



“De Tjolomadoe”: from Cultural Heritage to Industry 4.0

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ABSTRACT

This article describes a combining research innovation (in cultural heritage) with Industry 4.0 at “De Tjolomadoe” the used sugar factory building. The original name is *Suikerfabriek Tjolomadoe* at Malangjiwan Karang Anyar. Owned by *Kanjeng Adipati Mangkunegara IV* of Surakarta built in 1861. By fact, it is the only one sugar factory owned by the Javanese Royal Family during Dutch Colonial era. After Republic of Indonesia was built, it nationalized by Indonesian Government (1946) during Soekarno era (1945-1967). After held it in Adaptive Reuse in 2017 the building’s roles a new function as Convention and Heritage. By refers to a qualitative research, the study aims to finding the elements of industrial 4.0 SDGs in “De Tjolomadoe” included the museum concept. Inside the Convention and Heritage building was found an edutainment facility to accommodate the millennial age. Behind, the gigantic of sugar factory machines, dioramas, archives, miniatur models, original drawings are shows as museum collections. In the huge of “De Tjolomadoe” outdoor lanscape there are the originally of building construction by giant typo”ANNO 1928 ” in the brick wall, the Art Deco style of the Resident’s House Administrator, the Prince’s Gazebo, the Sarkara Hall as a multi-function hall, and prefectly by the beautiful Sunken Plaza. Related to industrial 4.0 SDGs they show the internet of thing (IoT) by created the Old Javanese civilization of sugar factory. Especially in The Royal Landscape’s corner there are “glow in the dark” by an artificial intelligent architecture. It shows the glory of the last Sugar Factory in Java Island during at the Colonial Era. Now, by the successfully of the Adaptive Reuse in 2017 was composed The Cultural Heritage with industry 4.0 has modified “De Tjolomadoe” to be one of the venue of the millennial visitors to create their happy times during its appreciation.

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INTRODUCTION

“De Tjolomadoe” Convention and Heritage is the happening issues. Media covers the used sugar factory building now was looks like a ‘new’ building after held in Adaptive Reuse in 2017 [1]. A new appearance of the old one named is *suikerfabriek Tjolomadoe* in Dutch spelling or *Pabrik Gula – PT Colomadu* in Indonesian. After “De Tjolomadoe” inaugurated in March, 2018 they was created a new Museum. The used sugar factory which built in 1861 by the Prince of *Pura Mangkunegara- IV*. Fact, is the only one sugar factory owned by The Javanese Royal Family during Dutch Colonial era [2]. Then, it nationalized

at 1946 during Soekarno era (1945-1967). Signed in *Soerat Koeasa Istimewa* by his grandson, *Kanjeng Adipati Arya Mangkunegara –VIII* [3]. In early of Indonesian Reform at Soeharto era (1967-1998), the sugar factory are closed. One of the reason is the sugar factory did not get the supply of raw materials because the land had been reduced. Then, the property owned by Indonesian private company named *Badan Usaha Milik Negara* (BUMN) [3]. Unfortunately, the used sugar factory is not taken care of so that almost as damaged building and vandalism has occur. Because of the location of used factory was strategically located to the airport of President Joko Widodo’s resident in Solo so he often passed. Finally, the President asked to Rini Soewandi as Ministry of BUMN to take care about the property to be economic point center based on cultural heritage. Then the Ministry assign to Tumiana as the President of PT. PP Property Tbk,

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he has roles as the Developer of the Revitalization project. During 18 month the construction based on Adaptive Reuse heritage building was held by PT PP Property Tbk, and to be authorized around 30 years. By used an adaptive reuse method then, the used sugar factory to be a 'new' building appearance then roles as a flavor venue and tourist destination of music shows, cultural events and museum as well as tours destination, especially the hinterland of Solo City [4].

The historical building is a prominent of the sugar maker factory at Malangjiwan of Karanganyar, Central Java. Built in 1861 named "*suiker fabriek of Tjolomadoe*". The factory was owned the Noble of Pura Mangkunegara. During operated by Government the factory already decline, and totally closed era in 1998. For more than 20 years the buildings was damaged included its whole of archive of architecture. Since it was closed, the damage building looked scary and haunted. In other hand, the collective memories of factory building are still remind, especially by the labour families. The collective memories related to the building itself was proof that the historical building is timeless [5].

