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FROM KNOWLEDGE TO INNOVATION SOCIETY[i]

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ABSTRACT

Knowledge has been what has always distinguished humans from other living being, once it was applied to solve a problem in a routine or an innovative way. The current society has developed much more knowledge than ever before. But it remains idle and unused or under-used, at least, with people and peoples who are not innovative in their concept of economics. They are under threat and/or practice of exploitation as neo-colonies, if their capacity to apply knowledge for innovation is smaller than with other people and peoples. Innovative culture and systemic thinking make a crucial difference. Knowledge is essential, but its application for innovation is even more so. There are many around, e.g. in the latecomer countries to the modern economy and society, who care for knowledge, but do not care for innovation and turning knowledge into innovation enough. Therefore, what they need is an explicit way from knowledge to innovation society. We are sketching it here.

Key words: entrepreneurship, innovative business, innovative society, systemic quality, sustainable enterprise

1. THESIS

It is not precise enough, if one denotes the modern society as knowledge society or civilization. Misunderstanding is possible concerning one's aim with one's knowledge. Knowledge is very important, but a raw material. Sometimes it is an aim of its own; only creative people use it to produce inventions and entrepreneurial ones to make innovation from inventions. [1] These entrepreneurial people are masters of the modern globalized world. They are winners. [2] It is not the technological innovation that has made their role so important, but the management and culture innovation, which has in the last centuries and decades, especially in the last two-generation cycles, covered about 20% of humankind. They are mastering the entire world. The transitional countries of Central and Eastern Europe are trying to catch up, China is very successful in catching up; India, and parts of South America are expected to follow soon. They will succeed by switching from the traditional to the innovative business in a crucial share of their companies/people, and thus to the innovative society, step by step. This process includes dramatic changes in the type of market relations, in its criteria of optimal companies, and in related human values / culture / ethic / norms. The institutional transition changes legislation, which matters, but is not holistic enough to work, if these market relations, criteria of optimal companies, and human values, etc. are not requisitely innovated. Systemic thinking is unavoidable for all influential factors and their synergies to be considered in a requisite holism. (See e.g.: [3])

2. DEVELOPMENT TOWARD THE INNOVATIVE SOCIETY

Gradually, in the advanced countries, innovative business has become the prevailing culture [4]:

- The market ratio of supply and demand passed through the transition from application of knowledge:
  - (1) The *random market* in which producers produce for themselves and sell only random surpluses (»self-sufficient economy« prevails), via
  - (2) The *producers market* in which they no longer produce for themselves, but their supply is smaller than demand (»queuing economy«, buyers cannot find everything they want), to
  - (3) The *buyers market* in which supplies exceed demand (»market economy«, suppliers cannot find buyers for all what they offer, innovation is necessary), and further on to
  - (4) The *state supported buyers market* in which supplies exceed demand a lot (»advanced market economy«, government supports competition, innovation is very necessary / crucial for survival).
- The continuous need for innovation encourages creativity, not only knowledge, of everybody, and therefore causes the evolution of democracy as a societal mechanism making room for *creativity and holism*, not only as *democracy in politics* (with

many parties, civil society, etc.), but also in *economics* (with free entrepreneurship, choice of job, profession etc.), *on shop floor* (with invention and innovation circles, quality circles, leadership instead of managership, i.e. co-operative instead of commanding management etc.), *in family, education, local community life, everywhere.*

The innovative society (IS) differs from the (foregoing, historically) routinistic society [4]:

- IS applies all achievements of development of the worldwide civilization.
- IS accepts and applies its own and foreign innovations rather quickly.
- IS applies foreign knowledge to upgrade its own knowledge in order to effectively develop and use all the new technologies of production, organization, education, etc.
- IS, on this basis, attains both a high international competitiveness and quality of life.
- IS's inventiveness and innovativeness, both as attributes and activities, reach (at least) the West European level, so do their preconditions.
- In IS, the creative (co)workers, scientific and other inventors and innovators are well appreciated because they are the most useful (co)citizens and (co)workers.
- In IS, the uncreative individuals are in trouble, especially the ones under-using their natural and learned capabilities.

