

Creative process and investigation method – the interlocking of the masterworks and the doctoral research

In this DLA paper I am trying to introduce my last 5 years spent with doctoral research, a complex artistic path, as well as its scientific intergrowths, complications and conclusions. Although, back in 2014 when I started my DLA studies, this artistic path once started from a rather individual way of artistic thinking and concept, and had the intentions of individual self-expression, for today it has already become a journey of exploration, a unique discovery experience, enriched by the means, methods and concepts of other fields of art and science. So my artistic work and the doctoral research encompassing it have been in hand in hand, interlocking, interweaving and completing each other, because the consequences and developments of the experiments of my research have had an intrinsic retroaction and effect on my attitude, intentions and goals as an artist.

So, apart from the unfolding of the thesis, in question, the paper also presents that it is possible to conceive artistic ways, processes and practices which, following a beginning from a certain primordial individual artistic motivation and intention, at one point during the creative process come across a subject or a practice which then either necessarily and inexorably involve the investigation, elaboration and maybe even cultivation of certain fields of sciences or specialities involved in that certain subject,¹ or because it is the artwork, the practice or the process itself, the elaboration and exploration of the circumstances of which involve methods that can be considered scientific investigatory methods,² and which thus run across a course similar to an

¹ . As part of my doctoral research closely interrelated with my artwork I also prosecuted further supplemental studies. Thus, at the semester of 2014/2015 I attended (instrument) acoustic lectures of professor János Pap at Liszt Ferenc University and in 2019 I visited and worked for the piano manufacture of the famous pianomaker master, David Klavins at Vác, where among others, I was studying techniques of piano making and creating experiments. And in Venice at the Academy of Fine Arts I attended the contemporary music course of Nicola Cisternino, and at the Conservatory I attended rehearsals of the seminar of Giovanni Mancuso. Besides all of that, in the meantime from around 2014 I started studying music theory and musical composition and started writing music which I've been dealing with intensively in the past 3 years. It has been during this time that I have been working on a large scale composition of 200 pages and at least 80 piano pieces of which I used to play and improvise details at certain pianos in public places during my long term Erasmus- scholarship stay in Venice. I usually played for at least 1 or 1,5 hours, thus assuming also myself as a „living and walking” music (or melody) machine (as if I myself were one of my own artworks), a refined and subtle musical construction of a kind.

² These methods are, in the case of my work, for instance beyond the experiences and regular practice as a piano player, the contemplation and study of music theory, and, regarding the practical aspect of the creating and building of the mobile, kinetic and „functioning” constructions the the practice and learning of mechanical engineering, technical work (mechanics, physics, carpentry or joinery), the design and further construction methods involved in the complex execution process. And, in the case of instrument designs and works, the studying and experimentation and the necessary elaboration in acoustics

experimenter-discoverer experience, starting from the beginning and then arriving from one recognition to another through systematic experimentation, just like an experimenter, fulfilling thus a kind of constantly developing, evolving and progressing process, in a certain sense. In this way a certain artistic way or practice can change or transform in the meantime. As for further parallels between scientific and artistic methods: which is for the scientist his or her laboratory, is the studio for the artist, which is for the scientist his or her experiments, proof and verification is for the artist his or her artwork. And experimentation is also a familiar concomitant of artists and certain artistic practices.

Thus, in this paper also unfolds, how a certain artistic path or practice can change and transform underway, and how an initially individual, autotelic and subjective artistic motivation, intention and articulation may become a rather workshop-centered interactive – oriented collective practice, which, instead of the transmission of a direct poethic message sees its purpose and essence in the discovery intention and experience, the progress and challenge of exploration itself and, as from the perspective of the later user, the possibilities of application as an experience.³ More precisely: as we shall see, until the 'end' of this artistic journey (from the start up until the present state), the necessary, ultimate purpose of the 'researcher – artist' is the designing, inventing and creating of such new instruments or constructions and processes, where the interactive user experience has a greater importance and significance than the transmission of an actual, immanent, underlying subjective or personal artistic message or melody.

