social challenges.

Comparison of the range of interpretation of paradigm components shows *that the creation of the new paradigms has widened the range of interpretation or domain of each paradigm component compared to the positivist paradigm.* In specific paradigms there are parts in the range of interpretation or domain of all paradigm components that *can be found in every paradigm and are common per paradigm pairs.* These common ranges of interpretation indicate, on the one hand, what is preserved while being terminated – what continues to exist while being slightly transformed and assuming new interpretation – in the new paradigms from the positivist paradigm, and, on the other hand, why the new paradigms are alternative paradigms.

The examination of the range of interpretation or domain of paradigm components reveals how new paradigm variants come into being and how they can be produced from a given paradigm set. This mechanism is as follows

- either by extending the range of interpretation or domain of one of the paradigm components and reinterpreting the changed content of the component in the given paradigm subject to the interpretation of the rest of the components,
- or by placing the range of interpretation of one of the paradigm components in accordance with one of the paradigms into another paradigm and redefining its interpretation in terms of that,
- or by combining the different ranges of interpretation of an identical paradigm component of two different paradigms and then placing them into one of the paradigms and reinterpreting them therein,
- or by applying these elementary mechanisms linked to each other.

Using the notations of the paradigm matrix for futures field introduced in section 1.3.2, creation of the paradigm variants for futures field can be described as follows: (See Table 9)

Table 9. *Creation of paradigm variants for futures field*

Creation of variant	Changes in C_i	Changes in E_{jt}	
		New interpretation in the relevant point of time	New interpretation in the following point of time
Extension: $(c_i)_t + a$	$((c + a)_i)_t$	$E_{(j+1)t}(((c+a)_i)_t)$	$E_{j(t+1)}(((c+a)_i)_{(t+1)})$
Placing $(c_i)_t$ in the place of (c_i) of the $(t+k)^{th}$ point of time	$((c_i)_{(t+k)})$	$E_{(j+1)t}(((c_i)_{(t+k)}))$	$E_{j(t+k+1)}(((c_i)_{(t+k+1)}))$
Combination: $(c_i)_t + (c_i)_{(t+k)}$	$(c^+)_i)_{(t+k)}$	$E_{(j+1)(t+k)}((c^+)_i)_{(t+k)})$	$E_{j(t+k+1)}((c^+)_i)_{(t+k+1)})$

Source: Self-made

Reinterpretation of the modified c_i -s will result in an alternative paradigm variant in the relevant point of time or a paradigm variant applying to the following point of time if the new c_i variant and its reinterpretation contributes to the renewal of the old paradigm.

These mechanisms are similar to the mechanisms of biological mutation, crossing and combination. In the creation of paradigm variants it is an applicable criterion whether the new variant is viable or not. This criterion can be asserted by *subordinating the creation of the new paradigm variant to the solution of a new theoretical or practical task.* Furthermore, by other researchers responding to the creation of the new paradigm variant by following, refusing or further developing it. The elaboration of the values, new interpretations of paradigm variants by scientific research activity of futures practitioners pools, in addition to self-reflection, efforts to adopt the scientific findings of related areas of science through recognising the multi- or interdisciplinary nature of the relevant subject area and endeavours to voice the new results of the theory of science in the futures field. (I discussed the meta-analysis of these issues in details in section 4.1.)

The creation of paradigm variants can be clearly identified in the practices of the futures field as well. The prospective futures trend in the 1970's and 1980's (see section 2.2.1) can be construed as a paradigm variant of the positivist paradigm. By attributing a great role to human choice, this trend included man in the future shaping factors, and assigned the task of the formation of desirable future to him. Thereby it extended the subject and goal of its research but solved them in the positivist paradigm; therefore, it only softened development tendencies. At the same time, this paradigm variant provided the greatest help for new paradigms to develop. Therefore, it is not by chance that *Eleonora Masini*, representative of the prospective futures trend became the futures researcher who gave full exposition of futures studies for the first time (*Masini*, 1993).

The following two examples do not constitute a futures trend, only method development work that implies creation of a paradigm variant. One of the examples is a forecast work carried out by *Éva Hideg, Erzsébet Nováky, András Vág and Sándor Kuti*, in which they arrive at an option of the future of Hungary outlined from connecting development trends to the expectations of the population (*Hideg & Nováky & Vág & Kuti*, 2005). However, they used the advance calculations made with trends to explore the stability or instability of the time series of domestic macro indicators. They presumed that in the areas where time series indicate stability, the course of processes cannot be fundamentally changed by subjective futures concepts. Where objective indicators show instability, subjective expectations and futures concepts might have a future shaping role. To translate this into the language of paradigms, they borrowed the analysis of development trends from the methodology of the positivist paradigm but they transposed it to the pattern exploration methodology of the evolutionary paradigm by examining stability/instability by time series.

The other example shows that the elements of certain methodological components of the evolutionary and the critical paradigms can be applied also by connecting them. Canadian futures practitioners came up with the idea that in exploring sustainable agricultural futures they would include societal actors/stakeholders in the quantitative modelling from the beginning of modelling works (*Charma & Carmichael & Klinkenberg*, 2006). They did that to enable the models to give answers to the questions that concern stakeholders regarding their future. By model building and experiments

carried out together with stakeholders, on the one hand, they provide stakeholders with scientifically based information for developing their own futures concepts, and, on the other hand, they confront stakeholders with probable consequences of their futures concepts formed in workshops. In this manner this futures exploring technique represents a new and peculiar foresight procedure.

The procedures referred to as examples show that *the variation and selection driven development has been present in futures practices since it became a science*. Evolution of new and alternative paradigms might strengthen this form of development because it is easier to connect, modify and combine (recombine) the various components of the two new paradigms similar in terms of their approach to the future, assessment of the status of futures researchers and social utility and utilisation of the end product than the components of the positivist paradigm and the new paradigms that represent an entirely different approach to the future. If it is possible to assign goals and results that can be handled also by practice to the new variants, then viable paradigm variants can be created. This process might be going to take place as the evolution of new futures trends and schools. *Today the option of the variation and selection driven development is exercised by the futures field only to a low extent yet because alternative paradigms strive to defeat rather than reflect upon each other or to create paradigm variants by building them from each other.*

The meta-analysis of the paradigm set of the futures field shows that creation of a paradigm variant has been started in the futures field within a single paradigm as well. The existence of the paradigm set might reinforce creation of paradigm variants, i.e., the process when futures practitioners determine new part tasks and make them solvable. Creation of paradigm variants will give rise to a new paradigm for futures field if as a result of them the range of interpretation or domain of the paradigm components is widened compared to that of the already existing paradigms and thereby the interpretation of modified content domain of the entire paradigm – the range of codomain – is also renewed and the new variant is accepted by futures practice.

We can widen the range of our information as to how the paradigm set can be recombined if we carry out meta-analysis of the termination and possibilities for termination of the blind spots of paradigms. In this case *we systematically search for the possibilities of recombination.*

4.2.3 Analysis of blind spots

In the meta-analysis of blind spots I search for the answer to the question how the blind spot of the positivist paradigm was terminated; how the blind spots of the three paradigms are related to each other and how the blind spots of the two new paradigms can be eliminated.

The blind spot of the positivist paradigm is the human factor; the future shaping role of man cannot be handled within the paradigm. However, the evolution of the new paradigms for futures field has made it possible to handle the human factor because the two new paradigms concentrate on the future shaping role of the human factor. *The blind spot of the positivist paradigm was terminated by the fact that the futures field having reached a crisis has renewed the paradigm by paradigm shift through self-reflection and responding to new societal needs. In other words, by focusing on the human factor, the*

range of interpretation of paradigm components have been extended compared to the positivist paradigm and the content of the paradigm matrix for futures field has been given a new interpretation. Creation of paradigm variants played a smaller part in eliminating the blind spot since at that time the futures field had only one paradigm. The determining role was played by changes in the approach to the world and the future and its consequences, which arose from recognition of the change of age.

Yet it cannot be stated that the blind spot of the positivist paradigm has completely terminated and that the futures field with its three paradigms can give answers to all kinds of questions concerning the future. I support this statement by the comparative analysis of the blind spots of the paradigms.

In the evolutionary paradigm the human factor plays a determining role. Man, society has concepts about the future. In the evolutionary paradigm the future is a complex phenomenon, which is formed upon the effect of determination, indetermination and chance. The evolutionary paradigm asserts that futures studies can outline possible futures by being able to explore the patterns of the cultural/social evolution. In the course of studying it, it can highlight the part played by the human factor in shaping the future and enduring changes. Social adaptivity and ingenuity are its categories by which it describes the active and future shaping role of the human factor. When society is passive, then it cannot change its customs, cultural and social values, or it does not have any information that it could mobilise in order to identify and solve problems, or it is unable to learn and then it is compelled to endure changes. *The question owing to what and how this fundamentally two kinds of future shaping role of the human factor changes cannot be answered in the evolutionary paradigm.* From this it can be deduced that *in the presentation of possible futures evolutionary futures researchers employ only arbitrarily defined possible solutions – or solutions subject to presumptions – with regard to the two kinds of role of the human factor.* If society is a farsighted and learning system, then it would react to futures problems in this and that manner, and as a result of that the future might take shape in this and that manner. If it is not farsighted or does not learn, or if it is not resourceful enough etc., what consequences this might involve with regard to futures concepts. Model experiments carried out in this fashion are very useful and thought provoking but remain within the confines of their inability to improve the quality of the answer within the paradigm even by continued research, which means that the blind spot of the paradigm cannot be handled within the paradigm.

Compared to the positivist paradigm, the evolutionary paradigm made huge progress in rendering the blind spot of the positivist paradigm manageable by construing and handling the human factor as one of the constituting parts of the evolutionary pattern. However, even under the evolutionary paradigm it is impossible to know how a society existing in a particular space-time sees its futures problems, how it reacts to them – in what respects it becomes active and in what respects it will be passive – and what futures concepts it exercises. Now this is the point when evolutionary futures researchers propose that these issues should be addressed in a separate research process. Regarding the research process they presume that their models and research results will be also used in practice. *Even in this case they do not reckon with connecting the so evolving particular futures concepts to evolutionary patterns for feedback.*

The critical paradigm also concentrates on studying the future shaping role of the human factor. This paradigm studies the relation to the future and futures concepts of

people, groups of actors/stakeholders, and helps development of acceptable/desirable futures thoughts regarding the community's future. By its new approach and methods it assists in eliminating the blind spot of the positivist paradigm, provided that it is able to produce any subjective futures thoughts that specific groups of actors/stakeholders of society undertake. However, this paradigm has its blind spot as well. While it is able to explore the undertaken, accepted and desirable futures tied to specific groups of actors/stakeholders and can help to develop them, *within its own paradigm it is unable to analyse questions how the futures thoughts of specific groups of actors/stakeholders might affect the futures thoughts of other groups of actors/stakeholders and their conceived future shaping activity, or the formation of the future of future shaping factors outside the control of actors/stakeholders.* It cannot actually make it the subject of criticism either to what extent the futures problems and futures concepts of specific groups of actors/stakeholders are adequate in terms of their situation, and what undesirable consequences their activities in following their elected futures concepts might involve. The paradigm tries to make its shortcomings arising from its blind spot manageable by continuous improvement, reconsideration of futures thoughts. However, the blind spot of the paradigm cannot be terminated even by ceaseless search for acceptable/desirable futures since the questions that constitute the blind spot cannot be answered in a new foresight procedure either. With all that *the critical paradigm has also considerably contributed to eliminating the blind spot of the positivist paradigm because it has made it possible to organise and research the activity of the human factor that forms group futures thoughts.*

Both the evolutionary and the critical paradigms have made it possible to study only certain special subject areas of the future shaping role of the human factor. Both new paradigms have their own blind spots; therefore, even with joint efforts they terminated the blind spot of the positivist paradigm only partially.