The *suikerfabriek* of *Tjolomadoe* at 1861 by *Kanjeng Arya Adipati Mangkunegara IV* continued by his grandson. The first building of *suikerfabriek* built in the Neo-Classical style refers to KILV archives. But, the late of historic building of "*Tjolomadoe*" in the 1998s when already closed it shows as Art Deco style. This fact, it will confused during the Revitalization Project of Adaptive Reuse process because it is required to refer to the authenticity of the building style [6]. As the famous Royal Prince of Pura Mangkunegara is also known as a Superpower's Prince. He role as the influencer surrounding of his factory. He has role as the influencer surrounding of his factory. As a rich of Prince of Java, *Kanjeng Adipati Arya Mangkunegara IV* had dedicated his factory to the communities of Malangjiwan Karanganyar. Because of it, then he known as The Legend. Because of it, then the *suiker fabriek Tjolomadoe* communities gave him by a honorary, namely "*Eyang*". Refers to the untold story related his beloved called "*Nyi Pulungsih*" his business made the community wealth. Their hopes, someday the factory building can be revitalise in order the grand message of "*Eyang*" or *Kanjeng Arya Adipati Mangkunegara IV*: "*Pabrik iki openono, nadyan ora nyugihi nanging nguripi kinaryo papan pangupo jiwone*

kawulo dasih. In Bahasa Indonesia: "*Peliharalah pabrik, walaupun tidak bisa membuat kaya tetapi pabrik ini bisa menghidupi serta memberikan perlindungan sebagai jiwa masyarakat di sekitar pabrik ini*". His legendary message's means "Please, take care this factory, although it cannot make it a rich men, but this factory can to give a life the people around". He needs that the sugar factory may a part of their collective memories. Related to the sugar factory building itself was proofed that the historical building is timeless.

A timeless building concept is related to the "quality without a name". Christopher Alexander stated (1999): We may seek the building's nameless. His idea has reflected "a part of the quality without name, but are not sufficient to define it individually. [8]. Behind roles as an Aristocrat, *Kanjeng Arya Adipati Mangkunegara IV* is known a prominent Artist of the Royal Family of *Pura Mangkunegara* of Surakarta. He wrote more than 42 books, including the *Serat Wedhatama*. He also created several traditional music - *gamelan* compositions, one of his well-known compositions is *Ketawang Puspawarna* [9]. His musical compositions then was sent into the out space through the Voyager Gold Plate in the Voyager I by unmanned spacecraft in 1977. For his courtesy in cultural services, especially in writing *Serat Wedhatama*, *Kanjeng Arya Adipati Mangkunegara IV* or called "*Eyang Mangkunegara IV* received the *Bintang Mahaputra Adipradana* award from the Republic of Indonesia in President Susilo Bambang Yudhoyono era (2004-2014).

In the 1881s he died and was buried in *Astana Girilayu*. One of the his advantages as the Royal Family of the Javanese Kingdom is, his soul being able to communicate with people through someone as role as his medium – as the ancestral spirits especially when someone visit to his tomb. The Javanese phenomenon may similar within *Bojuwoye* argues, that in many cultures has the difference explanatories models of the consciousness of the ancestral spirits. For instances, in the indigenus of African cultures related to an emotional bonding to their ancestral spirits. It is about the multiple realities related to "the dead people" are still very much around. Even though he/ she are in non-visible dimension of reality. Refers to their ancestral spirits, is an acknowledgment that his/ her spirits are still live on. Their ancestors have only transcended to another dimension. And, they need to be treated warmly. By

the respect and honor. Especially in Kenya, the people place a lot of respect to their ancestors. They are believed their ancestor capable to controlling them. events in life. The Zulu and Xhosa in the South Africa, they acknowledgement to "good will" and "a successfully life" for their living descendants. The phenomenon was indicated such as; the bigger crops, better business deals, or an achievement of other desirable goals. All happened since their ancestors are believed to still have interest in "the wellbeing" of them [10].

