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INNOVATION CULTURE AS IMAGINARY TERRAFORMING

The Role of the Innovation Catalyst in designing Radical Innovations

In 1966 artist John Cage, Robert Rauschenberg and Bell Laboratories engineer Billy Klüver initiated a meeting between a group of artists and engineers in New York. Over a period of 10 months they worked on art projects that were meant to be presented at the exhibition *Visions* as a part of Stockholm Festival of Art and Technology. Due to the problems of producing the overseas exhibition the American part of the artist never appeared in Stockholm but instead they showed their results at the, now notorious, *9 evenings: Theatre and Engineering* event which took place between 13th and 23rd October of the same year. Some of the new technologies were used for the very first time: closed-circuit television, television projector, fibre optic camera, infrared television camera, Doppler sonar device, portable wireless FM transmitters and amplifiers to mention a few.¹ From the historical perspective the festival in Sweden capital² and the series of events in New York in 1966 could be understood as a first public manifestation of organized collaboration between disciplines with broad influence on contemporary art, science & technology collaborations in the future. A mere three years later the laboratory for disruptive innovations Xerox Parc was established. In this lab visionary engineers were joined by visionary artists and members of humanities and together they worked on creating innovations that were often more than twenty years ahead of their useful applications. Similar avant-garde innovation platforms that are supporting collaborative paradigms combining art, science fiction and cultural studies in order to create inventions and innovations and should be considered as a point of reference are also MIT Medialab (1985)³, Nokia Bell Labs (1996)⁴ and X - The Moonshot Factory (2010)⁵.

Artist driven research and experimentation with new and more accessible technologies has been developing and growing since the 1960s. Even though this artistic research was never a part of the artistic or cultural mainstream, it greatly influenced the development of modern electronics, which years later became a part of our audio-visual everyday life. *New Tendencies*⁶, one of the first large artistic manifestations of new technologies in art, was established in Zagreb (Yugoslavia) in 1961. This platform was used by musicians and artists to present their avant-garde work until 1973. In 1979 the Ars Electronica Festival was

¹ https://en.wikipedia.org/wiki/9_Evenings:_Theatre_and_Engineering

² Festival in Stockholm took place as a conference where artists like Iannis Xenakis, Yona Friedman, Sven Fagerberg and Kostas Axelos in order to present their work in the field of art and technology. Artists like Alvin Lucier, Karl-Birger Blomdahl, Ralph Lundsten, Åke Karlung and Nam June Paik made their contributions.

³ https://en.wikipedia.org/wiki/MIT_Media_Lab

⁴ https://en.wikipedia.org/wiki/Bell_Labs

⁵ [https://en.wikipedia.org/wiki/X_\(company\)](https://en.wikipedia.org/wiki/X_(company))

⁶ https://monoskop.org/New_Tendencies

established in the Austrian town of Linz, and even today it remains one of the most important institutions for presenting a cross-section of art, technologies and society and an excellent example of the mixture of culture and technology.

In over forty years of the Linz festival, a number of scientists and engineers reflected upon their inspirational co-operation with artists, while numerous artists created artworks that interpreted and expanded the user's applications beyond their original intent and limitations. The newly formed connections and the often thrillingly conflicting meetings between the experts from various fields changed the Ars Electronica festival into an annual manifestation of transdisciplinary projects, which show the state-of-the-art techno culture of the period. With the establishment of the Ars Electronica Futurelab in 1996, Ars Electronica⁷ capitalised upon its privileged position, which was built through the hosting of hundreds of artworks at the festival and obtaining an excellent insight into the developing intermedia production with the annual Prix Ars Electronica award for which over 4000 artworks compete every year. AE Futurelab is the geographically nearest example of cooperation between art, science and industry, which develops speculative and prototype projects through which one can monitor and consider our near future.

Hacking the Nerds

The creative subversion of mainstream technologies, which we have been following through artistic projects for decades, opens an array of interpretations of the various ideologies⁸ that were responsible for technological applications as well as a better understanding of the technological and user capacities and potentials that could be released through a different, more emancipated and creative use. It is possible to predict the development of technologies through radical artistic projects in which the cohabitation of people (and other living creatures) is brought to the extreme with machines. On the other hand, one can - through artworks in which technology is brought to the absurd - easily notice its limits and potentials. The cooperation between scientists and engineers encouraged by the intuitive, emotive and spontaneous approach of intermedia artists can be seen in the establishment of creative spaces governed by different, speculative conditions and rules, which emerge from the special and imaginary construction of meanings. This situational uniqueness implies exceptional solutions, thus the participants in the creative processes are challenged to overcome their personal and expert points of view as well as the generally accepted social norms. The artists are fully aware that new paths open new doors, which is why they systematically create unknown and unverified territories (terraforming), which need to be

⁷ Ars Electronica consists of the Museum Ars Electronica, AE festival and AE Futurelab.

