

# The Value of Musical Creativity in Industry 4.0 Era: Based on Musical Composition Generated by Artificial Intelligence & Computer Learning

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**Abstract:** Music and creativity are an inseparable thing, creativity even as one of indicator for valuing of artistic compositions. The creativity of western music for some considered had been exploited since the 16s until the era of the 20s. As if trying to emerge new expressions, east exoticism and computer midi futurism were pursued. The era of 3.0 was an era in which computers are made it easy and efficient to accommodate idea (human-driven), but in the era of 4.0 computers no longer as tools, but become a source of creativity for human collaborators (smart factories) based on Artificial Intelligence and Computer Learning. For the author, the value of musical creativity is interesting to be studied more deeply. Does music generated by computers have the value as high as those generated by humans? From this thought, this paper tries to discuss the paradigm of musical value in the 4.0 era. Value discussed philosophical and empirical-sociological reviews. The results of this thought emerging the discuss and discourse about creativity in academics in the field of ethics as an attitude of intelligence through reasoning and academic arguments that produce work that can be accounted for.

## 1. INTRODUCTION

Creativity is one measure of the value of the existence of an art, especially western music, music and creativity is indeed something that cannot be separated. As the creativity expressed by Boden (1987) cited by (Ramon: 2018) that, ...creative ideas are novelty, combinations of known... involves memory, analogy, learning and reasoning under constraints (limitation).

As is well known that western music is more than 20 century old, if (Ganap, 2009) considers that, ...it is not excessive opinion if the source material for western music creation has been drained in the creation of baroque, classical and romantic music works even modern era until the 20th century. Since the discovery of the theory of the circle of fifth in the 17th century, the emancipation of western musical instrumental music in Europe began to occupy a higher position than vocal music in the Gregorian era. That century became the starting point of the development of intellectual music in the composition of sonatas, concerto and even symphonies, so in modern times composers sought to process new

material sources through exoticism (adoption of non-western sources) and through futurism (MIDI).

Futurism digitalization in the 3.0 era began to give the effectiveness of the production of music creators in accommodating and distributing musical ideas through technology media. However, the era of 3.0 computer technology is still limited to tools, while the behavior of creativity is still human-driven.

The 3.0 era is sometimes still misunderstood as a digitalization era that is not much different from era 4.0, 4.0 is only considered to add a more humanistic and beautified experience, even though there are very basic differences in era 4.0, namely a system where humans are no longer operators, but computers and technology have acted as collaborator creators who are able to make their own decisions through artificial intelligence (AI) and computer learning technology.

AI has been considered able to give a new way to find other sources of music creation, such as what Boden said that creative ones are novel, so with the support of computer learning, algorithmic systems, data computation through artificial intelligence can produce the same creativity as behavior humans can be, even more advanced.

In the urban context, Benny Yohanes's creativity paradigm (ibid, p; 9) is divided into five ontological bases, and one of them is the Futuristic ontological basis, the ontological basis of this perspective raises a creativity to present another (novel), the thing that the future to be presented in the present.

Such thinking is shown through factual examples through media coverage these days, The Yamaha Company has developed an AI that captures data from an artist body movement (dancer) in which the movement is converted into midi data and then transferred to a piano instrument, like that be played by pianist. Not to mention the presence of computer learning hardware such as Sync and Magenta developed by Google giving way to new possibilities in expressing artistic art.

The novelty that emerges certainly results in a new musical artifact, but as a statement (Bourdieu, 2011) that art is not only produced in the form of concrete objects but also in its abstract form, namely value, then the thought, a question arises then, whether musical artifacts generated by computer can regarded has a values as high as that generated by human?

The question becomes a discussion as well as the intent and purpose of this paper, the discourse of value in era 4.0 aims to provide a critical description that sees that one side of technology enhances civilization and academics discourse in the field of ethics and attitude intelligence through reasoning and academic arguments that produce work that can be accounted for.

## 2. AI & Computer Learning

The author chose several examples of musical phenomena resulting from the development of Artificial Intelligence (AI) and computer learning. (1) First a demonstration example initiated by the Tokyo University Of Art with the Yamaha company, the development of artificial intelligence (AI) technology has enabled the transformation between motion art namely body movement into a musical composition.

