# TRANSFORMATIVE RESEARCH DRIVEN INNOVATION - THE ARTISTRY OF INNOVATION MANAGEMENT IN THE AGE OF SPIRITUAL MACHINES

Professor Dr.Edmond Hajrizi (corresponding author),
*Rector - President of UBT*
*ehajrizi@ubt-uni.net*
*+381(0)38541400*


Dr. Károly Nagy,
*Head of European Research Collaboration at UBT, Co-Executive Director of the BME-UBT Joint Transformative Research Center*
*karoly.nagy@ubt-uni.net*
*+377(0)44724983*
University for Business and Technology (UBT)
Prishtina, Kosovo
*Lagjja Kalabria p.n.,10000 Prishtina*

*"Transformative Research: The Artistry and Alchemy of the 21st Century"*
Dr. Arden L. Bement, Jr. Director, National Science Foundation
(Bement, 2007)

## Abstract

*In our approach the real innovation process is toward to the satisfaction of objective virtual (future) social needs. To manage such a process, it means the process of such a type of innovation which is oriented for the satisfaction of future needs, is not a simple task. The old effective needs are very often manifested in different plans, directives, and sometimes in legislation. The society, the different state institutions, but the private sector too builds strong compulsion trajectories in support of the satisfaction of these obsolete needs. The above described very simple conceptual definition of the innovation, what was developed by us based on many years of practice and experience in the field of innovation gave us an opportunity to find new possible approaches in support of the right innovation strategy development, the management of innovation processes in the circumstances of radical social and technological changing, to find new ways for the development of human resources, what are needed for the management and the implementation of the innovation. In this study we will introduce the most important results of our researches and we will formulate considerations and recommendations in support of being put in to the practice these. We will do this by presenting the five pillars of the new innovation model we have developed.*

**Key words:** responsible innovation, transformative research, modularization, virtual needs, virtual world, diversity, intuition, spirituality

## Introduction

In our approach one of the basic functions of the science is to discover the objective virtual (future) needs of the society and to develop the theoretical and methodological background for the satisfaction of these needs. The process is the satisfaction of virtual needs is the innovation. During the process of innovation the virtual needs effectualize, it means that these needs pass in to effective, actual, every day needs. At the same time some effective needs what we are unable to satisfy or the satisfaction of which is not efficient will be disappear, the old effective (actual) needs will be replaced by new actual needs (Szabo, 1985. pp. 332-333). In the light of these we can define the process of social & technological development as the preparation, creation of the conditions for the satisfaction of the above described need-transition performance. What is really challenging that from the very beginning of the satisfaction of virtual needs these are constantly losing their prestigious position and new virtual needs move in to their place.

To manage such a process, it means the process of such a type of innovation is not a simple task. The old effective needs are very often manifested in different plans, directives, and sometimes in legislation. The society, the different state institutions, but the private sector too builds strong compulsion trajectories in support of the satisfaction of these obsolete needs.
Huge brainwashing marketing and political machines are working to manipulate the people's consumer habit, to manipulate the public procurement. At all costs, they want to give away the many useless foolish junks.

The above described very simple conceptual definition of the innovation, what was developed by us based on many years of practice and experience in the field of innovation gave us an opportunity to find new possible approaches in support of the right innovation strategy development, the management of innovation processes in the circumstances of radical social and technological changing, to find new ways for the development of human resources, what are needed for the management and the implementation of the innovation. In this study we will introduce the most important results of our researches and we will formulate considerations and recommendations in support of being put in to the practice these. We will do this by presenting the next five pillars of the new innovation model we have developed.

## I.     The age of Singularity

As the first pillar we will introduce our considerations related to the basic nature of the beginning of the new age after the called by Manuel Castells "Information Age" (Castells, 1996). Previously (Nagy, 1996, p. 154), we thought this era would become a reality when people's participation in virtual worlds becomes everyday and everyday (we will write about the basic nature of virtual worlds in the third chapter). So the basic question what we are face is what would be beyond the information age, what kind of social needs we would be faced in the second part of the 21th Century. We constantly analyze and dispute the forecast of the leading scientific and political institutes from all over the word and developing our own vision. Our current position is closed to the vision what was introduced by Ray Kurzweil in his book "The age of spiritual machines" (Kurzwell, 1999). About the concept of technological singularity he wrote in his book "The Singularity is Near" (Kurzwell, 2005). With arguments, we will adequately support what is the same and different from what we anticipate from his point of view.