The correlation between cultural heritage with potential Industry 4.0 related to Bartodziej is do have regarding end-to-end digital integration in production logistictis based on their functions [11]. According to him, the relevance of the concept Industry 4.0 with "De Tjolomadoe" Convention and Heritage is in their relations and identify drivers, and their challenges to use of Industry 4.0 technologies included Internet of Thing (IoT). Refers to United Cities and Local Governments (UCLG), As well as the Preamble of the 2030 Agenda indicates; "We acknowledge the natural and cultural diversity of the world and recognize that all cultures and civilizations can contribute to, and are crucial enablers of, sustainable development" How is culture relevant? It was described in the cultural aspects are significant for the achievement of the relevant role. It takes into account the explicit references to culture made in the 2030 Agenda, but also builds on evidence existing elsewhere. UCLG mentions, that cultural services are basic services, and may equal access to for all, including the poor and the vulnerable. Cultural expressions, goods, services, and also the heritage sites can contribute to inclusive and sustainable economic development. Based on UCLG 2030 Agenda, the Adaptive Reuse was found the similarities. Inside "De Tjolomadoe" Convention and Heritage, building was shown the old artifacts that have economic development. Several sugar factory machines in giants scale located at the lobby area, the café, the corridor and the convention center. And, inside the museum there are located dioramas, archives, miniature models, original drawings as museum collections contains the economic value because it have historical value. Then, to proper to Industry 4.0 they shows the Internet of Thing (IoT) of the Old Javanese Civilization of sugar factory, and The Royal Landscape corner within "glow in the dark" by an artificial intelligent architecture. Now, the combine of cultural heritage of Industry 4.0 at "De

Tjolomadoe" to be a new one venue that closer with the millennial visitor.

EXPERIMENTAL METHOD

Refers to The General Assembly of the United Nations, related to the *Transforming Our World: the 2030 Agenda for Sustainable Development* was describe the global agenda on sustainable development until 2030. Building on refers to the Millennium Development Goals (MDGs), is one of the global agenda from 2000 to 2015. And, a new 2030 Agenda includes 17 of aspect in Sustainable Development Goals (SDGs). There are 169 specific targets refers to the 2030 Agenda, it has amounts a minor step forward in sustainable development [12]. To response to the Millennium Development Goals (MDGs) 2030 Agenda, we proposed an Adaptive Reuse of historical building of "De Tjolomadoe" case. The old heritage building has the cultural aspects, and an assessment toward to the final MDGs 2030 Agenda. A preservation project, and a conservation project of the historical building may adding the economic value. One of the preservation project is an Adaptive Reuse. The define of Adaptive Reuse is re-developed based on an existing building. It often described as the re-structurally proces of the old buildings to generate an economically value [13]. The important step of preservation is to sthrengthen the originally structure and to reveal the building style by to reveal the building façade. According to Austin and Steward that to reveal the building style is need to visit by phenomenological method, it addressed as the first stage. Is part of get a feel of the adaptation post-industrial architectural heritage toward a new cultural functions. Refers to Austin, Steward, & Forrester in 1988, reveald to the originally façade and building style it must be done in thus stage.

The act to revealed the building's façade is addressed to study the building's style. The first steps of a phenomenologically method has include the four steps; (1) to bracketing step, (2) intuition step, (3) analysis step, (4) description's step [14]. The bracketing step roles as identifying to keep and check any pre-conceived beliefs, public opinion, or notions related to the phenomenon. In the first step, researcher may "brackets out" any pre-suppositions to giving effects on her/ his study in order unbiased perspective. Named it "phenomenological reduction" or as a process of isolating the

phenomenon. The intuition stage roles as an important part requiring in order to become totally immersed as well as their phenomenon. Researcher may remains open to “the meaning of the phenomenon” in order to describe their experiences. In thus stage, the process results in “an understanding”, and it may require researcher to various data collection. The analysis step is a process to analyzing data has role as to enrich data. By uses the processes such as “coding and categorizing” to organize the data and describe the experiences. The description step is the end of the research process. A good researcher will use his/her understanding to describe and to define the phenomenon as well as to communicate to others.

References related to innovative is refers to “innovative dialogue” of Pacey that has to kinds, first over-simple distinctions made beteen high technology and supposedly more appropriate forms. The point usually is that appropriate technology is employed to serve human needs directly, whilst high technology is concerned with high performance and complexity for its own sake; it is motivated by prestige and virtuosity, and seems sometimes only to produce ‘toys’ for scientists or politicians. The second, something of this view has been implied by previous pages, but as a warning againts taking such distinctions too far, for example classifies technology in a different way. Refer to him, Architects more than most technologist ten to be responsive to argument such of innovation ways. [15]. Meanwhile, the “Industry 4.0” means similarly to smart digitally factory devices are linked, and use to communicate to the big data (raw- materials, semi - finished products, many products, kind of machines, tools, robots, and men). The characteristic of “Industry 4.0” are flexibility and efficiency integration of all customers in business process.[16]. Refers to WEF’s, the five million workplaces could be lost in 2020. Due to used the digitalization all industries especially in the modern countries. They will quickly stop the market demand, especially the out off dated technologies. Due to lack of quality and such production they shut down to high costs and inefficiency. The digitalized will have significant impact for the developing countries like Indonesia. They are must be revolutionary change the “way of thinking” in the factory/ the production business. According to Messenger and Smith [17], McMananmon stated there are 4 (four) main reasons related to the Developing countries: (1) The Government’s inefficiency, and the poor of delivery services, (2) to increase their digital skills to avoid

the disparity between modern and developing industries, (3) the decrease of case corruption. For example is the Suffolk University case, they use information and communication technology to increases in order the corruption decreases. Digitalization may be not the possibility anymore, but it’s the necessity of the modern world.