The above mentioned progression and metamorphosis of this researcher – artistic journey I present along a progressive course, in the order of the making of each artwork, from the first music (or melody) - machine I made until my latest piece of masterwork. I order these 'stations' in 3 chapters, regarding and indicating thus the qualitative formation of the works even in the naming of the titles, which are in order: I. (Art)work-instruments, II. Instrument-works, III. Sound – instruments. The titles of the chapters are also concept and naming attempts for the masterworks, which reveal significantly and symbolically the changing and transforming of the different aspects of the artworks, the diversity of their interpretation, as well as their multiple

³ Such an aim or purpose could be amongst user-centered fields for instance art therapy, instrument playing, or even the inventing of new musical/instrumental practices, new pedagogical or didactic possibilities, discovery experience, scientific game, etc. The designer and maker of such practices cannot be considered an artist who solely works for an audience of fine arts or the „artworld“ but takes into consideration and considers the beneficiary „user“ and „player“ of his or her works the collective of humanity in general.

capacity and possibility for interchanging and interconnecting to each other and suggesting that heterogeneous, multiple complexity which denote and characterize these so-called 'hybrid works', reflecting the diversity of the meeting, interconnecting and interlocking of the different processes, dimensions, fields of art and specialities involved in the making.

Therefore, the 3 main parts of the paper is structured according to the artworks which I regard as my 'masterworks' in this context, each of which represent the different 'stations' or stages of the artistic -researcher journey and approach: thus each chapter focuses on the issues surrounding the works, the theoretical, technical or historical background, or unfolds the certain investigational situation and findings induced by the given work and analyse the possibilities of further consideration, development and perspective.

Thus, the paper also reveals how the concept and basic idea present in some of these masterworks (just like in the case of *Music Machine No. I (the one with bicycle wheels)* or in the case of *Music Machine II (Per speculum in aenigmate)*) changes and transforms from the automata musical construction concept to interactive instruments or 'Sound-instruments', just like the 'Modified' Music Machine I. However, these are not only instruments, but 'Sound-instruments', for the functions and the methods and fields of use of which the practices, categories or concepts seem to be yet undiscovered or unborn.

Consequently, I consider these masterworks as the 'milestones' of a still ongoing artistic-researcher process, and the latest piece regarded as masterpiece I conceive as a prototype, an experimental 'sketch' of an upcoming later work, a 'snapshot', an instant cross-section of a research course and work still in progress, Through these stages I present and demonstrate the changes of that artistic – research course, how the artworks, developments and revelations followed one another, through the elaboration and experimental processes and the experiences, revelations and consequences I gained through the further analysis of the phenomena.

Thesis

In each of the chapters I investigate the different aspects, theoretic issues and background of each different artwork considered as masterwork, in this regard. In each chapter there's a main theme or issue which becomes revealed and unfolded, thus, accordingly, altogether 3 thesis can be composed.

The main issue of research for me basically was inspired by those works which I have been making since 2012, those which I initially named as 'Melody Machines' (Later Music Machines). At that time my aim in general was to find 'justification' for my works, in order to obtain more understanding of the nature of these works, as a unique phenomenon being in the borderline of fine arts and music, and that intrinsic necessity which would crave form for itself only in these sounding and functioning mobile objects, musical constructions. However, what I have found turned out to be much more (suprisingly, even for myself,) than just a mere evaluation or self-justification of the works.

So, in the first chapter I understood the ontological meaning and origins of the works and realised how deeply sculpture and music are interconnected in the archaic, magical urge and gesture of 'animation' (in its original sense as 'bringing to life' or reviving) and that it is where that mystical, 'enchanted' effect comes from which we can still feel or experience today when we can perceive an inorganic construction come to life, that is, to move or to give out sound.⁴ So my first thesis is connected to this recognition. In the second chapter I relate the fundamental principles, technical conditions and circumstances of the functioning of musical constructions, (from the first mechanic organ through the carillons up until the invention of musical reproducibility that is, the appearance of the phonograph and the gramophon), and I present the 'Music Machines II and III', as the subsequent masterworks. Meanwhile the analyzation of the technical regards of the Music Machines I realise that each of the musical constructions I made include some kind of a novelty, either in their function method and principle or in their technology, to which I havent been able to find any similar previous example yet, at least during my exploration regarding the history of the musical constructions and automata instruments.