The dialectical system of attributes of an IS includes [4]:

1. Contemporary, creativity based *democracy* both in the entire society and all organizations.
2. Contemporary, creativity-enhancing *market* in which, as well as in the democracy, innovative and entrepreneurial persons and organizations prevail.
3. Contemporary perception of *ownership*, which tells clearly the responsibility and includes creative and innovative ambitions rather than seeking rent (= income based on owning without creating) only.
4. Contemporary perception of *innovation*, which says that innovation is every useful novelty accepted as such by customers and granting the suppliers a suitable profit.
5. Contemporary way of running the business, the *innovative business*, which continuously strives on innovation of any kind.
6. Contemporary perception of entrepreneurship, i.e. *innovative entrepreneurship* which means that not every owner of an enterprise is an entrepreneur, but only the one who combines his or her business factors in an innovative way in order to produce innovation and live on it.
7. Education and other societal subsystems, which are not economy and business, but rather create human resources, circumstances and preconditions for them to flourish, therefore also *support innovation rather than routine.*

For 80% of humankind the resulting open issue reads: how to accelerate one's transition from a pre-innovative to an innovative society, or how to avoid one's neocolonial exploitation in another way. Since we do not see another way, we will concentrate on the first. Experience of the most innovative 20% tells that it was innovation of management, which was first, not the technological innovation: the technological innovation needs society and management that supports or even demands innovation. [5]

3. INNOVATIONS OF MANAGEMENT TOWARD THE INNOVATIVE SOCIETY

The oldest *innovation of management* was the *hierarchical subordination* of the less qualified members of an organization to the more qualified and experienced ones. *Scientific management* is close to it. It makes sense as long as (1) the superiors do not abuse their position, and (2) the subordinates would not be able to perform well enough in their jobs with no supervision and instruction, due to their lack of expertise and interest. In the course of the 20th century, the equipment has been more and more introduced that has required more skill, education and training, and thus has made the traditional hierarchical subordination less and less useful and needed.

The next *innovation of management* may hence have been the (3) *human relations*, between the two world wars of the 20th century, and (4) *human resources*, in recent decades. Their main difference from the old tradition is the supposition that *subordinates are capable of creativity and responsibility***.** This finding has had a lot to do with the practical experience as well as with the growing need that the companies and other organizations both develop and activate as much of their personnel's creativity, inventiveness and innovativeness as possible.

Gradually, a next *innovation of management* has entered the scene, which we may call (5) *innovative business***.** It can be briefly defined by the following five sentences [4]:

1. In principle, every cost is unnecessary. In reality it is, if we work smarter, not harder, and produce innovations. This need requires entrepreneurship and leadership rather than managership. Then,

knowledge, creativity, and co-operation capacity can be used better.

2. Today, every product and process becomes obsolete, sooner or later. That's why we must know their life cycles, do research, do development (connecting research results with the daily needs and practices), create other inventions and make from them innovations as a new, beneficial basis of survival, all the time.
3. Survival, and therefore both good and poor work, is everybody's business. Nobody, neither the superiors nor the subordinates, are entitled by their own life reality to be irresponsible and unmotivated for innovation.
4. Therefore let us continuously, all the time and everywhere, search for possible novelties! Only a small portion of them may become *inventions* (= new, perhaps making sense and potentially useful ideas) and *suggestions* (= inventions reported to one's organization). From some of them, by research and development, sometimes something new and usable, but not yet used and beneficial, might be created: *a potential innovation*. Customers will accept only a fragment of them as useful and worth paying for, hence making a benefit to both customers and suppliers, therefore deserving the name of *innovation*.
5. The entire business policy and practice is innovation oriented, not just a fragment of it.

Innovation of management makes innovative business possible.