The study is refers to a qualitative research method. By adopted phenomenology research during 2016-2017 then we collected the data related to “*De Tjolomadoe*”. [6]. During the Adaptive Reuse process, “*De Tjolomadoe*” consisted of a duality of process based on a phenomenologically research of Tjahjono refers to Ardhiati [18]. The phenomenologically research itself devided into; (a) traced historical archives, (b) reveal the architectural drawing by learn some archival images. In other hand, the feasibility study conducted by PT Property Tbk itself to handling their investment. During the project there was the complexities problems related both of the process. The main research is to traced the historical data related to architectural drawing archives by searching in several library and intitutional archives such as; *Rekso Pustoko* of Mangkunegaran Palaces Library, National Archives of Indonesia, ANRI, *Het Nationaal Archief* of De Hauge Netherland and several of private library. On other hand, the architecture studio are process to preparing the interior and the museum content based on the archival data.

RESULTS AND DISCUSSION

Result

An “Adaptive-Reuse” of the used sugar factory maker of P.G Colomadu was held on a dual process; (a) by traced the historical archives, (b) revealed the originally architectural drawing, and (c) façade’s reconstruction by harnessing the original drawings and photos. A phenomenological method roles to identify any pre-conceived beliefs and such public opinions, or such notions related to the phenomenon. Researcher “brackets out” any her/ his pre-suppositions during the phenomenon step, in order to unbiased his/ her perspective. During process it needs a phenomenological reduction. In order to isolating the phenomenon, he/ she must separate it from his/ her already known about it as well as the Astana Girilayu’s incident. Then, to identify the original drawing, it requires more time, and patience to reveale the facade’s style.

In early of study, the site's condition was scary, a damaged of construction, the un-recoznized façade, the site already horrible resembling with "The Harry Porter's" studio. It found many vandalism situation. The wall already collapse, the steel construction was already broken, and all machine artifacts un-connected. After six months passed, the originally of architecture documents are founded inside the building. Many of sheet of the blueprint in a torn condition. were created in 1927 was signed by Lindeteves, the prominent builder of Semarang. [19]. Meanwhile, the several of old photographs in the 1861 as weel as the KLTV collections. Several photographs during King's of Siam when he was visiting at factory [20]. Then, all archives are simulated to be "a whole perception". The building façade and it style are identified as Early of Art Deco Style. Meanwhile, "the original side wall" which the giant typo "Anno 1928" was revealed as well as the factory maquette model photograph. Finally, the building has metamorphose from the Tuscany's Style of Neo Classical Indies Colonial Style into the Steel Constructions within The Early of Art Deco Style. The style was identified during the Prince's *Mangkunegara IV* Grandson. The transformation of architectural styles was separated by the Old Building's terrace. Now, it was marked by brick construction traced near the lavatories area.

The industrial 4.0 SDGs in cultural approach of "De Tjolomadoe" is one of the innovation held by created to be a flavor as venue and tourist destination of music shows, cultural events and museum as well as tours destination. The of old sugar factory machinery artifacts is roles as the iconic artifact of museum itself. The gigantic of machineries were conserve a located at the real position. The Adaptive-Reuse of historical building was succesfully held. The new appereance is looks like "A New Building". A singular of sugar factory's chimney tower was elegancy erected in the sky. Its roles as the landmark of the Malangjiwan Karanganyar district area. To adjustment with the mainroad leveling, then Architect of PT Airmas Asri Consultant had added a sunken plaza. Located in front of the New Building and the main road [21]. Inside the building, the gigantis of ancient sugar factory machines has role as iconic artifacts that show the glory of *suikerfabriek*. All artifats were conserved and located in originally place. The giant mechanines were located in several areas, among other; lobby area, corridors, café, and the

convention hall. Because of has historical content, then it has roles as the museum artifacts. There are many facilities inside the New Building, such as museum of "De Tjolomadoe", cafes and thematic restaurants. A primary facility is the Convention Hall with three thousand (3.000) peoples capacities. The giant of sugar factory machine series are located as the "Wow Effect" of the Convention Hall's inside and outside. By placing the objects then the Convention Hall becomes the only unique art space.