If we compare the blind spots of the new paradigms, then in the first approach and on the basis of the analysis of the paradigm set, we get the picture that the blind spots of the two new paradigms could be terminated if we were able to link the researches carried out in accordance with the evolutionary paradigm to the researches performed pursuant to the critical paradigm or the other way round. The blind spot of the evolutionary paradigm arises from the fact that it is unable to handle the changes in the active and passive role of the human factor as a subject of research. If we continued the exploration of the possible futures that follow from the evolutionary pattern by researches that would analyse also the acceptable/desirable futures of groups of societal actors/stakeholders, then we could produce new information from it with respect to changes in the activity of the human factor. The blind spot of the critical paradigm arises from the impossibility to study the relation between the future shaping role of human and non-human factors and from the fact that it is unable to make the formation of the futures concepts of various groups of actors/stakeholders in correlation to each other the subject of research either. If we supplemented the critical paradigm by the evolutionary paradigm, then it would be possible to research human and non-human future shaping factors formed in the present jointly since it is just the exploration of this kind of issues that evolutionary patterns are aimed at. Furthermore, it would be possible to study the formation of futures concepts of groups of actors/stakeholders subject to the formation of futures concepts of other groups of actors/stakeholders as emergent social phenomenon by the methods of the evolutionary paradigm.

In spite of the fact that in theory the evolutionary paradigm provides information on possible futures by exploring evolutionary patterns and the critical paradigm on acceptable/desirable futures as a result of the foresight process, *the researches carried out in accordance with the two paradigms cannot be actually connected in their unchanged form*. To fit in with the evolutionary paradigm, it would be necessary to carry out researches performed in particular space-time that would identify or explore the local evolutionary patterns, and local actors/stakeholders having knowledge of such patterns would jointly develop their futures concepts in a manner that would also connect them to evolutionary patterns for feedback. However, the procedures of the critical paradigm developing the acceptable/desirable futures of societal actors/stakeholders do not provide this kind of solution. They concentrate only on improving and/or attaining better quality common futures concepts by criticism and learning. Thus, they do not systematically take account of the factors that determine the future following from the evolutionary pattern and the possible consequences of acceptable/desirable futures with respect to the evolutionary pattern. To be more precise, they take them into consideration only in the manner and to the extent that actors/stakeholders subjectively know and judge them.

If we set out from the critical paradigm, then it would be necessary to link researches to the acceptable/desirable futures concepts of groups of actors/stakeholders that seek to find out whether or not the futures concepts of various groups of actors/stakeholders help formation of the futures thoughts of other groups of actors/stakeholders, and what consequences the futures concepts of various groups of actors/stakeholders involve with respect to the components, factors of the future that do not depend on actors/stakeholders. For the purposes of researches carried out within the frameworks of the critical paradigm, it would be necessary to link the interactions of various actorial futures concepts to the interactions of human active future shaping factors and non-human future shaping factors. However, they are not identical with the opportunities provided by the evolutionary paradigm. The reason for that is that in the course of studying evolutionary patterns, only rational or rationalised³⁶ pattern creation is elaborated even if the evolutionary futures researcher studies a given society in a particular space-time. Both rationality and rationalisation apply also to the role played/playable by the human factor in the pattern. On the contrary, the acceptable/desirable futures developed by the critical paradigm contain both rational and non-rational elements (intention, resolution, fears, hopes concerning the future). Rationalisation, raising awareness of non-rational elements or recognition of the irrational aspects of rational elements in the currently effective present is not necessarily a part of the futures concepts of actors/stakeholders according to the critical paradigm. This is another peculiar quality that makes it impossible to place or connect the research results attained in accordance with the critical paradigm in/to the researches carried out pursuant to the evolutionary paradigm in line with their current interpretation.

It is not possible to connect the two new paradigms to each other in order to get from the possible futures to the desirable futures and thereby eliminate the blind spots of the paradigms. Nevertheless, the above argumentation is not unnecessary because *it clearly shows the possibility to create paradigm variants from the two new paradigms through combination and move ahead step by step*.

³⁶ By 'rationalised' I mean that the futures researcher understands cultural/social values but does not qualify them, however, integrates them as variables into studying the evolutionary pattern.

If we take account of the possibilities for termination of the blind spot of the evolutionary and the critical paradigms one by one, then the following picture can be obtained with regard to creation of paradigm variants.

The blind spot of the evolutionary paradigm with respect to the paradigm components means that the range of interpretation of the approach to the future of the evolutionary paradigm does not include the impact that the futures concepts evolved in the present might produce on the real time future and on the present, and does not include the interpretation of the past of these futures, i.e., their feedback to the evolutionary pattern. In the paradigm, while the arrow of time is respected, the past, the present and the future are turned into present but as a reaction of the futures the future in the present is not turned into past in the present and into present. In terms of the subject of research, deriving possible futures from the evolutionary pattern can be but acceptable/desirable futures concepts present and working in society and the analysis of their past and present in the present cannot be a subject of research. The futures thoughts present and working in society can be researched by the critical paradigm; therefore, it is possible to create a paradigm variant that would combine the subject of research of the evolutionary and the critical paradigms. *Search for the past and the present of acceptable/desirable futures in the present* would make it possible to analyse how human actors/stakeholders and non-human future shaping factors can be linked in case of presumed realisation of certain futures and to analyse how the activity and passivity of human actors/stakeholders might change. *This would not mean fulfilment of a reversed task – research of paths leading from the acceptable/desirable futures to the possible future – but would mean the research of the possible ways of fitting or linking futures concepts regarded by various groups of societal actors/stakeholders as acceptable/desirable in/to the processes of the past and the present.* Namely, the futures concepts produced by societal actors/stakeholders are not fully identical with the acceptable/desirable futures that can be formulated from evolutionarily probable futures. The latter represent only the domains of the future that are supported by scientific futures research. The researches focusing on the possibility of the acceptable/desirable futures of groups of societal actors/stakeholders constitute a new research area that includes placement of futures in the present into the conditional future and the analysis of the past and present of these futures; and, therefore, would require further extension of the approach to the future. *For this reason, the range of interpretation of the approach to the future of the evolutionary paradigm should be extended to the past of the future, to be more precise, to the past in the present and the present of the future in the present as well.* The widening of the range of interpretation of the approach to the future and the new research subject that can be outlined thereby call for a new methodology, new research goals, areas of use and reliability criteria, whose development might trigger expedient production of a series of further paradigm variants. *By the series of paradigm variants created through combination* it is possible to reach the stage where complex feasibility of the acceptable/desirable futures of groups of actors/stakeholders, the *feasible future can be researched.*

To eliminate the blind spots of the critical paradigm, it would be necessary to significantly extend the 'future in the present' approach to the future by domains of time of the future such as the future in the present in the past and in the future, and the past and the present in the future. These domains of time are partly the domains of future of the positivist and the evolutionary paradigms. However, the future in the present in the past in the present and in the present is not the domain of future of the evolutionary paradigm either. In addition to the extension of the domain of the future, the subject of research of

the critical paradigm should be also extended to the analysis of non-human future shaping factors. Furthermore, its subject of research should be extended to the connection of the futures concepts of various groups of society and the analysis of their impacts shaping each other. Research of this subject of research would belong in content to the subject area of *possible social feasibility of acceptable/desirable futures*. In relation to this, *the present of the future of shapable futures might appear as a new time dimension of the future in the present*. The possible social feasibility of acceptable/desirable futures would formulate social commitments and tasks regarding the real time future.

The possible elimination of the blind spots of the critical paradigm shows that a part of them could be terminated *by combining the components of the critical paradigm with the components of other paradigms with different ranges of interpretation*, i.e., through creating paradigm variants. As the evolutionary paradigm preserves the positivist paradigm while terminating it, and the evolutionary and the critical paradigms have components with common ranges of interpretation as well as components with similar meanings or codomains, therefore, it is expedient to think in terms of combining the paradigm components of the evolutionary and the critical paradigms with different ranges of interpretation. However, with respect to the other part – the future in the present in the past in the present and in the present; and the present of the future of the shapable future – it would be necessary to widen the range of interpretation or domain of the approach to the future. The extension of the range of interpretation of the approach to the future is necessary for terminating the blind spot of the evolutionary paradigm as well. The present of the future of the shapable future would inform the evolutionary paradigm of the possible level of activity undertaken and planned by groups of societal actors/stakeholders. In other words, the analysis of possible social feasibility would enable the evolutionary paradigm to calculate the rate of intended future activity of groups of societal actors/stakeholders in the evolutionary pattern. *The need for further extension of the range of interpretation of the approach to the future is identical in and can be fitted in with both paradigms*. Thus, the blind spot of the critical paradigm can be also eliminated *by creation of a consciously designed and complex paradigm variant or through creation of a series of variants*.

The blind spots of both paradigms can be terminated by creation of a series of paradigm variants whose main components are

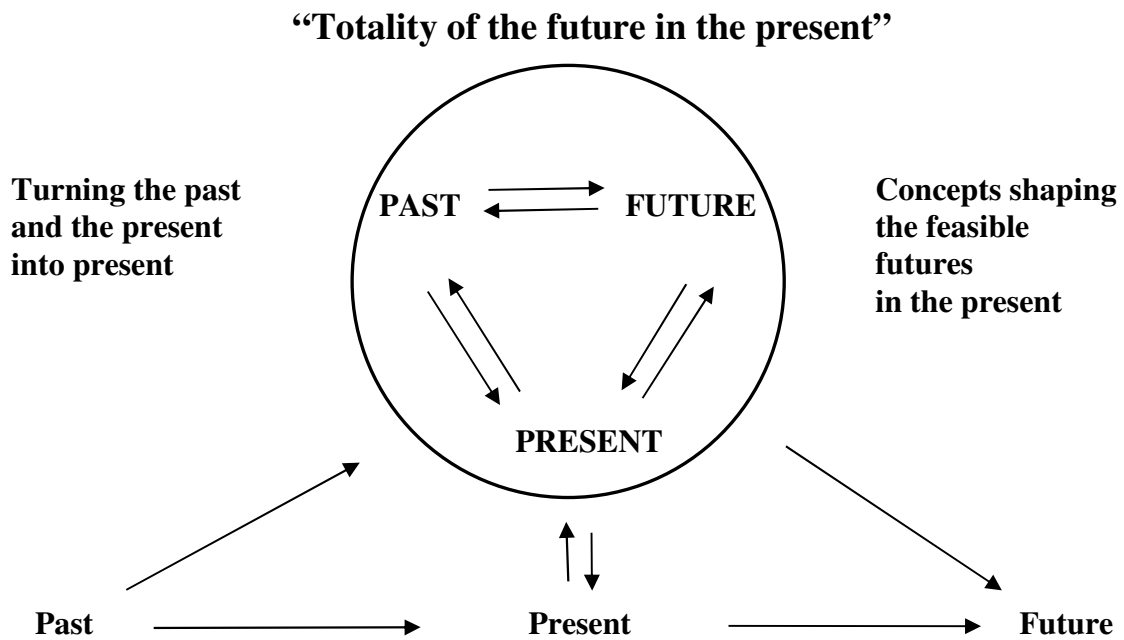
- extension of the range of interpretation of the approach to the future and its consequences with regard to the components of the rest of the paradigms,
- combination of the paradigm components of the evolutionary and the critical paradigms that are not similar and are different in their ranges of interpretation or domain, and reinterpretation of the components.

The range of interpretation of the 'future in the present' approach should be extended by the past in the present and the present of the future in the present, and by the present of the future of the feasible and shapable future. *By these new domains of time in the present it is possible to make the 'total future in the present' approach to the future complete, and thereby its connection with real time can become visible*. (See Figure 6)

Both the widening of the range of interpretation of the approach to the future and the paradigm variants created by combination would extend the range of interpretation of the paradigm set for futures field and would reinterpret the content of the paradigm matrix for futures field. *Therefore, termination of the blind spots of the two new paradigms can*

be solved by a new paradigm shift in which creation of paradigm variants plays a determining role. As a result of that, it would be possible to research both the futures possible in the present and acceptable/desirable futures as well as feasible futures shapable by actors/stakeholders in terms of their connections. *Further extension of the range of interpretation of the approach to the future and paradigm development tasks*

Figure 6. *The extendable 'future in the present' approach to the future and its connection with real course of time*



Source: Self-made

that can be solved by paradigm variants may become tasks of the futures field to be solved if they are justified by social needs as well. Responses to new social needs will evoke and urge creation of paradigm variants and a new paradigm shift. By paradigm development aimed at termination of the blind spots only already visible blind spots could be terminated, and development of a new paradigm would result in new blind spots.