⁴ In our age, at the edge of the anthropomorphic 'reviving' of artificial intelligence these recognitions are in fact, highly relevant.

After this I sum up the consequences and I evaluate and appraise the special effect and aesthetic (and technological) importance and significance of musical constructions which still holds up to the present day, which can be justified by the fact that these wonder artifacts are still being created nowadays, even long after the age of the invention of reproducibility of music. (The only difference is, nowadays they are made with the help of contemporary, up-to-date technologies. (As an example, I mention the work of sculptor-inventors, such as Andy Cavatorta). These works don't just have artistic significance, but they retroact upon the engineering and scientific fields dealing with them, thus supplying engineers who are working with or studying control programming and artificial intelligence with new challenges, exercises and new possibilities of inventing and discovering novelties.

I. Art (work) – instruments

As the title of the first chapter also suggest, my initial aim above all was to understand the phenomenon of the music (melody) machines as a work of art, its true meaning and ontology. My intention was to unravel the significance of these works, how do their effect mechanism work and where or in what lies their true hidden or underlying essence. Also, to understand that inner necessity which called into being the urge for their creation. According to this, my first questions belonging to this chapter were: What is the (bicycle-wheeled) Music Machine I. ? At that point I find out that it is a kinetic artwork, that is, a sculpture and at the same time it is also an instrument (or analogue music-player machine). As for the inner content, that is, as the 'information' or 'software' (or 'soul') of the artwork I recognize the music itself (the polyphonic melody that the machine 'plays'), which, with regard to its nature belongs to the art of music, but at the same time the object as a work of art manifests and functions in the 'play-field' or space of fine arts as a sculpture. Besides, the playing of the musical information gives the work a temporal feature, thus a process-effect and aspect and performative nature. I somehow had the feeling that there must be something more to this phenomenon, a greater significance and delicate strangeness (which makes them somehow stand out from other similar tendencies, such as other, previously known kinetic sculptures or other aleatoric sound sculpture phenomena), also because for me the composition of the musical information and content was as much important as the physical creation of the construction itself. My intuition was that the phenomenon awaits further investigation and explanation, so I decided that it is

necessary to go back and analyse the the beginnings of the evolution of the two main matter composing it: sculpture and music. In the meantime I found that in the genesis of these two it can be derived back to a similar root-cause. So in that chapter I understood the ontological roots of the works and realised how deeply sculpture and music interweave into each other in the archaic, magical gesture of 'animation (or the act of 'bringing to life') and that this is where this enchanting effect comes from which we still can feel in our veins today, when we can see or hear a construction come to life, to move or to give out sound. Accordingly, my first thesis is:

1. In the Art(work)-instruments (or musical constructions, music machines) I discover the encounter of sculpture and music. (or the musical act). I discover a specific, deep, hidden subtle relation of sculpture and music and I state that their being can be traced back to common, magical, atavistic reasons. Since, the ontological root of both of them we can recognise in 'animation' (which means literally, to give sth a soul) . (To explain this in detail, I also analyse the common and different characteristics of sculpture and music as a phenomenon.). And the first 'rendezvous' of sculpture and music we can find in a specific object – tool genre, which does not belong to any of the artfields though, but includes both of them latently and that is the instrument.

II. Instrument – works

The expression 'Instrument – works' on the one hand alludes to the ever changing nature of my Music Machine – works, and to the delicate turn where the instrument and interactive feature and application function comes in to the front, instead of the automatic function. First of all, it appears in my work Music Machine III. (Musica Taverna), which is rather a semi-automata instrument – work, which can be controlled by means of a pedal and the 'player' is also invited to freely program (thus, compose and adjust) the micro-melody (by adjusting and arranging the order of the beer bottles on the plexi disc.) At the same time the Instrument – works expression also alludes to the history of the automata music machines, the places where those

actual 'works', manufactories or factories were where the 'predecessors' of music machines, the first player pianos and orchestrions were produced.⁵

In the second chapter I review the basic technical principles and conditions of the functioning of musical constructions, and relate the history of those automata musical constructions which technically can be considered as the antecedents of my (Art)work-Instruments And Instrument – works, (starting from the first mechanical organ and carillons up until the invention of musical reproducibility, that is, the invention of the phonograph and the gramophon), and I present Music Machine II. and III., as my subsequent masterworks. Meanwhile the analyzation of the technical regards of the Music Machines I realise that each of the musical constructions I made includes some kind of a novelty, either in their function method and principle or in their technology, to which I havent been able to find any similar previous example yet, at least during my exploration regarding the history of the musical constructions and automata instruments.