⁸ "The medium is the message" is a phrase coined by the Canadian communication thinker Marshall McLuhan and introduced in his *Understanding Media: The Extensions of Man*, published in 1964. McLuhan proposes that a communication medium itself, not the messages it carries, should be the primary focus of study.

inhabited by new epistemology and hermeneutics (recognising emerging processes and phenomena and having an in-depth understanding of them).

Successful cooperation between artists, scientists and engineers surpasses the merely mutual servicing of all involved. The cooperation does not develop its full potential if it consists merely of artistic visualisations of scientific experiments, articles or neatly presented engineering solutions on one hand or a technical solution made to suit the artist on the other. We can talk about meaningful cooperation when experts from various fields and provenances focus on the joint creation of either an art project, a scientific invention or an engineering solution. In order for a creative cooperation to be successful one needs to establish the conditions and circumstances in which all participants can participate on an equal footing, use a language that they all understand, have an in-depth understanding or feeling of the other's work, and are ready to walk down unknown, difficult and often problematic paths. Paradoxically, for true leaps in the thinking and consequentially the innovation process to take place, every creative mind needs to overcome or (temporarily) distance themselves from the values that qualify them as experts. We call this value, which was created in specialised and hermetic institutions of knowledge⁹, research platforms and industrial plants *situated knowledge*. This knowledge is characteristic of optimised processes that are deterministic and oriented towards productivity (i.e. focused on a product or a concrete effect).

Embracing the Unknown

In artistic research laboratories and situations the creative cooperation between **artists** (the work of whom addresses the contemporary society saturated with technology), **scientists** (who understand that in pure science meaning needs to be found outside of the ivory towers of the academia) and **engineers** (who know that hard work does not necessary lead to a better society) has become a synonym for radical creativity. New spaces of thought, which surpass the existing epistemologies, are created through art projects that challenge our senses and mind with new, unusual, scandalous and sometimes ethically questionable works. Over the past twenty years social changes, which are caused by omnipresent technologies, have been occurring quickly and have not been properly reflected upon, at which certain technological applications or services often degenerate into their opposite or are discovered to be an unnecessary consumer whim. The concept of a consumer led society, which is not interested in responsible, ethical and sustainable use, is based on spectacular products that have not been reflected upon. The history of art projects in which artists used various technologies to hack, subvert, iterate or even invent new technological solutions, teaches us that technology, its scientific roots and industrial potentials should be better understood and incorporated into the lives of individuals and society, as the meaning and importance of including technology into human existence are generated through works

⁹ Such hermetic, strictly purpose and goal-oriented experts are colloquially known as nerds. <https://en.wikipedia.org/wiki/Nerd>

of art. This production of meaning (art) through artistic ideations complements the production of knowledge (science) and the production of value (economy).

In the field of information technologies, cybernetics, bionics and biotechnologies, ground-breaking works of art have been emerging for over four decades, which possibly makes the international intermedia art scene one of the most penetrating art practices. Artistic projects that emerge within these frames often push the boundaries of contemporary artistic research, which is verified by their exceptional international success (which is not measured in purchases and commissions, but in the numerous invitations to exhibitions and expert panel prizes, received by these projects around the world). However, as a rule, such avant-garde art projects do not have a mass following, which is a result of their radicality, explicitness and visionary views that the broader audience finds hard to understand; thus, such exceptional leaps in emotions, experience and thought remain ghettoised to expert circles.

Alongside the successes of the previously mentioned cooperative platforms, the value of technology culturalization has also been recognised by the European commission¹⁰, which through various financial mechanisms¹¹ aimed at art projects, events and discourses encourages connectivity between art, science and industry, with the goal of improving innovativeness. These mechanisms encourage innovations through numerous consortium projects, in which cooperation methodologies are easily formed. In turn, these should encourage the European economy to improve its innovativeness in the creation of visionary, ethical and sustainable solutions having in mind European social values as well. Networks and platforms for radical innovations emerge from the most successful project consortiums, which are, as a rule, formed as open institutional organisations with the intent of encouraging sustainable synergies and ensuring a more stable and supportive environment for such innovativeness.