4. SYSTEMIC AND CYBERNETIC MODEL OF INNOVATIVE BUSINESS

The phases in P. 3 bring us to the process in Fig. 1. Its phases are briefed in a logical sequential order, but in reality the process is not linear at all, but dialectical, i.e. full of interdependencies and interactions [4]:

- *Vision*: »survival on the basis of competitiveness by holistic and entrepreneurial creative work and cooperation aimed at a systemic quality in accord with customers' requirement«.
- *Mission:* »delight customers with an excellent systemic quality and attract them as sustainable customers«.
- *Policy:* »implement innovative business as a source of a continuous systemic quality in all parts of the business process and all units«.
- *Strategy* towards implementation of such a policy may employ continuous self-assessment of one's own quality in terms of the Deming Prize, European Quality Award, or Baldrige Award, or (as a first phase) attainment and re-attainment of International Standards Organization's rule ISO 900x/2000 certificate, etc.
- *Tactics* for implementation of such an innovation strategy are organized critique, followed by teams'/task forces' work on solution of the selected problems (on a voluntary basis and on company time, one hour a week) with awards for inventions (symbolic in value, but with no delay) and innovations. Innovation reward is foreseen for all members of the innovative team, all members of their own organizational units, every organizational member including managers, while a half of the value created by innovation enters the company business funds. But this reward has its turn only after novelty has proven beneficial in internal or market success.

MANAGEMENT PHASES		PREPARATION PHASES
Definition of vision	⇐	Drafting of vision, mission, policy, strategy,
⇓		tactics, operation
Definition of mission		⇑
⇓		Definition of starting points for drafts
Definition of policy/ies		⇑
⇓		Consideration of experiences
Definition of strategies		⇑
⇓	<===	Intervening when and where needed
Definition of tactics		in all management phases
⇓		⇑
Running the operations	⇒	Checking the results of operation

Fig. 1: The cybernetic circle of the preparation and implementation of the management process

A further part of the essence of the innovative business is that the five sentences of its definition no longer apply to the producing part of the organizations only, but to **all activities and all parts** of life in all organizations. The effort must be broadly disseminated and permanent, because the pressure of competitors is

permanent, and for competitiveness the **quality must be systemic** which is impossible without continuous innovation.
Why has such effort become necessary so quickly over the recent decades?

5. CHANGES IN MARKET PRESSING FOR INNOVATIVE SOCIETY AND BUSINESS

Times of the surplus of demand over supply are over, in the advanced world. The basis of **competitiveness** has, even more unpleasantly for traditionalists, changed in periods of only decades – see Fig. 2. [6]:

DECADE	BASIS OF COMPETITIVENESS	MARKET PRESSURE FOR INNOVATION	OPTIMAL TYPE OF ENTERPRISE
1950s	Covering any need	None	Supplying anything
1960s	Price	To reduce cost	Efficient enterprise
1970s	Quality + price	To reduce cost and improve technical & commercial quality	Quality enterprise
1980s	Range + quality + price	To reduce cost, improve technical & commercial quality, and offer choice	Flexible enterprise
1990s	Uniqueness X range X quality X price (in interdependence!)	To reduce cost, improve technical & commercial quality, offer choice, and difference from others	Innovative enterprise
2000s	Uniqueness X range X quality X price X care for natural environment	To reduce cost, improve technical & commercial quality, offer choice, difference from others, and sustainability	Sustainable enterprise

Fig. 2: Development of the basis of competitiveness toward »systemic quality« over the last decades

If innovation has become so crucial and is so broadly defined, what types of innovation are there?

6. TYPOLOGY OF INNOVATION

Demand for systemic quality requires knowledge to become innovation. This happens by application of knowledge to make beneficial novelties – on terms of their users. Figure 3 briefs the dialectical systems of interdependent preconditions for knowledge to become innovation [7]:

Innovation = (invention X entrepreneurship X management X holism X coworkers X suppliers X customers X competitors X socio-economic conditions X natural conditions X good luck X culture)

Fig. 3: Equation of synergetic precondition for an idea to become innovation

Every precondition requires specific knowledge in terms of contents and in terms of methods of its application. In addition knowledge is needed on ways to make beneficial synergies of knowledge of all types. Mostly, this can be attained in creative co-operation of mutually different specialists working as a team. This, again, requires knowledge on know-how. Application of all these many kinds of knowledge leads to innovation, innovative business and innovative society. Every knowledge, on its own, is too reductionist to make an idea become an innovation. All of them are interdependent and making a whole together.