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2. As a second thesis, we can compose that the musical constructions represent a special, unique experience and phenomenon in the field of artistic practice. For we could see that since mankind was born and started to think, some way or another but it has always been dealing with the thouth and production of these special automata instruments, and that their mystical effect and significance hasn't been reduced or ended together with the appearance of musical reproducibility and that it still generates admiration. Because

⁵ On the other hand it suggestively alludes to the immense 'enterprise' which I myself undertook when I started the creation of these constructions.

the phenomenon did not 'drain' by fulfilling the ends of vulgar 'canned music', in fact, it gained new power in the end of the 20th century, after the appearance of kinetic sculpture. This phenomenon, - which is, contrary to regular music players is in fact an actual 'living', acoustic musical-kinetic artifact or experience – has just transformed with the technological progress, in order to gain new power and recognition, (after the appearance of the kinetic sculpture tendencies.) Thus, we can say that the world of automata musical constructions (or machines) has brought to the contemporary art practice unforeseen new tendencies, experiences, cooperations and processes which is a new designer – developer field involving and bringing new, possible exercises and challenges for programmers and engineers.

III. Sound - Instruments

In the third chapter I describe the concept of the 'music of the spheres', the origin of the idea, its significance and its history since the time of its founder, Pythagoras through Plato and Kepler until our present day. I also investigate that, whether in our present day, according to a present 'advanced state' and standpoint of science there may be any scientific reference or basis of the poetic thought according to which the stars are 'singing'. I observe that, during the history of this concept, people would consider and attribute different things to the 'music of the spheres' and would use different assignment methods, though the basic idea haven't changed. For example there is an idea according to which the distances and intervals between certain stars are corresponding to the harmonic intervals defined by Pythagoras, then there is another theory which assigns the planets to the different sounds according to their orbital speed, while others believe that planets can be assigned to sounds according to their distance from the Sun, and according to Kepler these magical relations as harmonies are present in the ratios of the orbital periods of the planets (considering our Solar System). These harmonies were also discovered by Kepler by geometrical means, when he compared the orbits of certain planets to the platonic solids and their two-dimensional figures. We also got to know a contemporary theory of astronomers from the lecture of Zoltán Kolláth, according to which the pulsating light of the variable stars, that is, the periodic change of the surface temperature and the emitted amount of energy are considered to be the periodic 'sound vibration'(or sound frequency) of the stars. Furthermore, the sonification process in astronomy already takes into account all possible

features and attributes of the stars (the spectrum of these data is still expanding.), and considers all this data as possible sound information, which is then later transformed into music. The conscious hearing and the musical analization of this type of music (done by experts) has already supplied researchers and astronomers with lots of significant observations and revelations. Besides, lots of physicits are reasoning that our Solar System seems to be arranged according to special harmonic patterns and that functions as if it were an actual 'resonator' (which, according to Nicola Scarfetta, even synchronizes the Sun activity and the chlimate of the Earth.). So, it has been found that the original and basic concept of the 'music of the spheres' is not just mere poetry or fantasy, but it truly has scientific references, so it is worth to be engaged in the further and deeper exploring and discovery of the subtle relations between sound frequencies, musical intervals and their possibile astronomic references and regards.