Slippery Slopes of Creativity

Methodologically, the inclusion of artistic ideations in innovations leans upon the tradition of so-called *design thinking*, which has - over the past twenty years - managed to enter the innovative processes throughout the industry. In this context the most important victory of *design thinking* is that it has managed to be included at the very beginning of the innovation process and not merely just before the product or service needs to be optimised and embellished for the market. With their knowledge and experience of end users, designers are included into the planning of solutions throughout the innovation process. Designers are

¹⁰ ICT ART CONNECT

<https://ec.europa.eu/digital-single-market/en/news/ict-art-connect-activities-linking-ict-and-art-past-experience-future-activities>

¹¹ STARTS - Science Technology ARTS (<https://www.starts.eu/>), MAST - Master module in Arts, Science and Technology ...

good at imagining themselves in the role of users (emphaty) and thus contribute to the solutions that the users will gladly use or even internalise to the extent that they will become a part of everyday life. Designers have proven to be unmissable in the search for answers to complex questions addressing the reciprocal influence between man and technology.

But where do the key questions originate from? Is a question that arises from a problem, a question or merely a symptom of the problem? The online archive of *The Atlantis* magazine includes Derek Thompson's article: *Google X and the Science of Radical Creativity*¹² which describes the life of an innovative platform. Design thinking is at the very core of new inventions, thus we would like to quote a part of Thompson's text as a key reference to the beginning of the innovation process: " Moonshots don't begin with brainstorming clever answers. They start with the hard work of finding the right questions". At this point we want to establish the conceptual difference between the creative approach of designers and that of artists¹³, as designers strive to find a creative explanation of the answers to the questions, while artists - through the abstraction of the sensory-cognitive, emotional, psychological, material and similar elements - create a space for imaginary worlds, which are not yet symbolically marked. That is, they create questions to which they do not offer any answers. Artistic creativity leads to the emergence of new, never before seen, heard or experienced spaces, the meaning of which still needs to be found. These imaginary spaces, epistemological white spots, which need to be inhabited with meaning, represent questions in their own right. A question as a space (topoi) of something that has so far not been located and does not implicate direct answers, but encourages us to contemplate, and which arises in us through our perceptions, feelings (emotions) and speculations that are triggered by our senses.

Art thinking is an important and relatively new concept that we want to include in the innovation process. We first came across this syntagma within the frame of the Ars Electronica Festival, at the Future Innovators Summit in September 2016, when Hideaki Ogawa and Marcus Scholl presented the methodological approach to co-operation between artists, scientists and engineers. The two authors came up with the syntagma *art thinking* while cleverly leaning upon the historic contribution of the phenomenon of *design thinking*. By linking it directly to the theoretical legacy of *design thinking*, they introduced art into the field of innovation, even though science and economy would usually be highly suspicious about it (with rare exceptions). The general understanding of art is full of prejudices as regards its incomprehensibility, randomness and disruptiveness that confuses

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<https://www.theatlantic.com/magazine/archive/2017/11/x-google-moonshot-factory/540648/>

¹³ The difference is truly only conceptual, as the borders between the creativity of a designer or an artist are not strictly separated. Designers also have a highly developed visual intelligence and are not linear in their work, especially when they deal with speculative innovations, the solutions of which often lead to opening new questions as regards the possibilities rather than providing answers.

people and, in the event that the work of art is not 'beautiful and pleasant', also repulses and scares them. With the invention of the syntagma *art thinking* the entire field of art is trying to become domesticated (commodified) for possible use in the same way as *design thinking* was instrumentalised in various ways within the innovation process.

At this point we will not delve into the characteristics of *art thinking*, but we should keep in mind that it differs from *design thinking* in the fact that it enables the emergence of new questions, and that it, in the process of innovation, most commonly precedes the *design thinking* stage, as the latter is mainly focused on the search of concrete answers to the posed questions and concrete solutions to the problems. The introduction of *art thinking* into the innovation processes brings with it a certain disruption, which places the starting point, i.e. the reason or the need for the innovation, under question. In order to perform this in the same or at least a similar way as this takes place in artistic research and creativity, we need to establish the methodological consensus amongst the innovators themselves. Within artistic projects this consensus is usually established spontaneously, as artists form the group of co-workers based on their personal preferences and usually establish a strong personal contact with others in the group. Within the innovation processes, we need someone to coordinate, facilitate and moderate the various phases of innovation work. The process that selects the innovators from specific fields to fit the innovation and defines the phases and the expected results is known as *Innovation Design*. This process is led by an innovation catalyst¹⁴, who has a good insight into innovation methodologies, access to experts in individual fields, understands the language of artists, designers, scientists and engineers being able to translate between them. As an erudite the innovation catalyst is in contact with the development policies and various other processes in social realities that cover an array of stakeholders.