Ray Kurzweil considers that one of the key features of the new era of humanity is technological singularity "Kurzweil predicts that, as machines become more intelligent, humanity will also grow to become smarter" (Kurzwell, 2017). What is rooted in our opinion is the way this is realized, how can be achieved. „Indeed, for Kurzweil, the singularity, if it happens, won't be a machine takeover. Instead, he predicts it to become more like a co-existence, where machines reinforce human abilities. Kurzweil predicts that a hybrid AI would become available by the 2030s. This hybrid AI, he explained, would allow human beings to tap directly into the cloud with just their brains, using what he called a neocortex connection. Kurzweil previously predicted that part of this reinforcement would come from nanobots, which he said would flow throughout our bodies by 2030. We do not think this should happen, and we also think that this is not necessary. Humanity will grow to become smarter not because the simbiosis with machines, but because it is freed from the burden of non-human activities.

As it was written by Rolf W. Ashby "every system, organism in order to preserve work and life, is obliged constantly take care of to the diversity balance between maintaining own internal and the diversity of the environment" (Ashby, 1982. p.167). As the one of the world's leading inventors, thinkers and futurist, the co-founder of Singularity University, Ray Kurzwell said "the progression is not linear. And our brain is linear" (Kurzwell, 2017). Kurzwell, as the director of engineering at Google very actively supports the development and spread of newest and newest "brain extenders", the usage of brain-machine communication applications. It looks like that Kurzwell and his companions really do want to restore the diversity balance and that's probably the case. In our opininion they only forget one thing: the rapid growth of the complexity of our social essence is artificially generated. It is artificially generated even if this generation destroys the natural environment. The driving force of all this is business greed.

Going back to Ray Kurzweil's position quoted above, we think that tools and applications he calls as "brain extenders" are needed mostly in support of the use of more and more such extenders.  Thus, we do not approve that humans' natural faculties and potential abilities are suppressed or withered away by prevalent educational methods only to force rather expensive "intellectual" crutches upon them later on. This is a sure way of guaranteeing that they will no longer be able to stand on their two feet again and that they will have a penchant to purchase more and more brain extenders. We firmly believe that the transformative resrach driven innovation helps us to select between significant and insignificant will also help us get rid of superfluous upgrades, and development slack.

What is the solution to the conceptualization of Singularity University and other similar trends, not in the artificial, technological development of human capabilities, in the development of human-machine symbiosis, but in promoting the development of human capabilities, is seen in the liberation of man as a human being. In finding this solution, the spiritual approach has a major role to play.

## II.     Transformative research driven innovation

During the development of our innovation model the hardest question what we were face was recognition of the trends of the development of objective social needs. To find a solution we (UBT) together with the Budapest University of Technology and Economics (BME) we have created the UBT_BME Joint Transformative Research Centre. The transformative research is able to look at the horizon of "traditional" sciences. During the introduction of the second pillar we will formulate the basic principles of the usage of transformative research in support of innovation strategy development.

As we cited it in our motto, Dr. Arden L. Bement, Jr. Director, National Science Foundation (NSF) said: "*Transformative Research: The Artistry and Alchemy of the 21st Century*" (Bement, 2007). According to the definition of NSF „*Transformative research involves ideas, discoveries, or tools that radically change our understanding of an important existing scientific or engineering concept or educational practice or leads to the creation of a new paradigm or field of science, engineering, or education. Such research challenges current understanding or provides pathways to new frontiers. Transformative research results often do not fit within established models or theories and may initially be unexpected or difficult to interpret; their transformative nature and utility might not be recognized until years later. Characteristics of transformative research are that it: o challenges conventional wisdom, o leads to unexpected insights that enable new techniques or methodologies, and/or o redefines the boundaries of science, engineering, or education*"(NSF Transformative Research, 2016).

An important condition of the development and fast and wider spread of the transformative research driven innovation approach is the development of a really friendly social environment. The "traditional approach" to innovation has not too many enemies. But as we already mentioned in the case of the objective virtual needs oriented innovation the situation is absolutely different. Here the development is not aimed at the goals that are distorted by the business political interests but on the real needs of the society. Based on the results of our researches the only one solution is that the transformative research driven innovation has to be embedded in a wide range of social culture programs. At the same time this also ensure the integration of the achievements of this type of innovation directly in to the social capital. We call the innovation which targets the objective social needs with another term as "responsible innovation".