Through the engadget.com website, Steve Dent stated that AI tech developed by the Yamaha company was able to translate the motion language of a famous dancer (body movement) called Kaiji Moriyama into musical notation accommodated in acoustic piano instruments.



**Figure 1.** *Mai Hi Ten Yu*

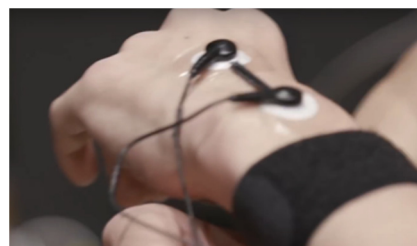
Doc : Yamaha Corporation *retrieved from* : <https://www.youtube.com/watch?v=tLFe2AzCodk>

Yamaha company stated in this era 4.0, AI tech gave rise to a "form of expression that merges or combines the art of body exercise with music." In other words Yamaha also stated, this is the first step to creating or achieving a new form of artistic expression. has been displayed at a concert held in Tokyo with the headline "Mai Hi Ten Yu". In the concert Kaiji Moriyama played the piano using his body movements accompanied by the Berlin Philharmonic Orchestra Scharoun Ensemble.



**Figure 2.** *Kaiji Moriyama & Berlin Philharmonic*

Doc : Yamaha Corporation *retrieved from* : <https://www.youtube.com/watch?v=tLFe2AzCodk>

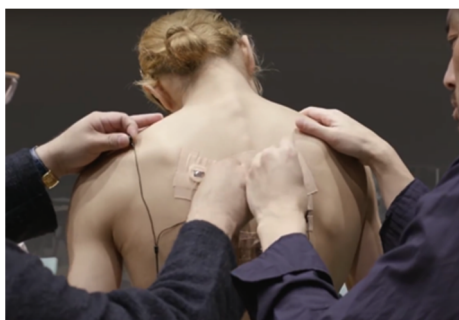


**Figure 3.** *Hand Sensor Installation*

Doc : Yamaha Corporation *retrieved from* : <https://www.youtube.com/watch?v=tLFe2AzCodk>



**Figure 4. Foot Sensor Installation**  
 Doc : Yamaha Corporation *retrieved from* :  
<https://www.youtube.com/watch?v=tLFe2AzCodk>



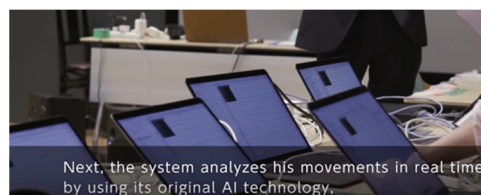
**Figure 5. Body Sensor Instalation**  
 Doc : Yamaha Corporation *retrieved from* :  
<https://www.youtube.com/watch?v=tLFe2AzCodk>

then the movements of the back, hands and feet are converted into data, then AI directly converts them into database based melodies in the form of Musical Input Digital Interface (MIDI),



**Figure 6. MIDI**  
 Doc : Yamaha Corporation *retrieved from* :  
<https://www.youtube.com/watch?v=tLFe2AzCodk>

The MIDI data is then automatically sent to the *Disklavier* Player Piano instrument to the sound of the acoustic piano.



**Figure 7. Artificial Intelegence**  
 Doc : Yamaha Corporation *retrieved from* :  
<https://www.youtube.com/watch?v=tLFe2AzCodk>



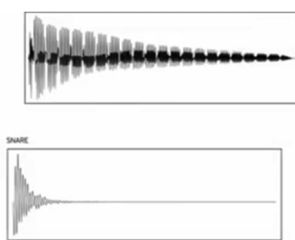
**Figure 8. Disklavier Piano**  
 Doc : Yamaha Corporation *retrieved from* :  
<https://www.youtube.com/watch?v=tLFe2AzCodk>

Second (2) Another example can be seen through the project developed by Magenta, Magenta is the development of computer learning that allows generating sound. This technology makes it possible to bring up virtual media and new materials from conventional materials, through a technology called NSync.



**Figure 9 Nsync, generating sound instrument**  
*Retrieved from* :  
<https://magenta.tensorflow.org>

The tool is based on computer learning that allows mixing sounds that have different characters and frequencies into a new material. Bass and Drum instruments, even Flute and Drum (Flure) Instruments are united into a new type of sound.