In 2011 the Harvard Business Review published Roger L. Martin's essay *The Innovation Catalyst*¹⁵, in which the transformation of the marketing company that had realised the full strength of participatory problem solving was described in great detail. To a great extent group work combines design thinking with pain-storming, brainstorming, fast prototyping, experimenting and quick tests that provide a fast feedback in the field. The text does not focus on the profile of the innovation catalyst, but on the effects of the guided design thinking processes, thus the role of the innovation catalyst is described merely as a moderator within the innovation process. Regardless of the undefined starting points, capacities, methodological approaches and other characteristics that the innovation catalyst should have, we believe that this article serves as a gradual entry into the understanding of the role of a facilitator within the innovation processes.

¹⁴ Catalyst is a synonym for art in non-linear realisation within the field of production; it also precisely describes the emergence of works of art, and has been used in the vocabulary of intermedia producers at least since 1994 when the NGO Arts Catalyst (which deals with commissioning, producing and presenting works of art) was established in London, <https://www.artscatalyst.org/>

¹⁵ <https://hbr.org/2011/06/the-innovation-catalysts>

There are other online records that use the syntagma innovation catalyst, however most of these texts on innovations address the encouragement of process modernisation within individual companies or industrial platforms¹⁶. None of these texts differentiate specifically between an innovation catalyst and an innovation manager or a head of the R&D department. The corporate understanding of design thinking as the driving force of corporate changes, which wishes to create innovations within the system while taking into account the changing circumstances, cannot be considered as innovation, but merely as an iteration of the same principles, which are, as a rule, limited by the starting points of the very same system. In this view design thinking should be considered in the function of corporate motivational practices, through which employees are encouraged to actively participate in corporate culture. The innovation blast of these innovations is almost negligible, however, they greatly contribute to the atmosphere within the company.

References linked to the most important innovation laboratories in the world¹⁷, over four decades of avant-garde artworks in the field of new media and bringing culture closer to science and technology, combined with European policies that have recognised the power of artistic ideations in encouraging radical production, service and social innovations in the digital and post-digital age, provide countless possibilities for establishing the profile of an innovation catalyst, who has active knowledge of the theories and practices of artistic creation and is also acquainted with the various concepts of the economy of social and product innovations. An innovation catalyst will systematically help develop innovative culture by connecting the most creative individuals, who will critically analyse, intuitively and systematically research and create on the very limits of the possible. The innovation catalyst is thus not seen as the most enthusiastic employee (enthusiastic as regards innovations) within the company, but as a mission, with all of the necessary professional ethics, theory and activities that will lead to a more thorough, sustainable, secure and ethical innovation.

However, regardless of the attempts to systematise and methodologically define the innovation processes, we have to accept the fact that real systemic and breakthrough innovations cannot be simply made to order. The illusion that it is possible to achieve wonderful innovations by putting together a group of experts for two hours has unfortunately become rooted through the practice of short workshops or training sessions within or outside of organisations. If this was true there would be an endless stream of wonderful innovations whenever and wherever they were needed. However, this is not the case. In order for an innovation to have the opportunity to truly emerge, we have to carefully establish the conditions and circumstances in which experts can, in unusual and

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<https://www.boardofinnovation.com/blog/5-steps-to-create-an-international-team-of-innovation-catalysts/>

¹⁷ Parc, MIT Medialab, Nokia Bell Lab, Google X-Moonshot factory, Ars Electronica Futurelab, ...

sometimes even incomprehensible ways, contemplate, research, experiment and create prototypes, even though this in itself does not ensure that an innovation will take place. At least not within the desired timeframe and in the desired place. We need to accept the fact that the path to true innovation is usually long and risky, which means that we need to provide the innovation team with a feeling of safety and the right to fail. By giving the innovation team the feeling of safety, this unalienable right (which the capitalist machinery, focused on competitiveness and profit, often renounces) improves the working conditions.

Road Map (The Topology of Innovation Process in Ten Steps)

The proposal for forming the innovation process is compiled as a map with ten thematic sections, all of which are necessary for the understanding, organisation, research, creation, experimentation and evaluation. The open format enables us to establish an innovation design that will suit the challenge, which means that it will be tailor made to fit the problem or context of the challenge. In this scenario a sequence of individual steps is recommended, however this sequence is not obligatory and even in an ideal situation it is most commonly not implemented in a linear or sequential manner.

- CHALLENGE:

Basically, the challenge can arise spontaneously as a reaction to the changed circumstances, an imbalance or as a problem that emerges from a logical upgrade of the existing environment. The challenge can emerge within a process of spontaneous, intuitive research and creativity (push) in creative research laboratories, or as a commission that addresses a certain social problem or desire for a new product (pull) which the client passes onto the innovation catalyst¹⁸.