This fact opens the issue of knowledge and will of specialists of different professions to co-operate on an interdisciplinary basis. Otherwise they would make oversights and fail rather than succeed in market.

7. REDUCTION, REDUCTIONISM, SPECIALIZATION AND PROBLEMS OF CO-OPERATION

The whole and interdependencies, what does this mean?

For millennia, humans have been trying to assure their survival, like all living creatures do. The difference is, that humans have happened to become creative, to start and continue to change the parts of nature in which they were living. Sometimes they were successful and sometimes they were not, on their own criteria. Thus, they have learned from their own and others' experience. They learned more and more. Eventually and gradually, they came to be *overwhelmed* with the *quantity of insights available*. Knowledge became poorly/partly usable/used.

The humans' way of solving the problem was and still is obvious: every person has unavoidably to *specialize* in a

selected part of the entire bulk of humankind's knowledge. This specialization, in the next step, unavoidable causes *reduction* of the entire quantity of insights into a rather manageable one. *Manageability* of one's life has been very appealing; it helped person/s and group/s produce insights and outcomes, which they found necessary.

Thus, the next step was to make the reduction *the right way of thinking and acting*, in the human attitudes. *Reductionism* became the dominating school about the way of thinking, especially in research, science, but also in the real life practice. It was very helpful, and still is so, when one tries to discover *details*, which are obviously very important for manageability. By it, *mystery* has come more and more to be *mastery* (see:), which was found great, of course, and still is so. [8]

But what happens about the *whole*, if everybody considers *details only*? It still exists. And it has attributes, which make it different from every individual detail, part. E.g. a watch is different from each and every of its parts, even from their sum. It has – as one case of a whole – its own attributes, which are not produced by its parts alone, but by their *interdependencies, essential relations*: every part of the watch needs other parts of the watch and is needed by them for the watch to be a watch. Parts depend on the whole, and it depends on parts. [9]

But can we individuals, being different specialists consider interdependencies and outcomes of their mutual influences, if we do not co-operate? We cannot. How much have you been learning about co-operation, especially about *co-operation with persons, who differ from you in their knowledge and values*, so far? Not much, if you have been in a usual school. What is the consequence?

8. COMPLEXITY, COMPLICATEDNESS, RELATION EMERGENCE, SYNERGY VS. SIMPLICITY AND LOCKED-IN THINKING AND ACTING

The consequence of the lack of co-operation, especially of an interdisciplinary one, is oversights, several kinds of blindness: we do not see the real reality [10].

Specialization without co-operation beyond the borders of that specialization *locks us in* its own arena. If we are economists, we are – for obvious natural reasons, limits of time and capability – not able to think and act in the role of mechanical engineers, medical doctors, cooks, cleaners, unless we learn another skill. We do not have much of a chance to learn all the skills, which are around these days. So, we tend to go on specializing and getting more and more locked in our own cage in our thinking and acting. In this we achieve, that the reality around us is *simple enough* to be manageable with our own skill.

But: is this *simplicity true or false*? It is locked in a *single viewpoint.* In the real world, we soon discover that other people think and act differently, quite frequently. This does *not* mean that we are wrong, but we are just *oversimplifying.* Our insight is partial, hence misleading, and may cause failure. The real life is much more complex and complicated. It is *complicated* in terms of the huge amount of attributes, which exist inside single parts of reality. And it is *complex* in terms of attributes, which are caused by *relations between parts of reality.* Reality is not as simple as it seems to be, if we consider it from single viewpoint alone and forget about relations, emerging attitudes and synergies. Everything and everybody exists *in relations*, not alone. But the above process has made humankind forget about it too much. It is herein, that the cause for most contemporary human problems lies: we humans tend to oversimplify instead of thinking in systems, wholes, interconnectedness, interdependencies; we tend to forget about real complications and complexities. And then we *imagine*, that we are mastering our mysteries [8]. And persons, who try to teach us to consider the reality without simplification, are difficult to understand and accept [10]. As a result, system thinking has been created, but it remained poorly used, since it did not help to simplify, but rather to *face complex reality* [11]. What can be done?

