

The Conservation of Ndalem

As a Part of Sustainability Efforts

The Case Study: Ndalem Tedjokusuman

Gerarda Orbita Ida Cahyandari
 Department of Architecture, Faculty of
 Engineering
 Universitas Atma Jaya Yogyakarta
 Indonesia
idach@staff.uajy.ac.id

Sidhi Pramudito
 Department of Architecture, Faculty of
 Engineering
 Universitas Atma Jaya Yogyakarta
 Indonesia
sidhi_pramudito@staff.uajy.ac.id

Yustina Banon Wismarani
 Department of Architecture, Faculty of
 Engineering
 Universitas Atma Jaya Yogyakarta
 Indonesia
yustina.banon@staff.uajy.ac.id

Abstract—The Conservation process of a traditional building usually experiences several problems relevant to the responsibility, the ownership, the maintenance, and eventually the financial support. These also apply to the case of *ndalems* as Yogyakarta's traditional heritage in which Yogyakarta Special Region declares its important cultural characteristics for the territorial local identity of this special region. The important role of *ndalem* should be supported by the policy of conservation and sustainability. However, in fact, it is difficult to find harmony between conservation and sustainability, because people usually evoke any tangible relevant matters. This paper discuss *ndalem*, in particularly by taking the case of *Ndalem Tedjokusuman* as the main case study, in giving the idea of conservation as a part sustainability effort. The research methods of this paper employ observation, surveys of physical identification, and interview. The analysis applies 3 dimensions visualization to show the category of spaces and building condition. The heirs described the spaces and activities during their past livelihood. The process of 3 D refinements was developed according to this long term memory. Sustainability, within its three pillars, which are social, economy, and environment, can be conducted to *ndalems* by adding culture. *Ndalems* embrace the core of a community. They support each other in term of tangible and intangible contribution. The process revealed that the problem of inheritance will affect the sustainability of *ndalem* as cultural heritage. Problems happen when the community experiences transformation and changes in terms of way of life, relationship, and ownership, which influence the intensive relationship between *ndalem* and its immediate community. Their intensive relationship may experiences either gradual or extreme decrease. However, the public space of a *ndalem*, namely *pendopo*, tends to have stronger sustainable capacity and longer existence. Therefore, conservation attempt shall include a certain radius or area of surrounding periphery of a *ndalem* to be included in conservation process in order to ensure the sustainable goal of a *ndalem* can be fulfilled. The sustainability of cultural heritage, neighborhood, and environment will address the sustainability of activity that involving the immediate community who supported the existence of the aforementioned cultural heritage.

Keywords—*Ndalem*, *Tedjokusuman*, *conservation*, *preservation*, *cultural heritage*, *sustainability*, *tangible*, *intangible*

I. INTRODUCTION

The *Daerah Istimewa Yogyakarta* (DIY) or the Yogyakarta Special Region is a special administrative region in the level of province declared after Sukarno proclaimed the independence of the Indonesian Republic. In September 1945, Sultan Hamengkubuwono IX and Sri Paku Alam VIII acknowledged the Yogyakarta Sultanate as part of the Indonesian Republic and declared their support to the republic. The DIY acquired legal actions related to the special region that was accomplished latterly in Act No. 13 the Year of 2012 on Privileges of Special District of Yogyakarta. [1] The act that determined the autonomy of the local government includes several rights and tasks as follow: the procedure of assignation, duties, and the roles of the governors and vice governor, the institutional affairs, the cultural affairs, the land affairs, and the spatial affairs.

The subjects of the special region include architectural domain, especially in term of spatial and cultural affairs. The local value in this special region territory is usually represented by the original style of local traditional buildings of the region. In other words, the conservation of traditional building is part of the strategy to support the authority of Yogyakarta special region. It is important to determine a building type that reflects the character of Yogyakarta traditional culture and architecture.

One of the obsolete traditional buildings in the Sultanate of Yogyakarta is called *ndalem*. The traditional Javanese buildings recognize the existence of hierarchical building typologies following the existence of hierarchical socio-cultural structure and nobilities of the Javanese society. The *ndalems* fall in the second rank of residential hierarchy after the Palace; as the noblest residence of the Javanese dwelling culture. The *ndalem* housing typology is usually owned by noblemen who are in close affinity with the Sultan. Yogyakarta has 70 *ndalems* located inside and outside the fortress of the Sultanate palace. [2]

However, the official record of the Heritage Listed Buildings of Yogyakarta 2010 only registers 10 *ndalems*, namely *Ndalem Kaneman*, *Ndalem Natatarunan*, *Ndalem Notopranan*, *Ndalem Wironegaran*, *Ndalem Pakuningratan*, *Ndalem Mangkubumen*, *Ndalem Wironegaran*, *Ndalem Ngadiwinatan*, *Ndalem Yudhaningratan*, *Ndalem Jayadipuran*, and *Ndalem Tedjokusuman* [3]. An additional of 8 *ndalems* has just recently been added in the latest record of the Heritage Listed Building enacted by Mayor of Yogyakarta No. 337 in 2017. This latest addition reflects the increasing recognition to the important value of *ndalems* for the cultural preservation and conservation of Yogyakarta from both the government and the citizen, although numbers of *ndalem* are still unregistered.