In the event that the client is known, the first step of the innovation catalyst is to establish an in-depth understanding of the issues and starting points, for which solutions need to be found (pull). In the event that the ideas emerge from within an existing group of innovators, independently of any demands, the role of the innovation catalyst is to overview the possible scenarios and applications (speculative innovations), find the possible uses or outlets in the real sector and address the possible clients, including the end users (in a market or any other model).

Working with an established team of researchers and innovators has certain advantages, as the innovation catalyst can foresee the conceptual range of the group. When the creative research platform is comprised of various laboratories, the process of obtaining new ideas

¹⁸ In this context the client is a rather casual signifier for the place of origin of the challenge, which the innovation catalyst and his team of innovators need to solve through innovation design. The challenge is often an expression of the interests of a group, company or selected decision-makers as representatives of society. Client is thus a topological group which the innovators see as a legal and formal entity (director, mayor, president, ...).

is given a great advantage, as the laboratories can complement or even critically evaluate each other. However, the historic experiences of some of the most successful laboratories have taught us that the freshness and sparkle of ideas can be easily suppressed by the pressures of deadlines, the hasty demands for final products and the unrealistic expectations of the market. A quick solution to the large and relatively expensive creative research platforms can be found in teams that are established ad hoc to find solutions to specific challenges. However, even though these usually have the advantage of faster innovation processes, their solutions usually fail to bring lasting and radical ideas and novelties.

Whether the innovation catalyst will engage an existing research platform from which he will select innovators with a laboratory background or he will establish an ad hoc team of innovators also depends on how radical innovation blast does he wish to achieve. As a rule, an ad hoc group is suitable for less ambitious innovations, which do not cross multiple disciplines or sectors and which demand a lesser level of analysis and interdisciplinary experimentation.

- INNOVATORS (The Team)

There are no rules that define how to assemble a good team of innovators, but it is certain that truly new ideas will emerge if the team consists of expert specialist as well as broad thinkers, who are capable of spontaneous reactions while leaning solely on lateral thinking and intuition. The advantage of specialists is shown in their quick assessment of the existing possibilities that is a result of their expert knowledge of the sector, however, the in-depth specialist knowledge can also be a handicap that makes it impossible for the expert to notice the deeply internalised limitations of their expertise (situated knowledge). On the other hand, the emergence of good ideas can be aided by broad thinkers who have the capability of contemplating large systems from which patterns emerge (emergent knowledge¹⁹), who can place the specialist knowledge into an entirely new context.

The role of the innovation catalyst lies in the meaningful creation of innovation teams, establishing good chemistry amongst the innovators, knowing how to present the problem that needs to be solved, and then lead the entire process which could take hours or months. The process of assembling a team of innovators can range from hiring existing research-creative laboratories, institutes or platforms in which the individuals know and trust each other, to assembling new ad hoc teams, outside the safe environment of co-thinkers.

¹⁹ Emergence is a synonym for emerging patterns that are at first glance or without necessary instructions, apparatuses or even processes, invisible. In the theory of appearance emergence has been recognised in the sense of cheating the view already from the 17th century onwards (teratology), while in newer times we talk about emergence in clinical psychoanalysis or when treating large data samples from which we can deduct useful data for a particular need.

Regardless of the situation in which the innovation catalyst facilitates the co-creation processes, one of his toughest tasks is to, as a partner in the dialogue, encourage the processes that lead to the emergence of creativity for as long as possible. One of his key tasks is to provide an environment of trust, spontaneity and a feeling of security. His capability of translating the language of artists into a language that can be understood by scientists and engineers and vice versa, is of key importance for the cooperation, as this helps the team surpass the limitations of situated knowledge. To a great extent, the feeling of security can be aided by the capability to embrace the unknown and the assurance that even failure can be treated as success, as even what appears to be a failed step often represents an opportunity to learn new lessons.

- ETHICS (principles)

The inclusion of artists and designers into the innovation process implies the inclusion of humanistic sciences, which means that the basic cultural and intellectual standards are taken into account. Similar to morals and laws, which enable social reality, the ethical principles help form the path that reveals new possibilities. Of course, these principles are not unambiguous, as the standards are constantly changing. The dichotomy between morals and ethics gradually changes the values which are not shared by all parts of global society, thus it is important to establish a consensus between the client and the innovators as regards the values and principles that the innovators should take into account in their work. These same rules need to be internalised also by the client, who with this accepts the responsibility for the execution or use of innovation in accordance to the principles within the frame of which it emerged.