### III.     Education and Science in the circumstances of singularity

As the third pillar of our new innovation model we will introduce the best practices of our university (University for Business and Technology - UBT) in the field of efficient learning and teaching of our future innovation managers. At the UBT we have been using the state-of-the-art methods of virtualization for a long time. These methods help to us to develop very efficiently such a key capabilities for innovation managers as for instance the intuition, clairvoyance and precognition.

One of the most important missions of UBT is to educate, inspire, and empower leaders, scientists, innovators to apply the results of transformative researches to address responsible innovation challenges. Our learning and innovation platform (Platform) empowers individuals and organizations with the mindset, skill-set, and network to build breakthrough solutions that leverage emerging technologies like artificial intelligence, Industry 4.0. With our community of entrepreneurs, corporations, development organizations, governments, investors, and academic institutions, we have the necessary ingredients to create a more abundant future for all.

We serve these audiences with a range of services, education programmes and trainings to help them understand and use rapidly accelerating results of transformative research and how to apply them to positively impact societies of EU, and the non-EU member state Western-Balkan countries. Our services include custom educational experiences that transform leaders, stunning conferences that inspire and prompt action, and innovative labs that incubate and accelerate corporate innovation and social impact projects.

The world urgently needs a new mindset and toolset to overcome the challenges of climate change, social inequalities, technology disruption. We empower leaders of partner universities, major corporations of our region, local governments, nonprofits, startups, and others to solve society's biggest challenges by helping them develop real – it means responsible – innovation programmes and apply emerging technologies to create an equitable and abundant future.

We have the visionaries, the teachers, the technologies, the makers, and a wider network of partners. There are thousands of people across the Estern Balkan Region who has been working tirelessly to create positive change.

When all of these ingredients combine, the possibility for impact becomes exponential. Our Platform promotes new ways of thinking and innovating. It is a launch pad for emerging ventures, and a powerful international community of doers and leaders—all poised to solve our region's biggest problems.

The UBT Transformative Research Driven Innovation Platform is based on the following organizational elements:
- BME – UBT Joint Transformative Research Center
- UBT Center Budapest
- UBT Preparation for PhD School
- UBT Informal Science Education Resource Center (UBT ISERC)

### *The BME – UBT Joint Transformative Research Center*

As we already introduced it in the Chapter II., in support of the discovery of future social needs and to develop frontier science research programmes the Budapest University of Technology and Economics (BME) and the University for Business and Technology (UBT) established the BME-UBT Joint Transformative Research Centre (TRC).
The TRC aims to realize the functions listed below:

- The generation of transformative research (TR) ideas, and the evaluation and qualification of TR initiatives;
- The establishment and implementation of TR programs, and the management of third party TR programs based on contractual agreements;
- The methodological support of TR programs initiated by the institutions of the parties and the third parties;
- TR idea generation and feedback of TR programs and methodological developments with full respect of related intellectual property rights to support the development of the scientific, technological and innovation base of the institutions of the Parties, their contractual partners, and the integration of the Balkan states;
- Participation in academic research at the institutions of the Parties, and support of the implementation of a new culture to meet the requirements of our age.

We are sure the operation of TRC will arrange the achievements of scientific and research development into hitherto unprecedented synergic constellations, which, in turn, will trigger significant trends of development and unprecedented innovation results.

### *UBT Center Budapest – UCB*
The UCB serves as a hub for different activities in Hungary. It presents conferences and symposiums in collaboration with UBT and UBT partner institutions; hosts events for alumni

and prospective students; serves as a vibrant forum for discussions of innovation, science, business, politics, music, art, and other relevant topics.

UCB provides different information services for the students and staff members of Hungarian Partner Universities, scientific and cultural institutions about the scientific and economic progress, cultural life in Kosovo and most importantly about the academic and research programmes of UBT. In addition, it provides information about the latest scientific achievements of UBT in the field of the scientific research, development of education and training programmes as well as innovation projects.

### *Preparation for the PhD School (PfP School)*

The PfP School provides different curses, special seminars and training programmes in support of the scientific activity of the UBT staff members, students, and also for the member of UBT partner institutions worldwide. The mission of our PfP School is to plant the foundation of a really true scientific approach and thinking to our students end to do enable them to safe and develop this method of thinking while they are in the difficult journey in the traditional science. In our opinion the basic elements of the real scientific approach are the next:

- Translating research into innovation
- Develop and use the Real Knowledge
- Laying down the foundations of the ability to recognize and select essential information.