The meta-analysis of blind spots also reveals that *theoretical/methodological development projects are carried out within the frameworks of the development of the paradigm by which the practice of the futures field can be widened and renewed. Termination of the blind spot of the positivist paradigm resulted in the making of evolutionary pattern and foresights, and practices to help formation of the desirable futures of groups of societal actors/stakeholders. Elimination of the blind spot of the new paradigms may give rise to a new futures practice: studying the possibility and feasibility of the desirable future of groups of actors/stakeholders. The futures field must address the issues of the paradigm of various practical futures activities as practical production of knowledge about the future helped by futures field. In this respect the critical paradigm has taken the first step already because it has accumulated plenty of fundamental*

principles and results with respect to the foresight process. The evolutionary paradigm only refers to the phase of its practice but has little knowledge about its possible ways yet.

4.3 Pattern of the development of the futures field up to now

Reconstruction of the history of the paradigms for futures field and meta-analysis of the paradigms in futures field show that:

- *The futures field became an independent and normal science through the positivist paradigm.* Responding to the most instinctive human needs, it promised scientifically based foreknowledge of the future by forecasting probable futures. However, it was unable to fulfil this undertaking especially with regard to forecasting long-term and complex problems; therefore, *in the 1990's it reached a paradigm crisis.* The scientific nature of futures research presented itself also in this period because after initial uncertainty and defence it successfully came out of the crisis by self-reflection and search for new research perspectives capable of reacting to changed circumstances and demands. In a globalised and instable world, it has found its place and task in helping the formation of the futures thoughts of societal actors/stakeholders.
- *In the paradigm shift taking place at the turn of the Millennium, the futures field discovered the future existing in the present and its role played in social formation of the future.* It has changed its approach to the world and the future and its attitude to the place and function of the futures field and the futures researcher. The future of society is shaped not by laws and development tendencies but by the activity of societal actors/stakeholders. The compass of the activity of societal actors/stakeholders is what they think about the future. Scientific futures studies does not forecast the future but helps societal actors/stakeholders and individuals to develop their positive relation to the future and their futures concepts. By their scientific tools futures researchers can study concepts concerning the future, their realisation and non-realisation as well as the role of other future shaping forces and factors. Futures researchers can address the issues of the future as participating observers on the basis of a new paradigm.
- The paradigm shift has given rise to two new paradigms. The evolutionary paradigm focuses on studying the pattern of cultural/social evolution, and the critical paradigm on criticising and developing the futures thoughts of societal actors/stakeholders. We can consider this change development in the science of futures field because *in the paradigm shift the futures field has specified its assumable goals, tasks and various ways of attaining them and adjusted them to changing circumstances, needs and possibilities.*
- *In the futures field, in the years of the turn of the Millennium, a paradigm shift as defined by Kuhn has taken place* because both the evolutionary and the critical paradigms have changed their approach to the world and the future and have completely rewritten the paradigm matrix for futures field compared to the paradigm matrix of the positivist paradigm. The difference lies in the fact that *the positivist paradigm has been replaced not by one but by two new paradigms.*

- In the course of the paradigm shift, the content of the interdisciplinarity of the futures field has been transformed. *The futures field has strengthened its interdisciplinarity in terms of social and human sciences and has become an independent interdisciplinary science that not only organises interdisciplinary researches about the future but is also able to take part in other interdisciplinary researches.*
- Through the paradigm shift the futures field has become a post-normal science because it has strengthened its practice-orientation, reflective and self-reflective capacities as well as its competence to take account of user's aspects and evaluations. *The post-normal science aspect of the futures field has not been able to fulfil its purpose yet with respect to connecting theoretical and practical knowledge about the future continuously and in a manner that helps their interactive development.*
- After the paradigm shift, the development of the futures field has been determined by the competition between the two new and alternative paradigms. *The competition has accelerated full development of both paradigms and their fast translation into practice.* In the paradigm competition none of the paradigms has been able to win yet; at the same time, undesirable effects of the competition have become identifiable. The harmful effects can be recognised in narrowing of the communication between futures practitioners researching in line with specific paradigms, in the mentality that drives them to defeat each other and in the efforts of specific foresight activities to separate from the futures field. This turning inside and against each other is harmful because it distracts the attention and diverts researchers' intellectual capacity from responding to social challenges. *The futures field can get rid of the harmful forms and effects of the paradigm competition if each competing paradigm reflects not only on itself but also on the other paradigm while taking account of changing needs of practice.*
- *The futures field has developed a paradigm set consisting of three paradigms.* By this paradigm set the futures field can solve three kinds of practical forecasting and foresight tasks. The blind spots of the new paradigms imply that the futures field cannot handle all futures problems even with the assistance of the three paradigms.
- *The variation and selection driven development has been present in futures practices since it became a science.* The existence of the paradigm set for futures field might strengthen this kind of development because each paradigm can be used for creating new paradigm variants. *Creation of paradigm variants will result in a new paradigm for futures field only in the event that the range of interpretation or domain of the paradigm components is widened compared to the already existing paradigms, and thereby the entire paradigm matrix is renewed also in its content or codomain.*
- *The blind spot of the positivist paradigm has terminated through the paradigm shift as defined by Kuhn. Elimination of the blind spots of the new paradigms also calls for a paradigm shift. The new paradigm shift can be solved by*

creating paradigm variants only if we further extend the range of interpretation of the 'future in the present' approach to the future and subordinate the creation of paradigm variants to making the new time dimensions of the extended approach to the future researchable. Further widening of the range of interpretation of the future can be outlined by comparative meta-analysis of the paradigms, but this can become a development task in the futures field only if responses to cultural/social needs make it necessary.

- *The paradigm shift has given rise to the development of a new kind of futures practice. This new practice is the production of practical knowledge about the future helped by futures studies. The paradigm development of the futures field must deal with the formation of the paradigm of this new kind of futures practice as well.*

5 Complex paradigm dynamics of the futures field

To present the complex dynamics of paradigms for futures field, I examine the range of possibilities in which the futures field can respond to the challenges perceptible at the beginning of the 21st century. I outline a possible answer of the futures field that represents a paradigm shift which can be applied fundamentally by self-development drawing on internal forces and several sources. I construe integral futures and its paradigms, then, I incorporate the new paradigm constructions in the paradigm dynamics of the futures field. Finally, I determine and characterise the development of the futures field on the basis of the paradigms and the paradigm shift.

5.1 Complex analysis of the range of possibilities

5.1.1 Possibilities for the future that can be derived from the pattern of development up to now

If we follow changes in time in the history of the paradigm for futures field, then *we can observe phases of formation – the first paradigm coming into being and being fulfilled – paradigm crisis and paradigm shift.* The paradigm competition taking place in the present can be regarded as a period that prepares a new paradigm shift, in which reacting to new societal needs and further developing its approach to the future the futures field will develop a new paradigm/new paradigms. *The history of the futures field will continue through a new paradigm crisis and a paradigm shift, following the pattern of the development of science as defined by Kuhn.*

If we take account of the fact that the paradigm shift in the futures field has not fully followed the pattern defined by Kuhn because the positivist paradigm has been replaced not by one but two paradigms, then we can consider the present paradigm competition a process of the paradigm shift. Regarding the future we can presume that *the first paradigm shift will end by one of the two new paradigms defeating the other one.*

If we pay regard to the fact that the futures field has become a post-normal science through the paradigm shift, then there is not much chance for the futures field to become a single-paradigm science again. However, the futures field has not become a post-normal science completely yet; therefore, the weakness of the connections between theory and practice might be a dynamising factor of the further development of the futures field. *It can advance a new paradigm shift by urging development of futures theory and practice in which they reflect on each other.*

The efforts to eliminate the undesirable impacts of the paradigm competition might also generate dynamics if the two competing paradigms switch from parallel paradigm development to paradigm development that reflects on societal needs and to communication between paradigms on the merits. Thereby the two competing paradigms could be connected while focusing on joint research of the possible and the desirable futures. As it has been shown in the meta-analysis, this paradigm development task *can be solved by paradigm shift.*

The three-paradigm futures field can use its paradigm set also for producing new paradigm variants and testing them in practice. The paradigm variants that prove to be good in practice might take the shape of trends or schools. Moving ahead along this path, variation/selection driven development can strengthen in the development of the futures field. If as a result of that the range of interpretation of paradigm components are extended and the paradigm matrix is renewed also in content, then a new paradigm shift might arise.

The analysis of the elimination and possibilities for elimination of blind spots shows that *elimination of blind spots involves or must involve paradigm shift*. Blind spots of alternative paradigms can be terminated by expedient and pre-designed paradigm variants.

Interdisciplinarity of the futures field played a paradigm generating role in the evolution and paradigm shift of the futures field. In the paradigm competition special futures paradigms with clear qualities have developed, which start to resist new interdisciplinary impacts arriving from external fields and have become able to take part in other interdisciplinary researches on the basis of their own paradigm. From this it can be deduced that *the futures field can carry out paradigm development by drawing on internal forces if it creates new paradigm variants and provides the human factor for elaborating them and applying them in practice by making the training of futures experts regular. As a matter of fact, thereby it would not close the road to impacts of interdisciplinarity that upgrade approach and methodology; it would improve the proportion between internal and external scientific impacts in favour of the internal impacts only.* (See Table 10)

Table 10. *Paradigmatically possible futures of the futures field on the basis of the complex meta-analysis of paradigms*

Factors affecting dynamics	Possible futures
1. Following the logic of changes in time up to now	Continuation of the process of paradigm formation – paradigm crisis – paradigm shift through new paradigm crisis and paradigm shift responding to new societal needs
2. Outcome of the paradigm competition	A/ completion of Kuhn’s paradigm shift by the victory of one of the paradigms B/ elimination of the undesirable forms and consequences of competition by connected operation of self-reflection and reflection – by paradigm shift through developing a new paradigm
3. Fulfilling the post-normal science quality	Termination of lack of connection between theory and practice by a new paradigm shift and by developing new paradigms
4. Use of the paradigm set	Taking the variation/selection development course, by creating and selecting paradigm variants
5. Elimination and possibilities for	Planned recombination subordinated to

elimination of blind spots	external criteria/systems of criteria and affecting the range of interpretation and content of paradigm components, which results in a new paradigm shift
6. Impact of interdisciplinarity	Paradigm generating role in the formation and paradigm shift of the futures field – in the future internal own forces will catch up with it through regular training of futures experts

Source: Self-made

Each possibility may be qualified in terms of how they can affect the task-solving capacity of the futures field. The meta-analysis carried out shows that *development of a new paradigm enhances the task-solving capacity of the futures field*. I use this statement for qualifying possibilities for the future. (See Table 11)

Table 11. *The impact produced by each possible future on the task-solving capacity of the futures field*

Possible futures	Changes in task-solving capacity
1. Continuation of the process of paradigms formation – paradigm crisis – paradigm shift	+
2. A/ Completion of Kuhn’s paradigm shift by the victory of one of the paradigms B/ Paradigm shift through developing a new paradigm	- +
3. Creation of close connection between theory and practice through paradigm shift	+
4. Taking the variation/selection development course, by creating new paradigm variants	0 or +
5. Recombination of paradigms subject to external criteria – paradigm shift	+
6. Paradigm formation with strong interdisciplinary effects	+

Source: Self-made

The futures possible on the basis of factors 1, 2.B, 3, 5 and 6 can give rise to paradigm shift and evolution of a new paradigm for futures field. Factor 2/A, possible outcome of the paradigm competition, if it means victory of one of the paradigms for futures field, it will reduce the task-solving capacity. Factor 4, use of the paradigm set represents a capacity growing development path if it results in a new paradigm. If it does not give rise to a new paradigm, then development will stay within the confines of the range of possibilities determined by the three paradigms. Improvement is possible also in this case, if new paradigm variants can provide more accurate, more efficient task solution than the present paradigms.