In general, innovators can lean upon the 17 goals of sustainable development²⁰, which have been advocated by the 2030 UN Agenda for Sustainable Development since 2015. The typology of the principles changes in relation to the measures addressed by the future innovation. Thus, it can be political in the broadest sense, or theoretical or philosophical in the more niche examples. Regardless of the size of the problem they address, it makes sense for the principles to be interlinked. Taking into account the generality of the principles that strive to improve the lives of people globally, the ways of solving problems and the means used to solve these problems can quickly become obsolete and should thus always be considered in the light of the most up-to-date findings of humanist and natural sciences and the most ethically solid practices should be chosen. We need to take into account the cultural environment in which we work, its absorption capacity and readiness level for innovations. This is why it is necessary to, in the process of innovation, also consider the ways of preparing and developing the capacities and potentials of the target society within which we want to spread the innovation.

- MAPPING

²⁰ <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>

The innovators need to be informed as regards the existing solutions, similar or identical examples as well as any previous attempt of dealing with such cases, as this could help the innovation team find the lowest common denominator, which can serve as an orientation point when defining the progress of the innovation process.

The second level of mapping, which is of key importance for the understanding of the starting points of the challenge, are the eco-systemic²¹ connections, which represent the marginal conditions of the issue. These starting points can be qualitative, quantitative, focused on contents, conceptual, social, material, etc. and they represent the broader picture into which the solution of the challenge should be placed. In this map one can see the emergence of the possible connections with other categories, which provide new possibilities for solutions or even expansions of the starting expectations.

Alongside mapping the existing attempts and solutions and the possible ecosystem connections, the innovation catalyst might also want to map the individual experts who can be drawn into the innovation teams (outsourcing).

- CHALLENGE SOURCE

Prior to the beginning of the innovation process, a detailed research will harmonise and unify the numerous starting points which are necessary for efficient team work. As a rule, these starting points do not indicate the future solutions, however, they do show what type of solutions will not be offered by the innovators. In this phase, the series of no-s that the team of innovators gathered during their analysis should be presented to the client as the possible directions in which the solutions will be sought will depend on the internalisation of the frames that have emerged from the various analysis and studies. The meeting with the client should not be merely a part of the established protocol, for it should also include a detailed analysis of the client activities, production possibilities, work ethics, etc., that are of key importance to the client's company or organisation. In order to have an in-depth understanding or even redefine the problem a good estimate of the ontological starting points (general analysis) combined with a good understanding of the particular starting points (client) of the problem that the team of innovators will attempt to solve are important. The client needs to be involved in this process, as without precise information from the innovators, the client can easily fail to understand the possible solutions that the innovation process will provide.

²¹ In this case, the term ecosystem is used as a synonym for meaningful connections that are complemented, expanded or substituted and not as a reference to the natural ecosystem, in which the survival of the fittest rules alongside the symbiotic connections. The organised human society (bios) differs from the plant and animal life (zoe) by its developed civilisational values upon which the production mechanisms should be based. Unfortunately, neoliberal capitalism often bases the survival of the fittest with the natural order of things, in which predatory species are given a special mention.

At this point the innovation catalyst has the opportunity to evaluate the work performed on the basis of the starting points which he used to set up the team and the innovation process as well as any eventual new criteria that have appeared (and were confirmed) during the meeting with the investor, and if necessary, repeat any one of the steps that were carried out so far, including expanding the innovation team or substituting its members.

- ART THINKING

Taking into account the topic that had emerged during the process of solving the problem, the innovation catalyst can invite an artist into the team or personally prepare a selection of artworks that address the chosen theme. Regardless of whether the innovators include an artist or whether the innovation catalyst himself had come up with a selection of art projects, it is the task of the innovation catalyst to appropriately explain, translate the artistic principles, methods, effects and the poetics of the artworks to the other members of the team. The works of art are often impossible to verbalise as their narrative is coded in the direct experience of the viewer/participant, thus the role of the innovation catalyst also includes guided visits of artistic events or locations, viewing works of art (exhibitions, installations) and similar, with which he tries to sensitise the innovators to the unspoken, which can only be felt in the works of art. The reactions to these feelings become the starting points for the practical hermeneutics and situational epistemology. In this sense *art thinking* is not the creation of works of art, but is an attempt to understand and mirroring those imaginary dimensions, which emerge through artistic creation! In order to perceive these dimensions in an appropriate and sensitive way, the task of the innovation catalyst is to explain the idiolect of the author (a single artistic explanation of the method, way of perception, compositional principles, semantics of materiality, etc.) to the innovators in the team, and with this draw attention to the experience intelligence that is used to perceive a work of art.