From the point of view of transformative research driven innovation the four most important training programs, special seminars of the PfP School are the next:

a) *The eKnowledge trainings*

These are designed to develop special skills such as the following:

- *Precogniton*, also called prescience, future vision, future sight is an alleged psychic ability to see events in the future.
- *Retrocognition*, also known as postcognition, describes "knowledge of a past event which could not have been learned or inferred by normal means."
- *Clairvoyance* - is the alleged ability to gain information about an object, person, location, or physical event through extrasensory perception.
- *Extrasensory perception* - includes claimed reception of information not gained through the recognized physical senses but sensed with the mind.
- *Intuition* – it is the ability to acquire knowledge without proof, evidence, or conscious reasoning, or without understanding how the knowledge was acquired.
- *Telepathy* - is the purported transmission of information from one person to another without using any of our known sensory channels or physical interaction.

It is important to emphasize that the development of these trainings is still undergoing a pilot phase. The possibility of participation in them is optional and completely based on the self-esteem of the participants. It should be noted that the early experiences of the development of the ability of telepathy also question the meaning of the above-cited neocortex – cloud – neocortex connection.

b) *eTrainings*

The eTrainings series is based on a special methodology developed through the collaboration of professional organizations. Basically, it aims at the exploitation of the opportunities offered

by the consequences of extreme stress. The eTrainings program may be used to develop the foundations of the skills listed below:

- o Effective participation in collective decision making and the foundation of consensus making skills.
- o Laying down the foundations of the ability to recognize and select essential information.
- o Laying down the foundations of effective participation in radical changes and change management.
- o The development of skills required to preserve basic values in action.
- o Foundation of the skills required to identify with new concepts and strategies.
- o The foundation of adopting new approaches.

*c) Science and Art Special seminar*

This seminar will reinforce the idea that science and art are not mutually exclusive; in fact, they can and should be used to enrich each other. The material of this seminar based ont he research results related to the development of the theoretical and mathodological background of transformative research idea generation.

To make this idea generation easier, similary to the practice in the USA, we also develop Idea Labs and Idea Factories (*An Ideas Lab is a new merit review strategy being used at the TRC to address grand challenges in transformative research. The Ideas Lab process starts with submission of a brief application to participate in the Ideas Lab, indicating a Principal Investigator's interest in and preliminary ideas regarding the specific Ideas Lab topic. A diverse sub-set of participants from a range of disciplines and backgrounds will be selected from the submitted applications by TRC and will be brought together in an intensive, interactive and free-thinking environment, where participants immerse themselves in a collaborative dialog in order to construct bold and innovative approaches* (NSF Ideas Lab 2016). *In the IDEAS Factory model, the five-day Ideas Lab culminates with the development of multidisciplinary collaborative concepts by teams of participants; a sub-set of these teams are then invited to submit full proposals* (NSF Ideas Factory, 2016).

In addition to these frameworks, we also use intellectual-creative techniques that focus on the intersection of science, arts and spirituality. The results are very promising. We will report them in another publication

*d) New Global Method of Thinking Seminar – NGMT Seminar*

The NGMT Seminar shows the way for the acquisition of field-specific knowledge for politicians, researchers and business leaders. Globalization is a comprehensive and changeable process, which came to a halt after the terror attacks against the United States on 11 September 2001. Now this process is undergoing a renewal. The renewal of globalization presents new threats and at the same time offers new opportunities for the so called small countries.

### UBT Informal Science Education Resource Center (UBT ISERC)

Last year the UBT established the UBT Center Budapest - UCB. Based on the above mentioned TRC and UCB and knowledge base and courses of PFP School we will steward development of an Informal Science Education Resource Center (UBT ISERC) to support ongoing improvement of the international infrastructure for informal science education. For the field, the UBT ISERC will build capacity and support continued professionalization. It will foster a Community of Practice that bridges the many varied forms in which informal

STEM (Science Technology Engieneering Mathematics) learning experiences are developed and delivered for informal audiences of all ages, as well as further knowledge transfer between educational research and practice. Activities will include a clearinghouse for UBT and other institutions, companies funded awards to enable others to learn from and build upon this prior work, identification of practices and findings based on project evaluations, and leadership development, with emphasis on increasing diversity in the field. As a secondary emphasis, it will share relevant knowledge and practice with formal educators and university researchers. The functioning of UBT ISERC directly links to the Open Science Progranne of the European Commission and will support the sread of open science ethos and programmes in Western Balkan Area.