Discussion

The historical buildings have great values, not only as landmark or the icon, but it has roles as the memorial places that people identified and interact with. After Adaptive-Reuse project was held the used building of *suikerfabriek* of Tjolomadoe was change to be "De Tjolomadoe". The New Building of "De Tjolomadoe" roles is totally difference with the first. Is "De Tjolomadoe" has suitable with "From Cultural Heritage To Industry 4.0" ? The answered is yes, the old building was sustained even though more than 156 years old (1861-2017). Based on the proofed of the result of study are, among others; (a) the revealed the building's façade as the hybrid of Tuscany's style within the Neo Classial column. It indicated as The Indies Colonial style into the Steel Constructions of Art Deco style in 1928 still alive in recent, (b) An uniqueness moment during in the research proceess. It was revealed "the untold story" is role to enrich the phenomenological in an heritage building, and remind the originally of Javanese Culture's believe that ancestor's still life. "the Untold Story" incident will think hard to rationalized, but it really to enriche the research process in phenomenological method, (c) "De Tjolomadoe" shows the Internet of Thing (IoT) criterias of Industry 4.0 proofed by many facilities are connected with internet, (d) especially "De Tjolomadoe" has suitable with "From Cultural Heritage To Industry 4.0" was shown by the memory collectiveness of the stakeholder surround "De Tjolomadoe" that still remind of "Eyang" Kanjeng Adipati Mangkunegara-IV old messages related to care about the sugar factory. It proofed by evident that Indonesian Government's held to preserve by an Adaptive-Reuse in 2016-2018, (e) by placing the gigantik old sugar mechines artifact inside the Convention Hall becomes the only unique art space, (f) the Museum of "De Tjolomadoe" shows the Old Javanese civilization of sugar factory.

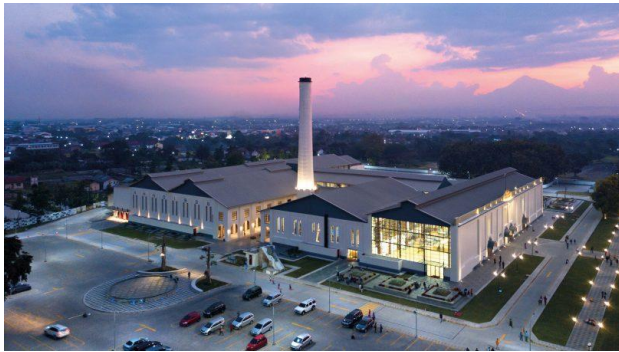


Fig. 1. “De Tjolomadoe” Convention and Heritage after held the Adaptive Reuse in 2017.
(Source: PT. PP Property Tbk, 2018)



Fig. 2. Old documentation of King’s Siam when visited to *Suikerfabriek Tjolomadoe* in 1929 it was revealed the mystery of wall building façade with giant typo “ANNO 1928”
(Source: PT. PP Property Tbk, 2017)



Fig. 3. Millennial Models with the Giant Old Sugar Factory Machines Shows The Glory of *Suikerfabriek of Tjolomadoe*.
(Source: Yuke Ardhiati, 2018)



Fig.4. The Museum inside “De Tjolomadoe” shows the Internet of Thing (IoT) by created the Old Javanese civilization of sugar factory.
(Source: Yuke Ardhiati, 2019)



Fig. 5. The Royal Landscape Corner Within “Glow In The Dark” By An Artificial Intelligent Architecture As Well As Industry 4.0 To Closer With The Millennial Visitors
(Source: “De Tjolomadoe” Instagram, 2019)

CONCLUSION

An Adaptive-Reuse is the way to preserved the heritage building. When “A” New Building façade are revealed after held an Adaptive-Reuse, then the old building is start to life again. “De

Tjolomadoe" case, the New Façade of the heritage building is an Early of Art Deco Style. By a new performance within an a new attractiveness then it role as tourist destination venue. By refers to a combining research innovation and industry 4.0 SDGs approach at the old building may suitable with the elements of Industry 4.0. The New Building performance of "*De Tjolomadoe*" shows the Internet of Thing (IoT) criteria of Industry 4.0, among others; (a) the visually of the museum storyline, (a) *Taman Wakis Wara* or the Royal Landscape within "glow in the dark" concept of artificial intelligent, (c) the visitor may to connect with instagram of "*De Tjolomadoe*" as well as the millennial communities.

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