The factors influencing the paradigmatically possible future of the futures field anticipate various kinds of future development courses. Any of them can be realised if specific factors assume a dominant position. If the six factors produce their impact at the same time, then possible development courses can be estimated by taking account of impacts that strengthen and contradict/weaken each other, in terms of how they can affect the task-solving capacity of the futures field. In this case, there will be only three possible development courses left. *The first path – a task-solving capacity enhancing course – is a new paradigm shift through developing a new paradigm where reflectivity of the futures field connected with self-reflectivity is strengthened, a new scope of blind spots are terminated (and new blind spots become identifiable at the same time) and closer connection between theory and practice is attained.* The futures field can implement this path by its own forces, using its paradigm set and developing its interdisciplinarity. *The second path – a task-solving capacity reducing course – is victory of one of the paradigms, completion of Kuhn’s paradigm shift by using own forces.* *The third path – unchanged task-solving capacity course – is combination of the present paradigm set fundamentally by internal resources, which enables the futures field to take the variation/selection development course with the current capacity.* (See Table 12)

Table 12. *Paradigmatically possible development paths of the futures field*

Development paths	Characteristic features
Path 1: Task-solving capacity enhancing course	New paradigm shift through new paradigm/paradigms by self-reflectivity connected with reflectivity by termination of a new scope of blind spots by termination of the lack of connection between theory and practice by using own internal and interdisciplinary scientific capacity
Path 2: Task-solving capacity reducing course	Victory of one of the paradigms, completion of Kuhn’s paradigm shift by own internal scientific capacity - with unsolved problems
Path 3: Unchanged task-solving capacity course	Variation and combination of the existing paradigm set by fundamentally own internal scientific capacity - with unsolved problems

Source: Self-made

The chances of the second and third paths are reduced by the fact that they combine little dynamising force and therefore leave the questions unanswered how it is possible to terminate lack of connection between theory and practice and eliminate current blind spots; how it is possible to use the upgrading impact of the interdisciplinary

approach and methodology in the development of the futures field. Both paths would lead to narrowing of the futures field and loss of its interdisciplinary nature. This might arise also in the case of the third path even if the futures field might flexibly vary/combine its paradigm set. Both paths would sooner or later give rise to a crisis because the futures field would not be able to react flexibly to new challenges with one paradigm or a limited paradigm set.

The first path, in theory, might include continuation of the logic of changes in time in the futures field followed up to now even with Kuhn's paradigm crisis and paradigm shift because the paradigm shift increases the task-solving capacity. *However, continuation of the logic of development up to now cannot be made probable because the futures field has a paradigm set already and it does not have to switch from one paradigm to another.*

I discuss the possibilities of the first development path in details because it contains the most factors that generate paradigm dynamics and their interactions; so, it allows interpretation of the concept of integral futures. I do not analyse how/by what combination of dynamising factors this task-solving capacity enhancing development course can be realised because it cannot be foretold. The realisation of the development path will be probably assisted by the developing activity of futures researchers and experts from other areas of science who join the futures field. Therefore, I discuss how a kind of integral futures approach can be constructed from this "basic material".

I solve this task in the following manner: *first, I select an external system of criteria, i.e., what new societal needs the futures field has to respond to. After that, I analyse whether the factors that generate paradigm dynamics can be shaped and connected subject to the external system of criteria in a manner that allows recombination of alternative paradigms and development of new paradigms that enable the futures field to become integral futures.*

5.1.2 Responses to challenges of the future

The future possibilities derivable from the course of dynamics followed up to now and the paradigm set from among those that might arise from the outcome of the paradigm competition, utilisation of the paradigm set, elimination of the blind spots of alternative paradigms and the impact of interdisciplinarity can represent the potential future possibilities of the development of the futures field only in the event that they help the futures field to react to new cultural/societal needs as well. The question is whether new challenges can be perceived in the beginning of the 21st century? If they can be perceived, what are they and how can the futures field respond to them?

The social practice of the early 21st century is compelled to face high degree of uncertainty, risks of the future, the possibilities of shaping its human/social aspects and their limits. Continuously in every field of life various kinds of knowledge – scientific, empirical and tacit knowledge – must be connected, built into each other and new knowledge must be produced in order for specific communities and mankind and their environment to survive and prosper. It is in this knowledge production process that human, community organisation, environmental, technical and economic tasks must be solved together and connected to each other to ensure real time implementation of survival and sustainability. The essence of challenges in short is *real time implementation*

of complexly construed sustainability and extension of participativity of people, communities, societal actors through integration of knowledge and production of new knowledge (Hideg, 1999). On these challenges as new external aspects, the futures field must reflect.

Sustainability is not only a new subject of research but also *a new approach to the world*, provided that it presumes that the world is a peculiar operation system of interactions between evolutionary systems of different kind. Its peculiarity lies in the fact that the evolutionary systems that take part in the interactions will preserve their operating and development capacity even after the series of interactions, i.e., they change coevolutionarily and each system is a successful survivor. However, this is only a human-centred interpretation of the dynamics that works in the world optimal in terms of human aspects. If we disregard this absolutely optimised interpretation, then *there is an approach to the world behind it which presumes that cultural/social systems and the systems that constitute their environment produce shaping impact on each other through interactions. Their joint movement in time is coevolutionary.*

This world view or approach to the world is different from the evolutionary approach to futures studies to the extent that it regards the environment/environments of society as evolutionary systems as well. This is not a big difference, *nevertheless, owing to it the attitude, approach to the world of the futures field must be modified* so that it should not look at the non-human world only as an entity that serves the cultural/social evolution. The critical futures studies must also modify its world view and approach to the world so that it should not consider human culture and society a system independent of the non-human world, which can be shaped by actors without any limitations. If the futures field wants to deal with coevolutionarily developing possible and sustainable futures in line with its current paradigms, and wants to take part in developing relevant futures concepts applying to them, then it again must modify its world view and approach and as a result of that the content of several components of its paradigms.

Extension of the participativity of people, communities, societal actors is a safe and desirable form of operation of our global and multicultural world in terms of social aspects. In this respect, the futures field – especially the critical futures studies – has already reacted to this social challenge and criteria and is actively taking part in the development and spreading of participativity. In spite of that, it must develop its actorial aspects even within the critical paradigm. With respect to societal actors, it should assign a greater role to searching for further possible actors/stakeholders and integrating them into the foresight process, and it should represent also non-human future shaping factors as actors in social discourse to express that societal actors shape their future freely but not without limitations (Hideg, 2006). Among limitations, the role of non-human factors – natural/geographical environment, biosphere, ecosystems, etc. – is growing. The evolutionary futures studies has also recognised the future shaping function of societal actors but studies it only at the level of the evolutionary pattern.

With respect to *integration of knowledge and production of new knowledge*, paying regard to the level of development attained by and the qualities of the futures field, futures studies must produce new knowledge by which it is possible to interpret the world and nature therein as well as the connections between human cultures and societies in the network of interactions changing in space-time, and which knowledge can be used for anticipatory formation of various kinds of human interactions. To this end, *the futures*

field must produce new theoretical/methodological and practical knowledge. It can produce this new theoretical/methodological knowledge fundamentally by integrating bodies of scientific knowledge and producing its own scientific knowledge. The futures field can obtain new practical knowledge in the course of developing forecast/foresight techniques that employ its new theoretical/methodological knowledge and react to new needs. Furthermore, the futures field *should paradigmatically ensure continuity of its production of knowledge and interactive developing relation between its theoretical/methodological and practical knowledge.* Also, it must preserve its interdisciplinarity and adjust it to its new tasks. In production of knowledge the evolutionary futures studies is lagging behind in practical respects. The critical futures studies is at a disadvantage in production of theoretical/methodological knowledge. It is the paradigm of the critical futures studies that can ensure continuous production of practical knowledge better than the evolutionary paradigm. Connection of theoretical and practical knowledge is unsolved at present in both paradigms.

Differentiation between the production of theoretical and practical knowledge is justified also by the following reasons. All different futures activity carried out in practice cannot assume the status of futures theory and methodology because then the futures field as a science will disappear. Under such circumstances it would not be possible to test attained scientific results, carry out comparative analyses, perform reflection and self-reflection. On the other hand, all theoretical/methodological research findings cannot become directly practical solution because the individual qualities of particular practice in space-time would be eliminated. Theoretical/methodological futures practitioners cannot take part in each practical futures activity because there are few researchers and the implementation and organisation of forecast and foresight processes require special expertise. Theoretical experts can write guides³⁷ but it cannot be taken for granted that specific practical futures activities will be carried out by taking them into consideration since regular training of futures experts is not ensured at present. Nevertheless, futures addressing theoretical/methodological issues also needs close relation with futures practice because without being aware of particular forecasts /foresights it cannot be self-reflective.

Forecasts/foresights made by the futures field are activities that perform integration of knowledge and production of new knowledge in terms of their subject as well. In forecast and foresight processes practical futures researchers integrate scientific, empirical, tacit knowledge, values and expectations into possible and acceptable/desirable futures. For this reason, it is necessary to distinguish between two ranges in the production of knowledge of the futures practice as well. One of them is production of information on possible ways of making forecasts/foresights and the other one is integration of knowledge and production new knowledge concerning the subject of forecasts/foresights. The former enriches the scientific information of futures field and the latter the practical knowledge of society. In terms of the latter, *making*

³⁷ Two significant methodological guides have been made in the futures field. One of them provides a summary for making regional foresight (*Gyakorlati útmutató...*, (Guideline for the Regional Foresight...), 2002), the other one for making strategic foresight (*Hines & Bishop, ed., 2006*) of methodological considerations and proposed methods for various part tasks to be solved. Both omit to raise and answer disputed theoretical/methodological issues and so leave it for future users to select, organise into a process and apply methods. Thereby they managed to avoid paradigm conflicts; at the same time, they provide a highly mosaic-like picture about the nature of making foresights. Owing to the latter aspect, they do not represent any professional standard of practical futures researcher's work.

forecasts/foresights and thereby the activity of practical futures researchers is part of social practice, to be more precise, future shaping practice of society.

Both theoretical/methodological and futures practice improving activities and specific forecast and foresight activities produce new knowledge but they are different in terms of the creation, validity and scope of the new information. The futures field of the early 21st century is facing challenges that call for solution of new tasks increasing in complexity. The futures field is able to reflect on challenges because its possibilities for development – operation of reflection and self-reflection in a connected manner, elimination of blind spots by recombination from existing paradigms, exploitation of own internal and interdisciplinary capacities jointly – enables it to do so in the event that it responds to challenges by paradigm development. In paradigm development, it must concentrate on developing new theoretical/methodological and practical knowledge and connecting them, taking advantage of the fact that its two alternative paradigms are supplementing each other and paradigm development can be achieved through recombination resulting from modification of paradigm components in subject and content that is in interpretation of subject. As part of paradigm development, it is necessary to find solution for making specific knowledge production lines independent and connect them within a system, at the same time.

5.2 Interpretation of integral futures

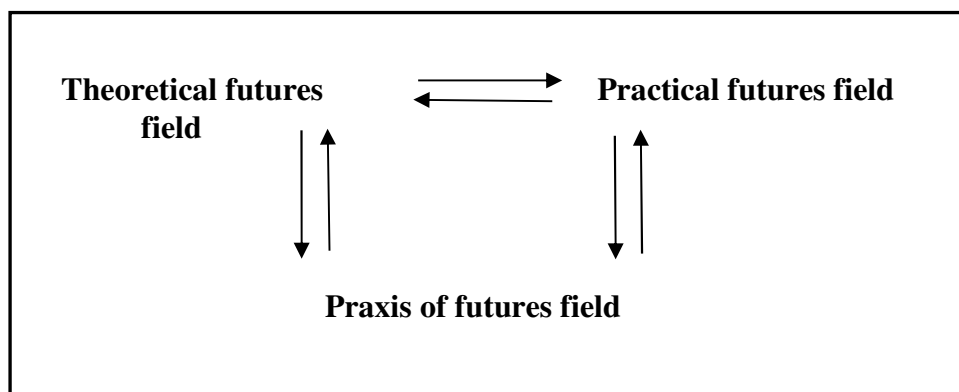
Can paradigm development reflecting upon challenges result in integral futures? It is possible to integrate the science of futures field by new paradigm development if we terminate the undesirable impacts of the current paradigm competition by developing new paradigms along new knowledge production lines supplementing and to be connected with each other. These knowledge production lines can be developed through recombination of the current two paradigms, in theory, supplementing each other. The new scientific knowledge production lines can be theoretical futures and practical futures.

The theoretical integral futures produces futures theoretical/methodological information and scientific knowledge and hypotheses regarding coevolutionary patterns and their changes and possible ways of changing them by societal future shaping thoughts and activities. Whereas practical integral futures produces knowledge applying to the knowledge production process by which forecasts/foresights are made and must be made in particular space-time. Both of them produce peculiar scientific – so-called post-normal scientific – knowledge characterised by reflectivity. Reflectivity is realisation of the process of cognition connected to reaction to new societal needs. This process can be efficient if it becomes independent in terms of its scope of subjects and at the same time is continuously related with the rest of the new futures knowledge production lines. In this manner integral futures is the result of the processes of differentiation – specific knowledge production lines becoming independent – and integration – paradigmatic building of the connection between knowledge production lines – within the futures field. However, paradigmatically integral futures can be construed as a process of creating a new unity within the futures field, fundamentally by recombination of paradigms.