In the Public Consultation document prepared by the European Commission Open Science is defined broadly as "a systemic change in the modus operandi of doing research and organizing science" (EU Open Science, 2017). Generally speaking, the paradigm shift embodied by Open Science refers to the rapid development of interactive and collaborative modes of knowledge acquisition, generation and dissemination, facilitated by networks that rely on modern information and communication tools. This recent evolution encompasses several interrelated trends and phenomena, ranging from citizen science to web 2.0. The various dimensions are connected and interact with the following four layers:
  - o Drivers: the global factors that explain the rise of Open Science;
  - o Enablers: the ICT and related developments that facilitate the rise of Open Science;
  - o Dimensions of Open Science in wider society; and
  - o Components of Open Science in tertiary education.

### *Coordinates of Existence*

Based on the practice of our courses, training programmes, we have recognized that the key question of the efficiency of above described training and education programmes, and in general of the successful planning and manage of transformative research driven innovation projects is the understanding of the conception of the so called *coordinates of existence* and the ability of the usage of these coordinates in scientific method of thinking. For instance from the point of view of the human – AI collaboration has a special significance the subject of understanding of the coordinates of existence of so called virtual worlds. Considering their basic nature the virtual worlds can be deemed to be in correspondence to „World 3", discovered by Karl R. Popper, i.e. the existents of the world created by human spirit (Popper,1998, pp.58-70). Likewise Popper we believe that the physical world (World 1) and the world of the conscious procedures (World 2) are in close relationship and interaction with one another and with World 3. In addition the interaction manifests itself in a certain objectification: in a series of being made objects the existents of world 3 may assume the co-ordinates of physical existence. In our case we speak about such virtual worlds, in which this objectification takes place on the basis of the achievements of electronic development.

The main function of world 2 – as Popper writes, - is to produce things pertaining to World 3, and to serve as a medium which may affected by things of World 3. For our part we feel the question to be open, whether this particular objectification process, during which the virtuality becomes real with the mediation of a digital medium can exist without the mediation of „existents" of World 2, to be precise can something else (e.g. artificial intelligence) take over this mediating role. The objective knowledge itself belongs to World 3, and it constitutes the most important part of World 3, that part, which has the most significant influence on World 1.

The objective knowledge taking Karl R. Popper's example again – consists of conjectures, hypotheses and conceptions (Nagy, 2001). These usually appear i.e. „objectify" as books, papers and lectures.

So if we speak not only about the "usual" innovation management, what is mostly technology oriented, but about the human factor of transformative research driven innovation, we will be face not only to the management of object with the coordinates of existence of World 1, but of World 2 and World 3 also. At the same time it opens an absolutely new dimension for the development of the innovation management theory and methods. The other problem is that as we mentioned it above, during the process of given innovation programme the coordinates of existence of targeted social needs they will change (*See in the text of Introduction*).

While for instance in the case of virtual dividing for pieces (modules) physical things there is a good chance that it will not distort the underlying phenomenon, in the meantime in the case if the things belonging to the two other worlds we can't to be sure that the whole components stay exactly the same as they were the part of all, if we examine them separated from the all. According to our experience in many instances there is no reliable methodology to predict or recognize the development of such malfunctions; intuition based on experience is the only way to guide us. While the simple technology oriented innovation implemented by specific technology instructions in the meantime there is no such a problem, but if there are some "bad structured" decision making situation with transformative research driven innovation, the importance of the intuitive capacities arises (Khatri, 2000, pp. 57-86), (Marinos, 2017), (Davenport, 2013).

The PfP School and the above introduced centres operate on a virtual organizational-infrastructural base: *„A **virtual organization** is a group of individuals whose members and resources may be dispersed geographically, yet who function as a coherent unit pursuing shared goals through the use of cyberinfrastructure. Virtual organizations may be known by a range of names, including: collaboratories, distributed work groups, virtual teams, online communities, and science gateways. Common characteristics across different types and classes of virtual organizations include:*

- o *Distributed across space, with participants spanning localities and institutions;*
- o *Distributed across time, allowing synchronous as well asynchronous interactions;*
- o *Dynamic structures and processes, at every stage of the organizational lifecycle;*
- o *Information and Communication Technology enabled, via collaboration support systems including e-mail, teleconferencing, telepresence, awareness, social computing, and group information management tools; and,*
- o *Engaged, with simulations, databases, instrumentation, analytic tools and services which require interaction among organizational members"*(NSF Virtual Organization, 2008)

The center's most important function in terms of innovation is the widening of the social base of the responsible innovation.