In the next chapter I present my masterwork IV., the Harmonograph. Furhermore, I describe its phenomenon, its antecedents and its hisstory, the functioning of the construction and the experiments, drawings (frequency – figures) and studies I made with it, and unfold the correspondences, consequences and results I have observed and experienced. The already mentioned relations between the numeric and geometric attributes of the orbits of the planets and the harmonic musical intervals observed by Kepler, here manifest itself beautifully. Because, here, in the case of the Harmonograph, by adjusting the correct frequency domains on the pendulums respectively, we can get to observe not just the frequency drawing (or 'tracing') of the intervals, but the actual, astronomic, two-dimensional projection of the orbital, celestial movement of the planets. Since the movement of the planets along an orbit around the Sun can be depicted in simplified astronomic drawings as concentric circles, thus the connections and relations can be demonstrated beautifully (thus for example, the correspondence between the orbit of Venus and the Harmonograph's pentagram drawing). I also introduce the mathematic formula, with the help of which the frequency drawing can be identified categorized as the musical intervals. With the help of this formula, beyond the pure aesthetic quantity of the draquings a clearly visual and mathematical assignment correlation reveals itself between the pictoral and sound frequencies, the polygons and intervals. This is the phenomenon which I call as 'code-transition' or 'vibration -converter'. Because the key word here is 'vibration', which can be converted into a drawing,that is, the two-dimensional projection of the vibration, with the help of the physical pendulum, After it came to be recognised that the conversion rule or formula inherent in the Harmonograph's system does not just create and mean a 'vibration-converter' betqeen sound and visuality (or geometry), but, by means of mathematical ratios, it

also makes a correspondence system between sound and astronomy, I started to work on a correspondence (or assignment) system, which could give an opportunity to musical notation or the visualisation of the different notes and intervals respectively, signed in a chromatic circle, while, at the same time it would also make visible the polygons (drawn by the harmonograph) of the corresponding intervals. Then I also review the antecedents of such 'analogic' circle-systems, expanding it also with other sound-colour analogic circle-systems and I present my own experiments on that current subject, as details of a work still in progress., and a last development which I have been able to made so far. After that, the investigation of 'sound as a vibration' necessary made me go on and continue forward with the new step, that is, the investigation of further visualisation properties and visual experimental possibilities of sound. That's how I found the phenomenon of Cymatics, the process discovered and named after Chladni, which is also an analogue visualisation method of sound vibration. So in the last chapter I detail the antecedents, the conditions and the history of Cymatics. Because, on the contrary to the Harmonograph's Lissajous-figures and polygons, the patterns of Chladni - figures rather resemble wave-patterns, that's why I wrote that – analogically to light – now here sound's 'wave-nature' is what comes to be examined. During the examination of the patterns I came to the observation that, contrary to my previous beliefs here the characteristic patterns does not correspond to harmonic intervals (defined by numeric ratios of integers) , but instead here there's always one sole and single frequency which belongs to a specific pattern.

Last but not least I present masterwork V., which is the 'Modified' (bicycle-wheeled) Music Machine I., in which I connected and combined my Cymatic installation, thus creating a 'Sound-instrument' which – with the help of cymatics – can visualise the sound at the same time (meanwhile live playing on the instrument). My further aim is to find a relation or a 'passageway' solution between these different 'vibration-converter' means and mediums of sound visualisation. To this relates to my 3rd thesis:

1. During my experiments and investigations I found that there is, there must exist a certain ultimate 'vibration – converter', analogic system and assignment or correspondence method, (which, instead of a subjective or arbitrary correspondence rule, would be based on a scientific coherence and correspondence.), which could provide some kind of a transition and thus could create direct conversion possibility between sound and

visuality, sound vibration and light wave, (thus music, mathematics, physics, geometry, colours and astronomical phenomena, and between all the (quantum) physical phenomena of the world surrounding us and which thus could arrange and order the different vibrational aspects, dimensions and qualities existing in the universe in a unified form.

In such a system, the base of the dimension of transmission and energy – just like in the case of the Harmonograph or Cymatics – , or the key word could be 'vibration'. These systems I call 'code-transition' or 'vibration – converters', I assume their existence and in my creations and works I intend to attempt the approach of such an intuition or concept or even the realization of such a system. Such attempts were 'Sound-instruments', too. In my opinion, the exploration of such systems and models by means of the interconnection of art and science is not just significant or rewarding because of user aspects, or as an artistic experience, but such researches analysing and focusing on the essence or the physical nature of things, the phenomena of light, sound, vibration and wave, and the transition relations and converter systems between these dimensions can lead to far-reaching results (even if they may be just visual patterns, or theories initially) which could contribute to astronomy or quantum physics - just like, in the case of sonification, as we could see – or to investigations regarding atoms or the quantum structure of sound and light and thus, eventually could help us in our ultimate purpose of solving and understanding the riddles of the universe surrounding us.