Integration within the science of futures based on differentiation must involve continuous and definite presence of the futures praxis implemented in social practice.³⁸ *The praxis of futures field* represents the presumption that *if the science of futures is able to produce both theoretical/methodological and forecast/foresight making information, then production of scientifically based forecasts/foresights can turn into a profession and regular training of futures experts can be launched.* At the same time, futures praxis that becomes an independent profession can be made subject of further scientific analysis and can add practical experience and innovations to the development of both theoretical and practical futures field. The futures praxis can be developed from and can become independent of the practical forecast/foresight activity so far closely integrated into the three paradigms. It is through the above-described differentiation and integration processes that *integral futures can develop as an interactive network of the integrated (theoretical and practical) science and social praxis of the futures field.* (See Figure 7)

Furthermore, the process of futures praxis becoming independent presumes that, in addition to academic people who practice the science of futures, there are futures researchers who will *engage in making forecasts/foresights as a vocation.* This presumption is not unrealistic since various activities carried out concerning the future have been generally accepted already to such an extent in the widest range of institutes that advisory, assisting futures activity has become an independent area of business and foresight manager has become an independent scope of work, position at work places in numerous countries all over the world. If the science of futures develops towards integral futures, then integral futures will be able to produce

Figure 7. *Interpretation of integral futures*



Source: Self-made

renewing effect on forecast/foresight activities carried out extensively in practice, and can draw on them in order to develop its theoretical and methodological scopes of subjects. By practising integral futures it is possible to provide learned lecturers and create the state-of-the-art knowledge base and system of professional requirements that lay the fundamentals for pursuing theoretically based and practice-oriented training of futures experts.

³⁸ In this respect I agree with *Tamás Kristóf*, who argues in favour of close connection between the science and practice of the futures field (*Kristóf, 2006*).

Paradigmatically, the science of integral futures is a two- or several paradigm science whose paradigms supplement each other and can be complete and reflective upon new needs of society only in connection to each other. Integral futures does not end competition but relocates it within the sphere of specific paradigms. Integral futures cannot be a single-paradigm science because then there is nothing that it can integrate. It cannot be a science free from paradigms either because then there are no common rules for practicing it and its information cannot be integrated either. *Integral futures is not a stage that closes the development of futures field but merely a possible and in several respects desirable new phase thereof,* which further enhances and upgrades the task-solving capacity of the futures field.

Evolution of integral futures will create the possibility *for the futures field to have a subject that exists and can be researched in social practice.* As this subject of research will include the practice of the science of futures, *self-reflection of the futures field can be pursued within the frameworks of the research of social future shaping practice.* By development and extension of the paradigm set *the developing integral futures will enable the futures field to take the variation/selection driven scientific development course.*

Richard Slaughter's thought raised in 2004 asserting that the competition dividing futures researchers should be terminated by integration (*Slaughter, 2004*) can be found also in the interpretation of integral futures set out in this paper. In 2008 *Richard Slaughter* continues to elaborate his thoughts only in terms of the critical paradigm as if it has already won the competition of paradigms. He believes that integration of knowledge can be achieved through transcending scientific and non-scientific futures thoughts and by transcendental meditation (*Slaughter, 2008*). I think this kind of knowledge integration does not fall within the scope of tasks of the futures field as a science. On the other hand, the futures praxis works with non-scientific futures thoughts, fears, beliefs, hopes etc. of actors/stakeholders as well. The analysis of possibilities also calculates with the victory of one of the paradigms in the second development path, however, it does not consider it a satisfactory solution owing to reduction of the task-solving capacity of the futures field.

Joseph Voros holds the view that the futures field could be integrated if its paradigm were a meta-paradigm that is floating freely over paradigms (*Voros, 2008*). Futures researchers could select from this meta-paradigm at their discretion in terms of what they want to examine, for what purposes and in what contexts. There is no such paradigm; therefore, *Voros* proposes that futures researchers should use the storehouse of social science paradigms for grasping, collecting new theoretical/methodological considerations. This idea is noteworthy in two respects: (i) *Even if the futures field is going to become integrating or integrated, we shall not be able to disregard paradigms.* (ii) *Voros also deems it necessary to leave the unproductive paradigm competition.* It is reasonable that he proposes to carry out this exit on a neutral field. However, this *modus operandi* is not typical of the current futures studies because futures practitioners use borrowed theoretical/methodological elements for the paradigm competition and futures researchers lay claim to a kind of standard professional requirements for practising futures. His proposal is not reasonable as it would leave the scientific and professional experience of many years' work carried out in line with paradigms, the accumulated knowledge base of futures to their fate, and proposes recommencement. Complex meta-analysis of paradigms for futures field and the analysis of the future range of possibilities of paradigm dynamics support the fact that *the futures field is capable of self-development*

and working out the paradigms of integral futures through paradigm development. With all that, the futures field getting integrated can make use of grasping as one of the forms of interdisciplinarity (Etzioni, 1989).

5.3 Outline of the paradigm of integral futures

Continuing the complex meta-analysis reveals that the integrated science of futures – hereinafter referred to as integral futures – is made up of two futures fields that are developing independently but in close interaction. *One of its areas is constituted by theoretical and the other one by practical futures. Both areas integrate and produce scientific information.* The theoretical futures of integral futures develops a paradigm for exploring coevolutionary patterns and their changes, possible ways of changing them and with respect to the role of the human factor and futures thoughts in shaping the evolutionary pattern. The practical integral futures also develops a paradigm but one by which integrated forecasts/foresights can be made for solving practical tasks.

The two areas within the scientific practice of the futures field implements division of work. Theoretical integral futures develops futures theory and methodology, for which it studies developments of practical futures and forecasts/foresights made with or without their assistance, the futures praxis, in terms of theoretical/methodological aspects. In its scientific activity, practical futures utilises and further develops the results of theoretical integral futures in line with the particular space-time and tasks of the futures praxis, and further develops its methodological information and procedures by studying the futures praxis.

The two independent areas of science of the futures field must have two different paradigms. The *theoretical integral futures*, on the one hand, reflects upon the aspect of new challenges that it develops its own approach to the world as an organic part of the coevolutionary interpretation of the world now taking shape, and, on the other hand, it wants to be a participant also in the global/social program of working towards sustainability by producing theoretical/methodological information for futures field applying to the development of coevolutionary/sustainable futures concepts. To this end, *it must transform the approach to the future and attitude and paradigm of the science of futures field as well, and must produce new futures theory knowledge.* It fulfils this task by developing its own *coevolutionary paradigm* because production of theoretical knowledge is adjusted to the subject of futures thoughts and its complex dynamics, i.e., field of reality.³⁹

Practical futures field of integral futures also reflects upon new challenges, provided that it wants to take part in the practical development of the possible, acceptable/desirable future of sustainability. It can discharge this task if *it develops various integrated forecast/foresight making techniques for the new approach and attitude to the future.* In the development of these techniques, it focuses on possible ways of and organising the participation of societal actors and on connecting and further developing their knowledge about the future. In the course of that, it further develops

³⁹ The concept of coevolution was used first by biological sciences and ecological researches. There are other terms for coevolution or presumption of systems of relations similar to it. Such as connectionism or interactionism. The terms imply that various researches, areas of science have discovered this group of phenomena and the scientific approach developed from them. The coevolutionary paradigm has become also a *meta-paradigm*, which indicates that it has conquered several areas of science already.

participativity and the connection of scientific, empirical and tacit knowledge about the future and its integration into a new unity, or, rephrasing the above, works towards connecting scientific/professional and lay knowledge and expectations about the future. *Its paradigm is a participatory paradigm fitting in with its peculiar tasks, developed by itself.*⁴⁰

The two new paradigms – the coevolutionary and the participatory paradigms – of integral futures *can be developed by expedient termination of the blind spots of the evolutionary and the critical paradigms* (see section 4.2.3) and by *creating paradigm variants resulting in paradigm shift* that achieves their termination.

Following the coevolutionary approach to the world requires changes in the approach to the world and the future of the futures field. While *the future is invariably turned into present and remains open in the paradigms of integral futures as well*, in the subject and content of the present of the future it is the possible, acceptable/desirable and implementable interactions between the human system and the systems that constitute its environment that become important. *This future is the multitude of mental and conceptual constructions continuously coming into being and changing in the human world of man/society reflecting upon their environmental systems and themselves, which affects and shapes the coevolutionary processes of man/society and the non-human world through various kinds of human interactions.* Theoretical integral futures develops the interpretation, scientific bases of coevolutionarily construed futures and the methodology for studying them. Whereas possible and at the same time acceptable/desirable and feasible human futures thoughts are to be developed in practice and with the participative assistance of future shaping actors/stakeholders in the course of integrated forecast/foresight making activities carried out in various areas, times and locations. Practical integral futures develops the methodology of various integrated forecast/foresight making activities on the basis of its participatory paradigm. Thereby *the futures praxis will include both paradigms: its end products will be coevolutionary in their subject and content, however, their production will be a participative process.*

The range of interpretation or domain of the approach to the future of both paradigms for integral futures will be further extended within the interpretation of the future in the present. In addition to turning the past and the future into present, it will include *the past in the present and the present of the future in the present – the feasible futures – as well as the present of the future of the shapable future and the future to be shaped.* As it has been expounded in the analysis of the possible ways of termination of blind spots, extension of the range of interpretation or domain of the approach to the future involves widening of the range of interpretation of the rest of the paradigm components and leads to a new interpretation or the new range of codomain of the paradigm matrix. If these two alternative paradigms are implemented during merging of

⁴⁰ The *participatory paradigm* is a social science meta-paradigm that integrates the general rules of social production of knowledge for practical purposes into a system. It sets out from the presumption that knowledge is always tied to man and person; expanding knowledge is valuable by itself because it serves fulfilment of the purposes of man. As knowledge is always personal, everybody must take part in social production of knowledge as a participant with equal rights. Production of knowledge is a process embedded in social and cultural environment. New knowledge is generated when the knowledge of participants is enriched or transformed and can be further developed. In addition to participation with equal rights, it is conditional upon the process of production of knowledge being legitimate, transparent, comprehensible for everybody and reflective (Heron & Reason, 1997).

the components of the new paradigms, then *integral futures will widen the task-solving capacity of the futures field by the task that it makes it possible to research the past, present and future possible in the present of the futures acceptable/desirable in the present, i.e., the futures feasible and shapable/to be shaped in the present.*

The approach to the future of both paradigms for integral futures will be characterised by complex interpretation of the present of the future that can be named integrated futures. This will be achieved by integral futures field as follows: *linked to the processes of real time past and present and the future taking shape* it will research potentially possible futures, help formation of acceptable/desirable futures of groups of societal actors/stakeholders and will help and research their development into implementable and shapable futures and futures to be shaped. (See Figure 8) *By taking specific types of futures to refer to each other and connecting them it will attain interpretation of the coevolutionary pattern and pattern shaping role of integrated futures.*

Futures researchers and their communities are participating observers in both new paradigms. This paradigm component will not change in its content either. Similarly, there will be no changes in the social role and general goal of futures field, i.e., in the activity of the futures field to help development and improve quality of the future shaping thoughts of society.

With respect to the subject, goal, task, methodological principles and rules for applying methods as well as “worthwhileness” and utilisation of results, paradigm components will be modified in content or in the range of codomain as well. Therefore, I discuss these issues with respect to the two paradigms in separate sub-sections.