## IV.   Risk management support of responsible innovation

The fourth pillar is the framework for the risk management support of innovation processes. Without these support our time and efforts can easily become foggy. The key question, the secure human – robot collaboration become a widely studied question. But what about the psychological damages of human – hybrid, humanoid robot collaboration, what about the risk of the usage of brain – machine communication? How we can train our employee, our

students to mitigate these risks? What kind of new risk management methodology we have to develop in support of the?

The question arrises: what could cause the innovation process to fall? First of all we are to face, that transformative research results often do not fit within established models or theories and may initially be unexpected or difficult to interpret; their transformative nature and utility might not be recognized until years later We can say that starting transformative research programs is not easy either. „*Transformative research is ... research driven by ideas that stand a reasonable chance of radically changing our understanding of an important existing scientific concept or leading to the creation of a new paradigm or field of science. Such research also is characterized by its challenge to current understanding or its pathway to new frontiers.*"(NSF Transformative Research, 2016)

The hardest question related to "potential peril" is the fear from Artificial Intelligence. Nick Bostrom, director of the Future of Humanity Institute, Oxford University made the following statement: "*The transition to machine super intelligence is a very grave matter, and we should take seriously the possibility that things could go radically wrong. This should motivate having some top talents in mathematics and computer science in order to research the problems of AI safety and AI control*" (Illing, 2018.)

There is a tremendous effort in support of mitigating the risks arising from the revolutionary development of AI, IoT and other innovations.

These and other similar issues are all manageable in their own right. We believe that in the field of transformative research driven innovation is the most important risk management task is prevention of a third type system collapse. The so called third type system collapse happens if several small, seemingly manageable problems eventuate a spiral of malfunctions. There is no reliable methodology to predict or recognise the development of such constellations; intuition based on experience is the only way to guide us. We found that the best management tool against the above synergic system collapse is interactive planning. The interactive method of planning, introduced firstly by Russel R. Ackoff (Ackoff,1974).

Through well designed and targeted development processes, it is possible to create a positive synergy which constantly neutralizes negative synergies resulting in a disaster.
Recently, we have made significant efforts to adapt risk prevention methods to go beyond the boundaries of risk management, and have been involved in the development and application of a unique methodology. It means that instead of ex-post efforts aiming to reduce the discrepancy between the threats to the valuables to be protected and existing counter measures, emphasis is based on the harmonization of efforts between threats and the protection against them through system creation and interactive development. This of course does not mean the complete negation of risk management. It only means that we realized the limits of risk management and look for new solutions to go beyond present day practices.

Our Risk Prevention (RP) approach places emphasis on the prevention of the development of risks. It organizes the conditions required for the security and safety of all innovators (institutions, enterprises, and individuals) into a unified system representing a new quality. Instead the fire fighting type of work done in risk management, RP focuses on the interactive development of positive synergies in the field of innovation conditions.

Related to the AI systems the most efficient risk prevention instrument is the adversial machine learning. Adversarial machine learning is the design of machine learning algorithms that can resist these sophisticated attacks against AI based systems (Huang, 2011, pp. 43-58).

In the course of innovation, we consider the EU's Declaration of cooperation on Artificial Intelligence (AI), with particular reference to the following objectives

- *Exchange views on ethical and legal frameworks related to AI in order to ensure responsible AI deployment.*
- *Contribute to the sustainability and trustworthiness of AI-based solutions, for instance by working towards improved information security, promoting safety and vigilance in the design and implementation, and increasing accountability of AI systems.*
- *Ensure that humans remain at the centre of the development, deployment and decision-making of AI, prevent the harmful creation and use of AI applications, and advance public understanding of AI.*

On 10 April 25 European countries signed the Declaration: Cooperation on Artificial Intelligence (EU AI Declaration, 2017). One of the important tasks of developing our innovation model is the theoretical - methodological foundation of these objectives and the development of related education and training programs.