**Figure 10.** Mixed Sound - *computer learning*  
Retrieved from :  
<https://magenta.tensorflow.org>

### 3. PARADIGM OF MUSICAL'S VALUES

Discourse on art and creativity in the discourse of value is a perspective that is both perspective and relative, but no art is born without creativity. Soemardjo (2000) mentions two important keywords, first (1) art is an expression, second (2) art as representation. Expressions are identical to human feelings, sad; angry; happy; etc., (ibid; p; 73), are considered as internal factors while representation is the response of humans to objects outside themselves (ibid, p; 76), which are then realized in a creative way.

In other words, art is an expression and representation of human experience about them, and that which is outside of them is then manifested or realized in concrete products (music in the form of sound) that have aesthetic value as a result of the creative process. This creative process in general by the author is divided into two aspects, first (1) objective aspects, meaning those related to material things, technical, artistic and concrete forms every their periodicity. Second (2) through empirical studies, especially from the sociological perspective.

First (1) the history of western music began in the 400s in the era of early Christian. That era shows the initial creativity of musical composition that emerged as a representation of the early church (Religion Servant) as a representation of the society of theism. Gregorian Chant was originally only a single song, then when instrumental music developed since the 17th century in Europe, especially since JS Bach (1685-1750) discovered the theory of circle of Fifth which produced 24 tonics for sharp (#) and 24 tonics for flats (b) which became the basis of the birth of the tonal system in western music, so from that discovery paved the way for the emergence of emancipation of instrumental music that appeared in the form of fuga, sonata, concerto and even

symphony (Ganap, 2009: 3).

The value of Instrumental composition creativity is seen based on the advantages of an instrumental work whose notes are independent of the lyrics or visual context in working on musical elements including themes and variations through musical line frames based on diatonic scale for producing complex motifs and textures. That is what (Ganap, 2009) considered the depletion of western music material since the cantus firmus principle was used effectively in the source of the creation of instrumental music in the seventeenth century.

Cantus Firmus in the early Baroque era (1600-1750) is often played using the principle of counter points on harpsichords and cello, or other melodic instruments which are characterized by exact rhythms, monodyous textures, and most solo works with accompaniment and harmony accompanied by bass continuo (Forney, 2011: p106).

Creativity continues to move along with the superiority of its compositions in classical times (1750-1825). Its superiority is no longer merely the textural movement of tones through counter-point principles, but has demanded orderliness, objectivity, and harmony proportions that reflect art and architecture in classical times that are new to ancient Greece and Rome style. Creativity in this era was assessed based on characteristics that were singable, lyrical melody, diatonic harmony, regular rhythm and homophonic texture meters and the use of folk music elements, (ibid: p150).

Not to mention if we continue to the era afterwards in the romantic age which is known by many composers through great works such as symphonies, concerto and several chamber music. The superiority of values in the romantic era is also shown through the characteristics of the lirical theme, colorful harmonies, expanded proportions and larger orchestras featuring new instruments (ibid: p244), then into the post romantic era which has changed into impressionist style until the twentieth century in the era modern, creativity is no longer literal descriptive but has tended to use symbols of description.

The last century in the 20th century saw its superiority in a trend of artistic creative exploration that was simplicity and abstract, surrealism and Expressionism in music. The most popular figure is Schoenberg and Webern, these two figures gave rise to a new harmony system with unlimited instrument registration, meaning that it can be very high and very low compared to the limitations of instrumental music in the classical era (ibid: p284).

The value of the artistic aspect if it is concluded is that the journey and its changes also follow the changing times and culture it represents. So that the process of awareness, prudence, intellectuality and even a game of human perception gives value for a temporary musical possibilities in each era.

The second aspect (2) is to assess creativity not only seen from technical studies about artistic and aesthetic, but value is also the result of cultural structuring, so it needs to be seen through the empirical view of study. (Minette, 2009: p19) said that music is the result of many complex factors, ie. musical, religious, economical, educational that were interplayed, so before speaking of values in a cultural perspective, music is also very relative to how to look at it.