9. KNOWLEDGE, INFORMATION, PROFESSIONS, ORDER

Humankind has been developing for several thousand years. Life has been more and more complex rather than simple, be it in terms of biology, in terms of economy, in terms of sociology, in terms of technology, in terms of communication and languages, what so ever. All these »terms« became parts of knowledge, which humankind has developed over all those millennia, and especially in the last decades.

This development is a response to the fact that life has been increasingly difficult to understand and master. New and new information has been added, this at least has been the intention. What actually has happened and still is happening is production of *data, rather than messages and information.*

Data are made when signs are put in an order, e.g. letters in a word, sounds in music. They exist and wait for somebody to understand them. Once this happens, the person receives a *message*. Seeing a word, hearing a piece of music, deciphering attributes of a stone, a plant etc., may make a message from data, if data's *meaning, contents* becomes clear. This is still no *information*, as long as it still lacks *impact, causing an action,* such as memorizing of the message, linking its meaning with some other messages and their meanings into a newly emerging synergy of messages, resulting in new understandings, new behaviors etc. [12]. Networking of information into a new synergy/whole produces knowledge. But it tends to be too *one-sided, partial rather than holistic.* Contemporary professions tend to be one-sided rather than holistic, unless professionals develop the habit of systems thinking, which reaches *beyond the limits* of their own professions to which it is added.

10. SYSTEMS THEORIES – TOOLS OF HUMAN ACTION AND/OR HUMAN FORMATION

Forgetting about the *context*, as well as about other people's viewpoints, is very easy to do. We are all specialists in small parts of reality; all other parts of this reality make us strangers everywhere. But we saw in reality, that parts of reality matter, and that they are *interdependent* with other parts of reality. This means that context matters even more than parts alone.

The development of specialization caused humans to forget about contexts of their own life, action, specialty, views, opinions, and experiences. Is it not interesting, that systems theory, as a theory of considering the wholes, has surfaced briefly after a few decades in the 20th century, in which:

- Humankind's knowledge has been growing tremendously, and has been causing an increasingly narrow specialization into single parts of knowledge, with very rare and poorly developed habits and knowledge of interdisciplinary co-operation;
- Humankind suffered from the biggest crises ever, having the form of two world wars and a world wide economic crisis between them?

Von Bertalanffy saw in his life time (1900-1972) that this limitation might destroy humankind. He wanted to *change the worldview*; we should all see the entire world and its entire biosphere as our only home, a very *complex* organization, i.e. a whole with many interdependencies. This is what he called the general systems. [13] What many other authors call the general systems now is not so much a worldview, but rather a methodology. It transfers knowledge, data, messages and information from one discipline to another discipline, but leaves disciplines locked in behind their own bars. It does *not* create *interdisciplinary cooperation*, but rather stays with formal bridges between disciplines. They are called *isomorphisms*, which mean attributes and tools of consideration, which one is able to apply in several different disciplines with no interdisciplinary interaction.

From the development of systems theories, which we cannot consider in any detail here, we can see that von Bertalanffy wanted to produce systems theory as a tool of *human formation.* He tried to help the world to survive by establishing a broad worldview, a holistic one. Other authors and practitioners mostly did not follow him, and they changed systems theories into *tools of human action.* They achieved many important results inside single disciplines, which came to be more *holistic inside their own field*. Less has so far been achieved in interdisciplinary approach and hence in consideration of *broader contexts*, although this would bring humankind closer to von Bertalanffy's and Elohim's [14, 15] warning: we humans are ruining more than creating a solution for humankind and the planet Earth. Environmentalists, meteorologists and many others share the same warning, even the highest political bodies of humankind do – the United Nations Organization. But, too bad, they keep staying short when facing the rather narrow and concrete interests of influential people and their organizations.