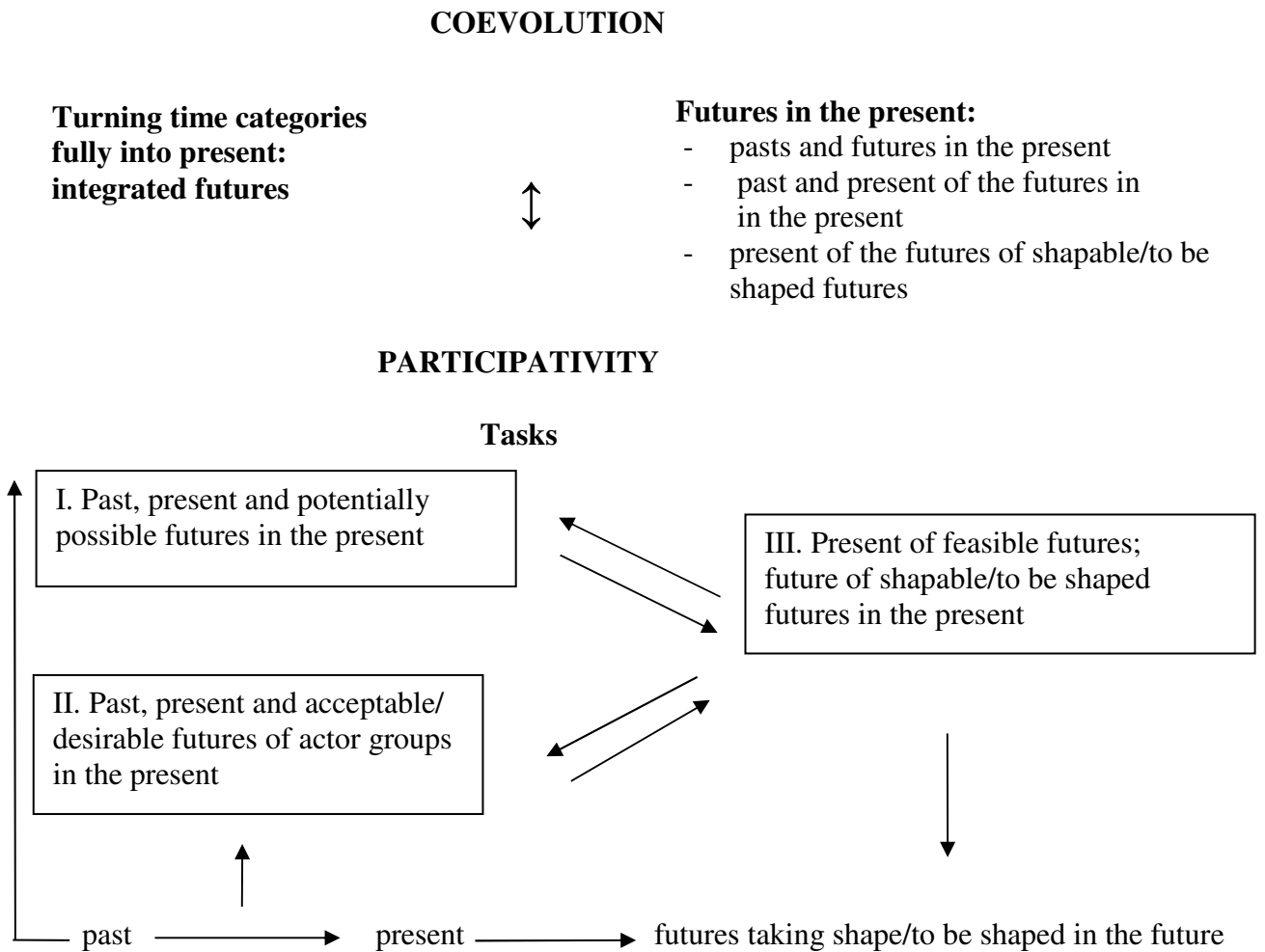
5.3.1 Coevolutionary paradigm of theoretical integral futures

The *subject* of theoretical integral futures is to study how coevolutionary patterns of various kinds of evolutionary systems develop, change and can change, and how the passive and active future shaping role of the human factor and the role of non-human factors and chance change and can change in patterns and their changes, possible ways of changing them.

The *goal* of theoretical integral futures is to produce *reflective knowledge* (interpretations, presumptions, conditional theories and methodology) concerning possibilities for joint survival/continued existence of the human and non-human world. It can solve its tasks assigned to these objectives together with developing its interdisciplinarity that can be linked to its own researches.

Its methodological principles will be characterised by complex dynamics approach and thinking in terms of holistic coevolutionary patterns, while its methods by coevolutionary modelling and building model systems, developing simulation procedures of possible interactions between emergent systems.

Figure 8. Approach to the future of paradigms for integral futures and tasks that can be solved by integral futures



As theoretical integral futures is also a *continuous knowledge integrating and new knowledge producing activity*, first, it must maintain its paradigm – interpretation of various futures, coevolutionary patterns, coevolutionary methodologies – and must construct further paradigm variants. Secondly, it must develop the theory of integral futures – the study of integrated future – for which it must study the history of the futures field and various practices of forecast/foresight making, i.e., it must be self-reflective. Thirdly, it must maintain continuous relation and interaction with practical integral futures in developing methods and techniques that can be used for making integrated forecasts/foresights. This new or increasingly emphatic function does not constitute a new paradigm component but only *affects modus operandi* even if this will result in additional research goals, tasks, method development. I specified the above-mentioned tasks at the relevant components in the paradigm matrix. For the outlines of the paradigms of theoretical integral futures. (See Table 13)

Table 13. *Outlines of the coevolutionary paradigm matrix of theoretical integral futures*

Component	Paradigm characteristics
World and future views	<p>The world is a coevolutionarily developing complex system whose development is influenced by human activity;</p> <p>The future is a multitude of mental and cognitive constructions coming into being and changing continuously in the human world of man/society reflecting upon their environment and themselves, which affects/shapes the coevolutionary processes of itself and non-human worlds through human interactions;</p> <p>Integrated interpretation of the present of the futures and their relations with real course of time</p>
Researchers/research team's position	Observing participant
Subject of inquiry in the futures field	<p>Possible connection of the dynamic process of various kinds of evolutionary systems depending on chance, determinism/inertia and reflective and self-reflective changeability of human futures constructions; studying coevolutionary patterns and their changes, possible ways of changing them;</p> <p>Studying the history of the futures field and various forecast/foresight making techniques used in the practice</p>
Goal and task of the futures field	<p>Production of new reflective knowledge (interpretations, conditional theories) concerning the possibilities for joint survival/continued existence of the human and non-human world/reality;</p> <p>development of methodology and methods for studying integrated futures;</p> <p>Self-reflection of the futures field as a science on itself: development of the study of integrated future, working out possible paradigm variants, maintenance and development of the theoretical/methodological knowledge base of futures field;</p> <p>Interactive relation with practical integral futures and futures praxis</p>
Methodological considerations	Complex dynamics, thinking in terms of holistic coevolutionary patterns
Rules for methods application	Generate new futures theory knowledge by dynamic modelling of links between various types of emergent systems, building models, simulation of possible system interactions and interactions between systems
"Worthwhileness" and usefulness of futures results	Being supported by scientific results, controllability, scientific and social discourse about the nature of future and futures, and possibilities for being placed

	in the process of practical integral futures and futures praxis, possibilities for further development in theory and methodology
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Source: Self-made

5.3.2 Participatory paradigm of practical integral futures

The *subject* of the paradigm of practical integral futures is *making integrated forecasts/foresights*. To this end, practical integral futures must deal with future shaping human actor/stakeholder groups and address the issues of actors that represent non-human factors in the participative process, their role played/to be played in making integrated forecasts/foresights and the methodology and procedures of linking various types of knowledge and generating new knowledge about the future.

The goal of practical integral futures is *to produce future management information* by which it is possible to research, build and maintain social and institute level participative and scientifically based future constructing processes and cycles. Therefore, its task is to develop and organise into cycles the linked solution processes of the three kinds of tasks that can be paradigmatically solved by practical integral futures – constructing possible, acceptable/desirable and shapable futures/futures to be shaped. Its methodological principle is organising participative future constructions based on participation of various actors/stakeholders into creative societal learning processes. In terms of applying methods, practical integral futures applies subjective, individual and group as well as Internet assisted procedures and develops them in order to enable it to use objective and quantitative procedures and model simulations for these purposes while connecting them to each other. The procedures and method application information to be developed serve participative production, feedback and controlling of new or upgraded futures concepts.

The information and knowledge to be produced by practical integral futures have dual ties: on the one hand, it is based on theoretical/methodological integral futures field, and, on the other hand, it is rooted in futures praxis. The knowledge of making integrated forecasts/foresights must be based on science and must be controllable, transparent, socially accepted and usable in futures praxis and exploitable in theoretical/methodological integral futures field. The role of futures praxis is of determining significance in the knowledge production of practical integral futures. *Information on making integrated forecasts/foresights can be considered knowledge only if it works in the futures praxis, in addition to being based on theoretical principles, and this praxis is the scene of responding to new needs and finding new practical futures knowledge by experiments.*

The paradigm of practical integral futures is built in line with the logic of the participative thinking and activity process of future formation; so the emphasis is laid on the character of the process paradigmatically as well. Furthermore, this process must be also continuous, in other words, the process organisation methodology of making integrated forecasts/foresights must be also developed in the function of changes in both theoretical integral futures and the futures praxis. Also, practical integral futures must develop its interdisciplinarity in relation to its own task solution procedure. For outlines of the participatory paradigm of practical integral futures. (See Table 14)

Table 14. *Outlines of the participatory paradigm matrix of practical integral futures*

Components	Paradigm characteristics
World and futures views	The world is a coevolutionarily developing complex system whose development is influenced by human activity; The future is a multitude of mental and cognitive constructions coming into being and changing continuously in the human world of man/society reflecting upon their environment and themselves, which affects/shapes the coevolutionary processes of itself and non-human worlds through human interactions; Integrated interpretation of the present of the future: actorial process of social construction and reconstruction of futures thoughts arising in particular space-time of the human world.
Researcher/ researcher team's position	Participating observer
Subject of inquiry in futures field	Various ways of making integrated forecasts/foresights; involving and connecting societal actors/actor groups, integrating various kinds of knowledge about the future and generating new group knowledge about the future
Goal and task of futures field	Development and maintenance of cultural/social and institute level future constructing cycles suitable for producing practical knowledge about the future; Development and organisation into cycles of the connected process of constructing possible, acceptable/desirable and shapable futures and futures to be shaped
Methodological considerations	Organisation of participative future construction based on participation of various actors/stakeholders into a creative social learning process
Rules of methods application	Linking subjective, individual and group as well as Internet assisted procedures with objective and quantitative methods and procedures to ensure participative production of new knowledge about the future
"Worthwhileness" and usefulness of futures results	Being supported by scientific results, accepted by society/actors, controllability, transparency, usability in futures praxis, exploitability in theoretical integral futures, possibilities for being further developed

Source: Self-made

As the paradigm of practical integral futures gives answer to the question how scientifically based integrated forecasts/foresights must be made, its paradigm, the

information and knowledge that can be produced by it may be used in developing the professional standard of the futures praxis and the professional competence of practical futures researchers.

5.4 Dynamic paradigm map of paradigms for futures field

The three paradigms for futures field made the subject of dynamic and comparative analysis in the complex meta-analysis represent the formation of the science of futures field and its paradigm shift.

Reaction of science to societal needs – the undertaking to obtain preliminary knowledge about the future to come – gave rise to futures field and development of its positivist paradigm in line with the positivist approach to science in the 1970's and 1980's. By extending prognostics and the approach to the future of production of special science predictions to the future of society and the world, *futures research* became a social science research area.

However, in the 1990's *futures research came to a crisis* because it had not been able to make socially acceptable forecasts. Globalisation and the postmodern change of age altered social needs and approach to science. Changes in social reality did not confirm and strengthen the forecasts made by the positivist paradigm. Sudden and unexpected changes – the oil crisis in 1973, globalisation all over the world, the fall of communism and change of regime of the countries in the eastern bloc – questioned validity of forecasting social development tendencies; at the same time, the instable nature of social changes and the control of societal actors over them became recognisable.

Postmodern currents of thought emphasised the fact that science is embedded in culture and has a fundamentally practice-oriented nature. Contemporary philosophy of science and sociology pointed out that science is unable to produce objective information independent of space and time and the situation of research. Researchers in scientific research are observers and participants at the same time. Scientific information and knowledge depend on space-time and context and can be further developed. Production of scientific information serves cognitive objectives but they can be always achieved only partially. Production of information is carried out under the influence of cultural/social conditions and needs surrounding science. The positivist or normal science approach was replaced by the post-normal approach to science.