The classical composition, for example, as stated by (Bambang, 2014) that J.S Bach, Bethoven or chopin works must have been regarded as music, but other entities such as the sound of trumpets Miles Davis or Heavy Metal were also called music. Not to mention the type of music that sounds as if it is without structure and impresses without melodies and sounds strange from Arnold Schönberg's atonal composition, even worse if music is composed of sound elements, then John Cage's work entitled 4'33 "is only quiet for four minutes thirty three seconds. Other phenomena such as those which are clearly as a song and even have musical value, according to Bruno Nettl cited by (Bambang, 2014) that, for Iranians the Qur'an is not categorized as 'music' (*mūsīqī*), even for Iranian music instrumental is connoted as sin and cannot be associated to religiosity like European music. Charles Culver (ibid, 2014) defines music as a sound with periodic and regular vibrations, but cannot be universally applied because it takes the example of some in the tribe in Papua Nugini (Kaluli) and the tribe in Africa sounds of friction with irregular patterns is considered music.

Cathleen Marie who cited by (Bambang, 2014) understands music as an 'auditory phenomenon produced even Bambang adding 'appreciated' and intentionally, so in other words music is a sound that becomes music, it must be produced with a specific purpose, then the quality of appreciation that arises depends on the meaning that given by listener (conscious of value). Then how are random natural sounds or those that are not intentional, or even some that are clearly considered musical value are not even considered as music as in Iranian society. This is what returns again, music must be appreciated as music if the listener does see it as music.

The ability to appreciate is indeed necessary

through the process of internalization through a society which teaches its music itself, so that creative experience is the result of the accumulation of individual experiences in the social environment, which is (Bourdieu, 2011) called cultural capital. Cultural capital is a type of capital that is associated with intellectual skills, the wealth of ideas of art ideas obtained through long experience in the social arena, so that valuation is certainly determinization, or attraction of power in the arena (Bourdieu, 2011). The accumulated experience is obtained through (Minnette, 2009: p19) trial and error in social contexts or situations through reflection, practiced, and developed over period of time which temporarily continues to experience small adjustments and changes.

So that the factor of audience appreciation level also affects the value that appears. (Bambang, 2014) explained that appreciation of musical values is obtained through listening activities, listening to the right is certainly through at least include the stages (1) Sensuous, (2) Affective, and (3) Intellectuals.

(1) Sensuous (spontaneous) - through the senses of hearing, the matter of 'delicious' or 'unpleasant' is seen through the body's moving response when hearing musical elements from reggae music, house music, in contrast to Jazz or classical which tends to be complex, body language we may face frowning through our faces or other body language that says there is complexity.

(2) Affective (through listening habits) we can be able to appreciate and familiarize ourselves with music that may initially be uncomfortable and then become towards likes or even dislikes. (3) Intellectuals (understanding) Understanding is not limited to likes or dislikes but has entered the intellectual cognitive area which then enables us to do two things (ibid, 2014), (1) able to empathize meaning regardless of the likes or dislikes of the art but want to see the objective value which is the specialty of music (2) is able to give a predicate to the composition of musical composition, this is where appreciation or giving of value, which this party through Bourdieu's perspective is the role of social appraisers including curators, media art, art intellectuals and even the majority audience, which then raises justifications about the "right way", "Wrong way", "Better ways" in evaluating a performing work.

#### 4. DISCUSSION

The concert performance was held by Tokyo University of Art, Yamaha and Berlin Philharmonic

Orchestra with the title *Mai Hi Ten Yu* at first glance as a form of performance like classical music in general, with a musical texture familiar to appreciators who are familiar with the style of music in the century era 20s, as in atonal Schoenberg or Webern works. Piano Formation and string instruments are room music style instrumentation in the era of impressionism, both in expressions and sensuous impressions, but the difference is the composition of the music presented is a result of the transformation of kinetic language.

From the point of view of formal analysis, the superiority of the creative presentation of the concert may only lie in the technological capabilities that change the language of motion into musical elements for piano instruments. The transformation in the previous era was also often carried out both a combination of music and motion art, painting. The common thread of art collaboration lies in the interpretation of each that will perceive different materials to be able to create a coherence, and the value of art lies in that interpretation.