In some cases it is possible to, through a selected work of art, recognise the space - topoi (or multiple spaces) from which the new meaning emerges, while in other cases the principles that can be discovered through the artistic idiolect help the innovators capture and define a completely new topic by mirroring these principles into their creative process. The only rule in this phase of the innovation process is that there are no rules. This means that we are, in this phase of innovation, left to intuition, a selection of no-s that we have amassed during our analysis and an open structure of elements that offer themselves in an endless selection.

At this point the innovation catalyst is of key importance, for he takes care of the presentation of the various artistic narratives with which he offers speculative support. He also persists in order for the innovators not to reach quick solutions, generalisations or two-dimensional solutions, as his task is to lead the innovation group to a certain ***ultimate***

point at which the ultimate question will arise, which will in turn, lead to the ultimate answer.

- DESIGN THINKING

There is no true distinction in the way artists and designers create, as the creation of works of art are to a great extent governed by existing technologies, materials, procedures as well as the contemplation as regards the consumer of the work of art. An important difference can be found in the conceptual approach and goals that the two practices follow. As previously mentioned in the section on *art thinking*, this deals predominantly with the denotation of something new (original), a field that did not exist before and from which an imaginary reality of a work of art emerges, a field that needs to be given a meaning. The meaning is given through sensory-perception processes, which address us through bodily, mental and emotional levels. In *design thinking* the available elements and resources that the designers creatively iterate from the very beginning of the innovation processes are contemplated in a structured way. The various methods of *design thinking* use a number of steps to develop the process from the understanding of the problem, through empathy (pain storming) and the first ascertainment, to research work (in which the ideas emerge in the form of prototypes through a hands-on approach) and materialisation, in which the best prototypes are tested, implemented and evaluated as regards their success in addressing the problem. In order to avoid solutionism, productivism and economism, which we recognise as negative sides of *design thinking* (as undesired side products of ilusionistic 'rabbit out of the hat'), we should persist from reaching conclusions too quickly, as these emerge as a result of unambitious expectations.

The role of the innovation catalyst, who has been sensitised to contemporary research and artistic practice, is to encourage the truly radical innovations by introducing *art thinking*, which uses in-depth addressing of the starting points to positively subvert the various existing quick-delivery methods. At this stage he needs to introduce the interventions of **speculative design**, which is in fact some sort of vector derivation of solution-oriented designer thinking that has been attached to the imaginary starting points that have emerged through *art thinking*. The understanding of imaginary constructs is taken as the basis within these speculations. These constructs which have emerged through artistic ideation, are prototyped and modelled with various materials, protocols and actors and the possible scenarios that the innovation could offer are included into the rethinking.

Product oriented *design thinking* is not excluded with the introduction of speculative design that is oriented towards the possible future. The first is determined by the criteria of optimality, while the other assumes the life of the product or service in ideal (idealised) circumstances. Speculative design thus offers an ideal possibility that can serve as a provider of good information as regards the ideal (so far non-existing) circumstances for the product or service. Such an insight into the possible scenarios provides the client with a basis for an informed and thus optimised decision as regards the product or service, for which a decision needs to be accepted already today.

- CONNECTING THE DOTS

The usual understanding of the innovation process is that the process ends once the initial problem has been solved with a proposal for a product or service. However, as it is radically new and ahead of its time, a truly radical innovation is merely the beginning of a successful implementation of the solution at the end of the *design thinking* process which shows the various empty spaces (another level of questions). From the viewpoint of applicability these voids can be seen either as dangerous or as new opportunities. For a better understanding of the newly emerged situation one needs to perform an iteration of the mapping process in the same way it was performed in the pre-innovation phase. One needs to use similar tools in order to determine the actual or eventual connectivity of the new innovation. The connectivity of the existing possibilities and the emergence of the new opportunities might create emergent pictures within the empty spaces that could not have been imagined before the creative and innovative process begun.

At this point we can, in agreement with the client, bring the innovative process to an end or use the newly emerged situation for a new cycle of the innovation process in which the innovation catalyst could change the members of the innovation team and repeat the meeting with the investor as well as change the art thinking and design thinking processes.

In the event that the client considers that the new opportunities are of key importance for successful innovation, the expansion of his operation, diversification or an opportunity to develop his influence, the innovation catalyst can split the innovation process on more branches and continue the work with various groups that seek symbiotic connections with the initial innovation and use this to create an ecosystem solution.