Futures research responded to the challenges of the change of age by self-revision, search for new perspectives and then by a paradigm shift. It changed its approach to the world and the future, and subject to them the content of the components of the rest of the paradigms, as a result of that it transformed its paradigm and *modus operandi*. The paradigm shift has given rise to a new futures research: the futures studies that no longer researches and obtains knowledge of the future to follow but studies the foresight of the human factor, which exists and works as societal actors' evolutionary quality, or the role of the human factor played or playable in the complex dynamics of society. *By discovering the present of the future, the futures field has acquired an existing subject that is not examined by any other discipline.*

The paradigm shift having taken place was a paradigm shift as defined by Kuhn to the extent that owing to changes in the approach to the world and the future the futures

field has left the positivist paradigm and has developed a new paradigm. It deviated from Kuhn's paradigm shift since *it switched not to one but to two new paradigms*. The new paradigms are the evolutionary and the critical paradigms, which became recognisable in the years of the run of the Millennium.

The common quality of the two new paradigms is that *both of them turns the future into present and futures researchers are participating observers in researches, and researches carried out in line with both paradigms cover all scopes of subject of the futures field from theory to practical application*. As researches are carried out simultaneously, the new paradigms are alternative paradigms as well. The evolutionary paradigm, recognising the future shaping effect of the human factor, studies the pattern of cultural/social evolution and the future shaping role played by the human factor therein. For these purposes, it develops the approach, theory, methodology and methods of exploring possible futures, thereby helping the future shaping activity of societal actors. The critical paradigm organises and helps societal actors' activity of developing group futures thoughts in order to form their acceptable/desirable futures. Furthermore, it develops the theoretical/methodological issues and procedures of this group future construction process.

After the paradigm shift, pursuit of futures studies is determined by the competition between the two new and alternative paradigms. The paradigm competition has speeded up fulfilment of both paradigms and rapid spreading of their application in practice. As a result of the paradigm shift, the futures field has become a post-normal science, its social and human science interdisciplinarity has strengthened and its paradigm set consisting of three paradigms has evolved. With this paradigm set the futures field can solve three kinds of practical forecast and foresight tasks and is able to create paradigm variants for developing its paradigms.

None of the paradigms has been able to win in the competition yet; at the same time, the undesirable effects of the competition have become perceptible. The harmful impacts can be identified in narrowing of the communication between futures practitioners who research in line with specific paradigms, the mentality to defeat each other, and in the efforts of specific foresight activities to separate from the futures field. Another problem in the present futures studies arises from the fact that *the nature of post-normal science of the futures field has not been fully developed with respect to continuous and interactive connection of theory and practice developing each other*.

Although the evolution of the three paradigms of the futures field follows each other in time, *in the present all three paradigms work* depending on what task is solved by the futures field. With the positivist paradigm, it is possible to make forecasts concerning phenomena, processes that cannot be influenced at all or significantly by man. By the two new paradigms it is possible to study and develop futures that depend on man.

On the basis of the paradigmatic meta-analysis of the past and present of the futures field, three paths of the possible continuation of futures dynamics can be defined. One of the paths is completion of Kuhn's paradigm shift by the victory of one of the paradigms; the other path is variation/combination of the existing paradigm set to attain more efficient solution of tasks; the third path is a new paradigm shift, by which the task-solving capacity of the futures field can be further enhanced. All the three paths are

equally possible. Nevertheless, it might occur and may be realised that the new paradigm shift should result in evolution of integral futures.

In integral futures, thinking is urged by the fact that the concept has been raised already and its creation is in progress among futures researchers. It expresses the need in futures studies to terminate the unproductive paradigm competition against each other and to make use of the knowledge base of futures studies accumulated so far. On the basis of the findings of complex meta-analysis *integral futures will evolve in the process of theoretical and practical futures and futures praxis becoming independent and developing in connection with each other*. This integral futures *will be created by paradigm shift* in the event that the futures field reacts to challenges perceptible in the beginning of the 21st century and focused on in the meta-analysis, more specifically to sustainability, participativity, knowledge integration and continuous knowledge production.

The futures field must shift paradigms because handling the problems of sustainability calls for a shift in world view if there is a need to change the quality of interactions between the natural environment and the cultural/social system as well. It is expedient to think about it in terms of coevolutionary approach. The coevolutionary approach to the world requires participative role in the interaction between the human and non-human worlds as well as in the internal interactions of cultural/social processes. Integration of knowledge and continuous production of new knowledge represent important challenges in terms of providing bases for and expedience of human interactions. *The futures field is also concerned in challenges because thinking about the future and its quality fundamentally determine the changes and alteration of human interactions*.

The coevolutionary approach to the world strengthens thinking in terms of the present of the future but it is necessary to make it possible to handle the full scope of the connections and interactions between the past, the present and the future in the present at the same time. In other words, the futures field must be able to handle the future in the present not only as a possibility, acceptable/desirable future but also as shapable future and future to be shaped in the event that it wants to take part in developing sustainability. To this end, *it must extend the range of interpretation of its approach to the future to the futures that can be realised and must be shaped in the present*.

Changing the approach to the world into a coevolutionary approach, more specifically presumption of the interactivity between human and non-human systems affecting each other and extension of the approach to the future postulates alterations involving paradigm shift in the futures field. The paradigm shift can be attained by the evolution of two new paradigms that supplement each other in the event that the theoretical and practical integral futures become independent by developing their own paradigm. The theoretical integral futures develops the theory and methodological bases for studying the human approach to the future that constitutes and shapes the coevolutionary pattern. Therefore, its paradigm will be a *coevolutionary paradigm*. To be able to integrate scientific, empirical and tacit knowledge and futures thoughts and further develop them, practical integral futures must find or develop the scope of appropriate actors/stakeholders and the forms of their participation in making integrated forecasts/foresights. For this reason, its paradigm will be a *participatory paradigm*.

Completion of the paradigm shift can be implemented by a series of creations of technically expedient paradigm variants. Creation of paradigm variants can be solved, on the one hand, by widening the range of interpretation of specific paradigm components, and, on the other hand, by combining the paradigm components of the two competing paradigms. During the paradigm shift, the already visible blind spots of the evolutionary and the critical paradigms will be also terminated, i.e., it will be possible to study the shift from the passive to the active role played/playable by the human factor in coevolutionary interaction, the possible effects of the futures concepts of societal actor/stakeholder groups produced on non-human future shaping factors, and the impacts of the futures concepts of actor/stakeholder groups shaping each other. Paradigmatically, integral futures is able to integrate already existing paradigms but in a manner where each old paradigm loses its original character in the new unity by being subordinated to the coevolutionary approach to the world and the approach to the future widened by the new dimension. In the course of that, the futures field will maintain and further develop its interdisciplinarity in accordance with its paradigm development tasks.

In addition to and in close relation with the science of integral futures, futures praxis will become independent as well. Operation of the praxis and close relation between science and the praxis can be ensured on condition that regular training of futures experts is created. That is how integral futures can express the rationality of man and society producing knowledge and acting by foresight in the early 21st century. *Integral futures will not come into being in the competition of paradigms* because both the coevolutionary and the participatory paradigms represent different levels and phases of production of futures knowledge and thoughts and their development can be attained by tolerant, collaborating and interactive researcher's approach and attitude. However, the competition will not end but will be transferred to solving issues within each paradigm. *Integral futures interpreted and placed in the complex dynamics of paradigm for futures field also means that the science of futures may switch to the development course determined by the variation/selection model of the development of science.* (For the dynamic paradigm map of paradigms for futures field, see Table 15)

5.5 Paradigms of futures field and the development of the futures field

In the futures field paradigms contain the possible ways of practising futures studies. If we use the dynamized paradigm matrix for futures field for reconstructing specific paradigms and carrying out complex meta-analysis, then the development of the futures field can be interpreted paradigmatically as well.

Each paradigm for futures field describes what forecast/foresight tasks the futures field can solve by that paradigm, taking account of the current societal needs urging the evolution of the paradigm and the requirements of science. The positivist paradigm can solve the task of making the future to follow probable. By the evolutionary paradigm the domain of futures evolutionarily possible in the present can be explored. The critical paradigm can help formation of societal actor/stakeholder groups' futures acceptable/desirable in the present by scientifically based procedures. The concept and research perspective of integral futures studying the possible and feasible future desirable in terms of the criteria taken into account make it possible to solve the theoretically and practically connected task of the possible (in certain cases as part of the possible the probable), the acceptable/desirable and shapable futures and futures to be shaped.

Table 15. *Complex dynamics of paradigms for futures field*

Becoming a science and development	Paradigm crisis	Paradigm shift	
<p><i>Development and the future are fundamental cultural values</i> in Western culture:</p> <ul style="list-style-type: none"> - who knows the future develops faster - science can know the future the best - social governance needs results of science and information concerning the future <p>Positivist approach to science</p> <p>Positivist Futures Research</p> <p>Positivist paradigm:</p> <ul style="list-style-type: none"> - research of the “future in the future”, - the future is shaped by laws, development tendencies - research and forecast of probable futures - <i>blind spot:</i> the role of the human factor in forming the future 	<ul style="list-style-type: none"> - Forecasts do not work - Disappointment in scientific futures research - Communication disorder between the futures field and its users - Self-revision and looking for a way out in the futures field <p>New research perspectives:</p> <ul style="list-style-type: none"> - staying within the positivist paradigm - placing the futures field under social science/sociological paradigms - looking for evolutionary and critical research perspectives 	<p><i>Postmodernism – end of the era of grand narratives:</i></p> <ul style="list-style-type: none"> - growing demand of societal actors/actor groups to shape the future, - the futures field is only to help in conceiving acceptable/desirable futures <p><i>Post-normal science</i></p> <p>Studying the future - Futures Studies</p> <ul style="list-style-type: none"> - the future is of a human nature, - studying the “future in the present”. 	
		<p>Evolutionary paradigm</p> <p>evolutionary pattern of complexities containing developing and human components as well, showing possible futures</p> <p><i>blind spot:</i> switch from passive to active role</p>	<p>Critical paradigm</p> <p>studying human foresight, help in forming acceptable/desirable futures of actors/stakeholders</p> <p><i>blind spot:</i> impact on non-human factors and vision of the future of other groups</p>
<i>the 1970's and 1980's years</i>	<i>the 1990's years</i>	<i>the 1990's and the years of the Millennium</i>	

The present	The possible futures	
<p>The futures field:</p> <ul style="list-style-type: none"> - has become a post-normal science - its social and human science interdisciplinarity has strengthened - has become a three-paradigm science - its evolutionary and critical paradigms are competing - the two new paradigms have accelerated development of the futures field and widened task-solving capacity by two tasks. <p>Problems:</p> <ul style="list-style-type: none"> - the two new paradigms develop alternative task-solving capacity 	<p>On the basis of the meta-analysis of paradigms:</p> <ul style="list-style-type: none"> - Victory of one of the paradigms, completion of Kuhn's paradigm shift - Variation/combination of the existing paradigm set - New paradigm shift by new paradigm/paradigms – taking the variation/selection driven development course <p><i>Reflecting on new social criteria:</i> extension of sustainability and participation of societal actors by knowledge integration and continuous production of new knowledge</p> <p style="text-align: center;">Integral Futures</p> <p>Connected development of theoretical and practical futures, the futures praxis becoming independent</p>	
<ul style="list-style-type: none"> - undesirable and development hindering effects of the paradigm competition: <ul style="list-style-type: none"> - narrowing of communication between futures researchers - disregarding social challenges - efforts to separate from the futures field - weak relation between theory and practice of the futures field - regular training of futures experts is unsolved 	<p>Coevolutionary paradigm</p> <p>coevoliton between future generating human foresight and non-human evolutionary systems, exploration of coevolutionary patterns, development of the science of integral futures,</p> <p><i>interactive relation</i> with practical futures and futures praxis</p>	<p>Participatory paradigm</p> <p>participativity in forming integrated forecasts/foresights, human representation of human actors and non-human actors and implementation of their extended participativity, procedure development, <i>interactive relation</i> with theoretical futures and futures praxis</p>

In terms of their content, paradigms are incomparable indeed but the tasks that can be solved by them constitute parts of the task-solving capacity of the futures field. The meta-analysis has pointed out that while specific paradigms replace each other in moving ahead in time, old paradigms are not lost but the tasks that can be solved by them are placed within strictly defined limits owing to the fact that the blind spots of old paradigms can be identified and terminated. A paradigm characteristically determines the period of the futures field when it evolves. Later on the evolved paradigm will not be dominant but remains present as a paradigm that can be used within its limits in futures praxis. The tasks that can be solved by specific paradigms are different but can be counted. We can speak about the development of the futures field if its task-solving capacity is enhanced, i.e., the number of developed paradigms increases.