We might see the same concept in the opening ceremony of a world cellist YoYo Ma who collaborated with dancer Lil Buck (Rothman, 2011). The presentation is a composition presentation that illustrates the elegance of a Swan 'The Swan' which is then represented through the figurative movement of Lil Buck. The difference is the transformation of motion which in the pre-technological era is carried out through free perceptions or interpretations as an art of interpretation, once again that's where the value was seen, in contrast to *Mai Hi Ten Yu*, Kaiji Moriyama's movements are not perceived by the human mind to be articulated in musical language, but the human movement which is considered as data then AI tech which will determine the results of sound, which Yamaha states aims to produce structured sounds and as much as possible avoid random sounds as a result of the fluctuating movements of Konji Moriyama.

From the futuristic phenomenon above, indeed AI tech can enable new patterns to emerge, even musicologists can work to find new music systems from the show which can then also find patterns in the art of musical motion. However, *Mai Hi Ten Yu* can still be seen as a balanced collaboration between human driven and smart factory. Balance occurs because but the Movement of Kanji Moriyama will still produce and determine the musical elements formed, even musical expression which will then affect the musical space (harmony) for the strings section. In contrast to Magenta and Sync, computer learning technology is more about something that is

not actually empirical, it is actually the opposite, that is, the resulting computing becomes a source of human creativity, so without computer learning ideas and ideas it will stimulate human creativity.

Preliminary questions about how we will see computational results? Can computers be given creative titles, Ramón (2018) states that creativity computed is almost the same as mathematical theory, computing systems in artificial intelligence (AI) can now automatically write poetry, painting and composing music, but then is it worth the same as art produced by humans ?.

The answer to that question is of course dependent, jokes is still have value as long as it still makes people laugh even though it is generated by computer, is there a joke like that ?, but it is different from visual works, of course (Ramon, 2018). Even the question can go back far that, what is generated by computers can then be considered music? This has also been stated before that for certain tribes forest sounds that are clearly natural sounds not produced by humans can be perceived as music. Ramon (2018) also states that enough time to depart from the old paradigm to the new paradigm, if creative behavior is always synonymous with organic (living) things, so far it has been considered that more likely animals such as chimpanzees or dolphins have intelligence in certain levels, even the world of computer science never acknowledges this (ibid, 2018).

The old paradigm still believes that computing is only a simulation of a behavior of creativity, but not creativity itself. But there is a lot of evidence these days that robots have become subjects even able to imitate and jokes, painting and even playing music like humans. This is an antithesis of the old paradigm that creativity is not merely a gift, and value is not necessarily the one produced by organic elements only, even science is able to investigate, simulate and even generate new creativity in the art.

## 5. CONCLUSION

If valuable art exists because of the results of sensory sensitivity, spiritual contemplation, and especially appreciated, the author will judges the results of AI and Computer literacy hve value as not as high that produced by humans, same opinion who agrees (Searle, 1980 & Boden, 1987) quoted by Ramon (2018), who judged that even if computers through artificial intelligence can have the same creativity as Bach and Einstein, still most of them are judged only as if they look creative but they aren't actually really creative.

Searle uses syntactic and semantic words in evaluating the results of art that are generated through computer technology. Computer is only able to do syntactic manipulation of inputs that are converted into data, in this case MIDI and then manipulated into a new, seemingly non-semantic outcome. Semantics means complete meaning, not fragmented on the basis of computational speculation, but intentionally, coherence occurs in consciousness. Whereas Syntax is more directed at the connotation of the game of grammar or the possible combination of computational symbols.

Other opposing perspectives may need Openness, openness needs to be supported by the power of appreciation, if Bambang (2004) divides the stages of appreciation through listening, it is necessary not only at the stage of affection to be close to the experience of sounds but to have cognitive stages as an inclusive attitude towards a new possible form of value. In addition, Opinion of Cathleen Marie (Bambang, 2014) who understands music as an 'auditory phenomenon produced even Bambang adds' and intentionally appreciated', in other words music is a sound that becomes music, must be produced with the intention and certain goals, then the quality of appreciation that arises depends on the meaning of the listener (conscious of value). In other words, *Mai Hi Ten Yu* will appreciate its had a high value if its audience does see it as worth.

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