11. HOLISM VERSUS ONE-SIDEDNESS AND OVERSIGHTS: REQUISITE HOLISM

Holism is an easy word to use, as long as we do not try to exactly define it. Different authors tend to have different definitions implicitly or explicitly.

In a strict sense, a whole contains *everything*, *all* parts and *all* their relations. But: which – everything? Experience demonstrates, as we already have noticed, that humans do not seem to be either able or willing to think and work in the breadth, which von Bertalanffy goes for. It turns out that everybody feels entitled to *define what is a whole and holism to him, her or them on their own – tacit, often – criteria.* (See: e.g. [16], [17]).

The mathematical basis which was introduced for some help, said that a whole (= system) is an *ordered set*, which means that it is made of two sets, the set of elements (parts) and the set of relations (interdependencies). This is a generally valid

isomorphism. It serves very well, as long as contents are less important as the mathematical basis for its description. Then we see, that the same piece of reality can be described with many different »systems«, i.e. as many different wholes. If wholes can be so *many* and so *different* in concrete contents, when is the approach holistic, and when is it one-sided? If the concept of von Bertalanffy has not taken roots in the real practice of the contemporary humankind, which one has?

No one with a general validity has. This is what the conferences about systems thinking and theory as well as their application let us find out. *Specialization* is too important to be forgotten about and sacrificed to a kind of holism, which might tend to leave specialization aside. Though, it is not enough to be specialized, which causes, along with *insights*, also too many *oversights*, because each and every specialization can cover only a *single viewpoint* or a few of them, at best, other attributes remain outside the scene and the screen.

The consequence is the *dilemma*:

- We may have a complex approach, which causes quite a lot of work for insights to be rather holistic, but this work may predominantly result in outcomes which are holistic enough and do not cause unpleasant side-effects and surprises; in other words: *a complex approach and work have simple consequences.*
- We may have a simplified and simplifying approach, which does not cause lots of work for insights to seem to be rather holistic, but may predominantly result in serious oversights, because its outcomes cannot be holistic enough; in other words: *a (too) simple approach can have complex consequences.*

Obviously, in each and every case a decision has to be made on *which level of holism is good enough* to solve the above dilemma well enough. One should avoid both exaggerations:

- *Total* holism, trying to include *all attributes from all viewpoints, and networking all viewpoints into the system of all viewpoints with no selection*; the result may be a lack of focus and hence a lack of response, which insights and actions are making the point, are essential.
- *Fictitious* holism, trying to limit *the concentration to one single viewpoint, which might be too much of a selection of a narrow kind*; the result may be a good focus, leading to a lot of knowledge about nearly nothing.

A middle way is close enough to reality in terms of both need and possibilities. This is what we called recently [18] the *requisite holism.* It turned out to be a law: successful persons and organizations (tacitly) live with this law [19], [20].

What is the way to meet the *law of requisite holism*? Rarely, a single person can know enough to meet it, perhaps in the case of a very simple activity, such as a job on the assembly line. More normally, several specialists will need to co-operate as representatives of several mutual different viewpoints, e.g. professions. But: what is the basis for them to agree to enter into such a co-operation, which is much less simple to do than working inside a single discipline alone? It is *practice and ethic of interdependence, because they differ in knowledge.* If this does not happen, knowledge remains partly use, wrongly used, or even misused and/or abused. In this case there is a danger knowledge makes a poor or even no contribution to life in an innovative society.

13. SOME CONCLUSIONS

All the briefed changes of reality require the current generation to know and apply knowledge different from the one they/we have learned in school. We have never needed so much innovation, and hence entrepreneurship and (requisitely) holistic thinking as we do now. Knowledge has changed by innovation, but innovation of values / culture / ethics / norms is even more needed and tough, at least for the catching up countries/peoples to succeed rather than to be neo-colonies of the more innovative ones. Everybody should understand in which development phase he or she is right now and/or heading to. And then the decision should be made: can we afford leaving our knowledge idle, or shall we do our best to master our way toward the innovative society? It is a historic decision for many to take. It requires their decision to innovate their own attitude about knowledge and innovation.

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