## V.     New innovation culture programme

As stated above, the transformative research driven innovation has to be embedded in a wide range of social culture programs. The formulated principles and viewpoints – from our point of view – can be extended to the wider dimensions of social development. Accordingly to this we can talk about the necessity of the new innovation culture in relation with the whole complexity of the responsible innovation idea. This could create at macro level, or globally, the cultural conditions of the development and implementation of the development policy that suit to the challenges.

Under the definition of innovation culture we mean values, adjustment to the innovation problems, and the cooperative ability in resolving these problems, the respect of others' interests, the pledge of responsibility and numerous other things that affect or determine the people's behavior in such condition, when they have to decide or act in order to anticipate the risks or moderate the existing damages from the activity of special care distribution coalitions. During the development of the new innovation culture the values, norms, habits, solutions and creations connected to innovation will change towards a new quality. These basic elements of culture pass from generation to generation, that people learn them by themselves. When it comes to culture-change this process becomes more complex. The acquirement of the knowledge connected to the changes and the formation of the implementation abilities means to everybody an extra burden, the not everybody can match the challenges arise from this and until the enrollment of the new order big unequalities can occur even bigger then before. Because of these the switch to the new innovation culture needs a social cooperation. The state's prominent task will be the aware and organized assistance of the cultural switches. In favour of the assistance appropriately financed and well-planned programmes should be evolved.

In the centre of the new innovation culture stands that the global changes acquire from the governments, business enterprises and other organizations and last but not least from the members of the society to pay more attention to the recognition and satisfaction of objective future needs of the society.

## Conclusion

In our paper, we have introduced an innovation model that seeks to meet virtual social needs. It has a great advantage that it simultaneously eliminates, certain unsatisfactory current, (effective) needs. The compass of such innovation is the transformative research. The transformative research driven innovation will consistently embody the beneficial improvements that are essential to social development from the unnecessary, from the so called development slack. This will result in significant savings in favor of actual needs and will reduce the artificially triggered, increasingly demanding complexity of the social environment. That is why we can say that this innovation is the responsible innovation.

Humanity goes into the era of technological singularity. We are in front of dangerous junction. In our opinion one of the directions points towards the human-machine symbiosis, towards the programmed humanity. Behind these, there are huge business and political forces. On the other hand, there is the age of the effective human-robot collaboration, such an application of AI, which is safe and serves the fulfillment of natural human abilities. The EU AI Declaration provides important guidance for routing.

The main task and at the same time the artistry of innovation management is to navigate the fragile boat of responsible innovation between the Charybdis of parochialism of different political and business interest groups  and the Scylla of unquestioning scientific interest groups. We are committed to further developing the theoretical-methodological bases of innovation, placing innovation manager training on qualitatively new foundations and strengthening social support. In the interests of the latter we initiate the development of innovation culture programs with a wide range of international cooperation. As a framework for all these activities, we have created an innovation platform based on a virtual organizational base. This platform gives space to the most ridiculous research, even spiritual experiments. Here, from research laboratories to experimental teaching workshops, all are together to support innovation. From here we will undertake a rigorous control of the results for the continuous development of our Bologna Process-based education system. By the way we would like to note that our education system is also in line with US standards. The UBT IRSC as an important the element of our innovation platform has a very important function: it is the widening of the social base of the responsible innovation.

 We are sure that we have not to focus in our research and education job not on the development of newest and newest „brain extenders" and on the education of our students for the usage of these extenders, but on topics what are not available not understandable for the AI, for the robots, for the computers. An example of this can be found in the following quotation: „Truly robust interaction between man and machine would require a broad understanding of the world. In the absence of that, computers are not able to talk about a wide range of topics, follow long conversations or handle surprises" (Greene, 2017). Understanding of the world is based on widespread, profound philosophical knowledge. In our study, we just highlighted a small element of this knowledge, the importance of understanding the existence coordinates of existence. This is the key for the disvovery of future social needs and for the management of responsible innovation.

Among the research results we have published in the present study, the development of our curriculum development, we emphasize that we pay special attention to the development of adversial machine learning-related research and training. Our innovation platform is open to any innovation institution, organization that wants to cooperate with us. We are happy to accept all cooperation initiatives.

We conclude our study by expressing our conviction that responsible innovation management is more of an art than a traditional leadership task. In this work, intuition and "leading your team in to unknown" approach and bravery play a great role.

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