- INNOVATION RESILIENCE

Even if the innovation process ends in a concrete product or service, its future can be uncertain. In order for the innovation to successfully see the light of day, the innovation catalyst needs to carry out a series of verifications in which he ascertains the robustness of the innovation. This process can be carried out with the initial group of innovators or a new group can be established, as there is great chance of emotional attachment to one's work which can easily obstruct the view of the more or less obvious dangers, weaknesses and mistakes of the innovation. The innovation catalyst needs to provide the new group with all and any information that has emerged during the development of the product or service, and at the same time keep a healthy distance. Testing the innovation as regards its resistance to failure (failure as a service - FaaS²²) can also be an independent activity with which the innovation process can be started, as the weaknesses of the tested product or service can indicate whether these should be set in a different way. FaaS is a protocol that

²² <https://www.apriorit.com/dev-blog/567-failure-as-a-service>

tests the system that had been established within the innovation process. It helps us ascertain whether the innovation that we propose and know rather well, is robust and resistant to sudden, unpredictable events (Chaos Engineering)²³. Testing the resistance of the innovation through external penetrations²⁴ is a completely different process, in which not even the innovation catalyst knows where and in what way will it hit. Even though the innovation catalyst ordered and enabled these tests, he is in the same boat as his innovation team, which will have to face a totally unknown way of thinking, a disorder, a change and new information.

Resistance to mistakes can also be tried in other ways, and in the end this will lead to the realisation as regards the robustness of the innovation. In the event that the innovation cannot be changed, the innovation catalyst has to estimate what is the chance that the client's new product or service will fail. It is definitely worth making a good risk assessment²⁵, as this provides good criteria for measuring the success of the innovation in the later estimates of its direct and indirect effects.

- IMPACT

Nobody is perfect. Thus, the success of the innovation catalyst is determined by his monitoring of the life of innovations in the real world and periodically evaluating their success. As the conditions and circumstances behind the emergence of the innovation change constantly, today's innovation can be outdated and inappropriate by tomorrow. Temporal distance is a relentless judge and if the innovation was measured far into the future it is likely to survive longer.

Preserving contacts with clients, who can report on the inner problems (those reported by users) provides key information for the understanding of the scope of interactions that were not taken into account during the innovation process. With a better understanding of the effects that the innovations have produced, the innovation catalyst increases his knowledge base, which he can put to good use in the future planning of innovation processes.

Apart from the effects that the innovation brings or fails to bring to the client, it is very important that the innovation catalyst also monitors the effects that the innovation has on users (individuals), society as a whole and on the environment (animate and inanimate nature).

²³ Chaos Engineering is a discipline of experimenting on a system in order to build confidence in the system's capability to withstand turbulent conditions in production. <https://principlesofchaos.org/?lang=ENcontent>

²⁴ <https://www.apriorit.com/dev-blog/567-failure-as-a-service>.

²⁵ Risk mitigation: avoid, acceptance, reduction of control, transference, <https://accendoreliability.com/4-effective-risk-mitigation-strategies/>

Innovation Catalyst as a non-profession

During the innovation processes one can stumble across numerous obstacles and problems that can prevent a new product or service solution from seeing the light of day. This is why the innovation process needs to be designed in a way demanded by the issue from which the challenge emerges and not be tailored to the expectations of the clients, users or the innovators themselves. The independence and neutrality of the innovation catalyst plays an extremely important role, as he is the leader on the journey into the unknown and as such needs the freedom to select the team, time and space, as well as the tools that will enable the team to truly focus on their work. He should not be governed by career rules and professional deontology, as his mission should be governed by his skills and reputation.

With ad hoc innovation design tasks this manoeuvre space focuses on micro processes with which the work of the innovators can be facilitated in spaces that are temporarily intended for innovation. Thus, one can expect that the innovation catalyst will narrowly focus predominantly on the client, his problem and the possible solutions and scenarios.

Innovation processes that take place through research and production platforms (HUBs, laboratories, etc....) and in which the innovation catalyst can work with multiple innovation teams, make it possible for the innovation catalyst to focus on establishing an innovation culture in which innovators are submerged into the imaginary realities that they have constructed through endless project or semi-projects, which, in turn, makes it easier for them to address the so far unthinkable challenges. The example of laboratories such as Parc, MIT Medialab, Nokia Bell, or Ars Electronica Futurelab reveal that groups which emerge in an exceptional innovation culture are exceptionally successful in their inventions and innovations regardless of whether they are searching for solutions to external challenges or whether they are offering home grown innovations to the real sector.

In the latter the innovation catalyst is a person, who, within an innovation platform that is composed of a number of laboratories, encourages research, experimentation and creativity and through this establishes some sort of an imaginary space governed by marginal conditions of space-time. In a metaphor of simultaneous discovery and creation of new territories this imaginary 'terraforming' functions as a prototype for a future society in which the possible scenarios for a better, i.e. safer, more sustainable and more ethical life are tested.