Each paradigm has contributed to enhancing the task-solving capacity of the futures field by making a task solvable. Integral futures is an exception to this. Integral futures solves a new task by two new and interrelated paradigms rather than by one new paradigm. The two new paradigms are justified by the complexity of the task.

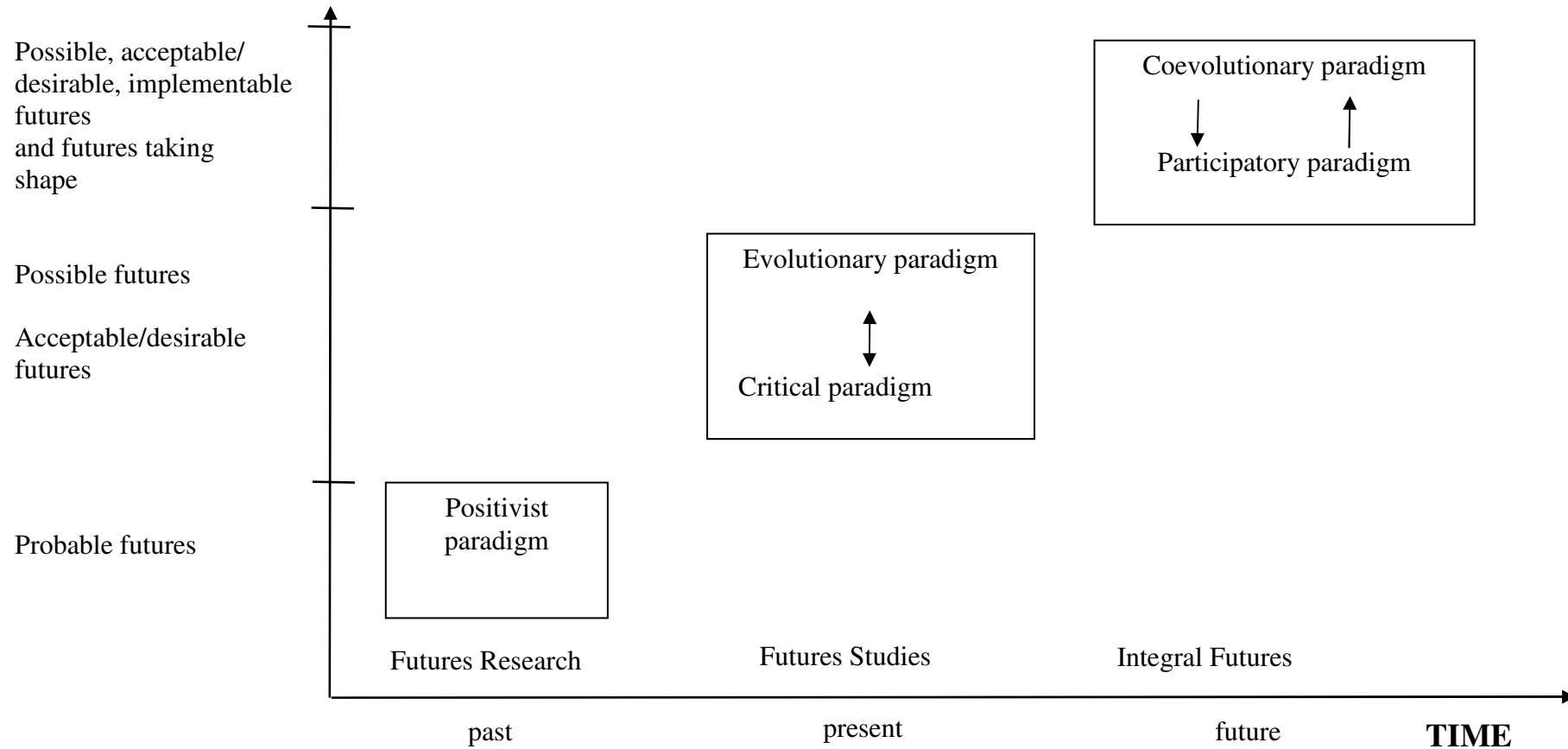
By the evolution of the positivist paradigm, the futures field became a single-paradigm science. After the paradigm shift two new paradigms competing with each other came into being, and as a result of that at present the futures field operates in accordance with a total of three paradigms. The next paradigm shift can widen the paradigm set also by two new paradigms for futures field. As they supplement each other, they allow enhancement of the task-solving capacity of the futures field only together. If integral futures evolves through the theoretical and practical futures becoming independent, then thereafter the current three paradigms and one of the new paradigms can be used for creating paradigm variants depending on whether we want to make a theoretical or a practical task solvable. Because each paradigm of the current paradigm set is such that subordinates task solution from theory to practice to a specific paradigm. *By evolution of integral futures not only several paradigms can be used for creating paradigm variants but paradigm variants can be produced also for the crossover of theoretical and practical aspects.* In this manner, by the paradigm shift that we are facing or is in progress the futures field can make a quantum leap in increasing its efficiency and speeding up its development.

The development of the futures field up to now and its possible and realisable future constructed in the present can be divided into three phases depending on the growth of its task-solving capacity. The first phase is the period of the positivist paradigm, positivist futures research; the second phase is the period of competing paradigms, the age of futures studies and the third phase is the period of integral futures hallmarked by the coevolutionary and the participatory paradigms supplementing each other. (See Figure 9)

Transition from one development phase to the other takes place through paradigm shift. The paradigm shift was preceded by paradigm crisis when the futures field had only one paradigm. *Paradigm shift leading to the following future does not require a new paradigm crisis* because the futures field can operate with the current paradigm set and the paradigm set can be used for creating paradigm variants as well.

Figure 9. *Paradigmatic development of the futures field*

**Extension of task-solving capacity
– number of futures**



Source: Self-made

However, a new paradigm shift by all means requires that the futures field should reflect on new challenges. I have showed an implementable research perspective thereof, the outlines of the interpretation and paradigms of integral futures as part of the dynamic and complex meta-analysis of paradigms for futures field. The research perspective of integral futures is open to criticism and further development, and based thereon particular research plans can be worked out for the futures field.

Summary: Findings of the complex meta-analysis, possible use of the results and directions of further development

By working out the paradigmatically possible and implementable interpretation of integral futures, my objective was to show a research perspective of the further development of the futures field from which systematic answers can be derived to the following questions addressed and disputed by contemporary futures field: Have the theoretical/methodological developments of the past decade created the evolutionary and the critical paradigms for futures field? Are the two new paradigms different from the positivist paradigm of futures research indeed? What science has the futures field become through paradigm shifts and in the competition of paradigms? How can the futures field come out of the now already unproductive competition of alternative paradigms and become integral futures? How does foresight activity generally used in practice fit in with the process of development of the futures field? How can the science of futures react on paradigmatic level to the new challenges arising in the beginning of the 21st century?

I have achieved this objective by complex meta-theoretical research of paradigms for future field. I have further developed the methodology used in meta-theoretical researches by operationalised dynamic paradigm matrix for futures field and its use, by comparative analysis of the paradigm set and blind spots linked to dynamics, and by complex analysis of possibilities for continuation of the paradigm dynamics.

*The results of the elaborated complex meta-analysis regarding the paradigms for futures field presented in this work reveal that so far three paradigms have evolved in the history of the futures field that can be made subject of a complex meta-analysis which can be systematically built by the paradigm matrix. These paradigms are the positivist, the evolutionary and the critical paradigms. *The three paradigms played and play a determining role in the development of the futures field.* The positivist paradigm made the futures field a scientific activity and made probable futures researchable. The evolutionary and the critical paradigms having evolved through the paradigm shift further extended the task-solving capacity of scientific futures studies with respect to exploration of the evolutionarily possible and the acceptable/desirable futures.*

*In the futures field, a paradigm shift as defined by Kuhn took place partly in the 1980's and 1990's. The positivist paradigm was replaced by a new paradigm, however, not by one but two new and competing paradigms. *It was in the competition between the evolutionary and the critical paradigms that the futures field became an up-to-date interdisciplinary and post-normal science.**

*On the basis of the paradigmatic meta-analysis of the past and the present of the futures field, there are three paths of the possible continuation of the futures dynamics. One of the paths is completion of Kuhn's paradigm shift by the victory of one of the paradigms; the other path is variation/combination of the existing paradigm set to attain more efficient solution of tasks; the third path is a new paradigm shift by which the task-solving capacity of the futures field can be further enhanced. *One of the implementable and desirable options of the third path is integral futures.**

The futures field can come out of the now unproductive competition of alternative paradigms by a new paradigm shift in the event that it reacts to the challenges implied in sustainability, participativity, knowledge integration and continuous production of new knowledge. The futures field can carry out the new paradigm shift drawing fundamentally on its internal resources if it uses its paradigm set for expedient creation of paradigm variants. Thereby the futures field can switch to the variation/selection driven development course of science.

The complex analysis of the range of possibilities shows that the complex dynamics of the development of the futures field implies development towards integral futures as a realisable option if *integral futures comes into being by a new paradigm shift and in the course of that theoretical and practical integral futures become independent within integral futures*. The development of *the coevolutionary paradigm of the theoretical integral futures and the participatory paradigm of the practical integral futures* makes it possible to carry out connected research of the possible, the acceptable/desirable and the implementable or shapable futures and the futures to be shaped.

In addition to and in close relation with the science of integral futures, the futures praxis will become independent as well. The operation of the praxis and close relation between the science and the praxis are conditional upon creation of regular training of futures experts. That is how integral futures can express the rationality of man and society producing knowledge and acting by foresight in the early 21st century. *Integral futures will not come into being in the competition of paradigms* because both the coevolutionary and the participatory paradigms represent different phases of production of futures knowledge and thoughts and their development can be attained by tolerant, collaborating and interactive researcher's approach and attitude. However, the competition will not end but will be transferred to solving issues within each paradigm.

In terms of their content, paradigms are incomparable but the tasks that can be solved by them constitute parts of the task-solving capacity of the futures field. While specific paradigms replace each other in moving ahead in time, old paradigms are not lost but the tasks that can be solved by them are placed within strictly defined limits owing to the fact that the blind spots of old paradigms can be identified and terminated. *A paradigm characteristically determines the period of the futures field when it evolves.* Later on the evolved paradigm will not be dominant but remains present as a paradigm that can be used within its limits in futures practices. The tasks that can be solved by specific paradigms are different but can be counted. *The futures field develops if its task-solving capacity is enhanced, i.e., the number of developed paradigms increases.*

The paradigms of the futures field that have come into being so far and the research perspective of integral futures represent also the development of the futures field because in the course of the process the number of paradigms developed for solving various tasks grows. By the presumed evolution of integral futures not only several paradigms can be used for creating paradigm variants but paradigm variants can be produced also for the crossover of theoretical and practical aspects. In this manner, by the paradigm shift that we are facing or is in progress the futures field can make a quantum leap in increasing its efficiency and speeding up its development.

By applying the methodology further developed for complex meta-theoretical research of paradigms for futures field, I have given a conceptually consistent answer supported by a series of meta-analyses following various criteria controlling each other and by their results to the questions raised and as an organic part thereof I have worked out the research perspective of integral futures.

Research results *can be used in practice* in three respects: (i) It is possible to derive expertise and quality assurance criteria from paradigms for futures field with respect to carrying out forecast/foresight activities. Professional and wider scope discourse between paradigms for futures field may contribute to testing, evaluating the results of theoretical and practical futures and of forecasts/foresights, to creating and developing regular training of futures experts and to increasing social acceptance of the futures field. (ii) It is possible to build into the training of futures experts: development of the competence of thinking in terms of various paradigms for futures field and possible ways of transforming them; development of the competence of complex meta-theoretical analysis; interest in and skills of participation in paradigm development; and the consideration that the connected pursuit of theoretical and practical futures fields serves production of new knowledge about the future. (iii) The methodology of complex meta-analysis can be used for studying the development of other areas of science as well.

The results of this work raise *further research subject areas*. Such as the following: Through the series of what paradigm variants can the development of the coevolutionary and the participatory paradigms be carried out or realised? How does the process of the theoretical and the practical integral futures becoming independent take place, and what channels may their interactivity have? What is the social practice of making integrated forecasts/foresights going to be like? What trends, schools are taking shape in the age of integral futures? How is interdisciplinarity of the futures field renewed and widened? How can the methodology of the complex meta-analysis of paradigms for futures field be further developed?

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