Ndalem Tedjokusuman is located outside the fortress, Wahid Hasyim Street 525 District of Notopranan, Yogyakarta. The owner has been PT. Gramedia Widya Sarana Indonesia since the 1980s. It is in the list of Heritage National Registration REGNAS[†] : RNCB.20100108.02.000179 within the Law of Permenbudpar No. PM 07/PW.07/MKP/2010. The first owner was G.P.H. Tedjokusumo, the son of Sri Sultan Hamengkubuwono VII. He established a traditional Javanese dance foundation. The architecture of the major part of *Ndalem Tedjokusuman* is still in its original condition. However several minor parts have already experienced a physical deterioration and partial addition.

The *pendopo* of the *Ndalem*, which is functioned as public space, still visually and physically reliable. However, the private rooms are not maintained, dirty, and partially damaged. Until today, the *pendopo* of this *ndalem* still accommodates various public and collective activities, but the rest part of this *ndalem* remains empty without activity. Therefore, the *Ndalem Tedjokusuman* is taken as a case study to explore the nexus of cultural conservation and sustainability effort because this *ndalem*'s physical condition and the role of the immediate community living nearby the *Ndalem* fit to illustrate the initial thesis of this research paper.

According to the latest implementation, the fourth pillar of sustainability, which is culture, has been promoted to address the relationship between conservation and sustainability [4]. In Indonesia, conservation is regulated under the authority of the Ministry of Education and Culture. But sustainability is regulated under the authority of the Ministry of Energy and Mineral Resources, and the Ministry of Environment and Forestry. Although conservation and sustainability policies are under different offices of governance, they have intersection and relationship that are possible to trace by finding compatible factors between sustainability and conservation. The observation on *Ndalem Tedjokusuman* attempts to unravel any relevant factors that influencing the quality of the conservation attempt. By understanding the aforementioned factors, this paper attempts to inform

knowledge on the best practice of sustainability implementation that potential to formulate a better heritage conservation policy.

This paper discusses the already taken efforts that have been done in *Ndalem Tedjokusuman* that contribute to conservation and sustainability. These involve research methods that potentially stimulate information regarding conservation and sustainability by employing interviews and constructing the 3D visualization of the building based on the past to the current condition of the case study. The objective of this paper is to determine the conservation factors that correlate and relevant to support sustainability. These factors can be formulated to support the regulation on the conservation of cultural heritage. This objective underlines the Act no 13 the Year of 2012 in which local value should be maintained through the relationship between conservation and sustainability [1].

II. METHODS

The research methods that are taken to construct this research paper combine qualitative and quantitative approaches. The qualitative methods employ historical interpretive approach that was being analyzed by employing interviews and 2D-3D interactive presentation. The qualitative methods that are taken manage to deliver necessary information to construct the visualization of *ndalem*. By constructing the visualization of *ndalem*, the long-term collective memory attached to the socio-cultural value of *ndalem*, and the spatial experiences in *ndalem* can be visually interpreted. Deep interview captured the imaginary picture of the original situation. This combined methods give opportunity to experience the space of *ndalem* virtually. The quantitative method employ questionnaires to acquire self-assessment values from the immediate community according to the existence of a *ndalem*.

Human is the center of interpretive observation of this research paper. Therefore, the methods that are taken attempt to unravel the meaning behind the activities and the spaces [of *ndalem*] by reconstructing the situation in times [when *ndalem* was still fully occupied] [5]. The interpretive method of this research paper is developed based on data collection and interpretation on the phenomenon that exist [in *ndalem*] [6]. The dynamic analysis of historical interpretative is part of an attempt to visualize and to establish the users' memory of *ndalem*. The digital presentation helps to reconstruct the memory of the inheritance of *ndalem*.

The keywords for the methods of this research paper are intangible and tangible; which comprise data and the role of the community of *Ndalem Tedjokusuman*. On the macro level, the research methods of this research unravel the involvement of the community. On the micro level, this research approach is positioning the building and the former owner as the sources to gain significant data relevant to the past occupation, uses, and appropriation of the *Ndalem*.

III. LITERATURE REVIEW

A. Ndalem

The existence of *ndalems* was in convergence with the history of the traditional kingdomship of Keraton Ngayogyakarta Hadiningrat that was established in 1756. The location of *ndalems* comprised the political, geographical, and the social governance territory given to the relatives of the Sultan. The social governance attached to a *ndalem's* territory was manifested in the existence of *magersari* land-occupation tradition, which representing a mutual dependency between the noblemen and its immediate neighborhood communities. [7] [8]

The building figure and the plan of *ndalem* apparently resemble the tiered form of ancient Javanese Hindu sacred buildings and temples [9]. Each part of the construction resembles the local Javanese values and norms practiced at the time.

A *ndalem* consists of a compound of building masses, and is formed by the main buildings and additional subsidiary areas located centralized in a land plot. The inner main house accommodates private activities and symbolizes the core of the ownership of the compound. This inner main house covers three spaces, namely *pringgitan*, *ndalem*, and *senthong*. The subsidiary space, the *gandok*, comprises of domestic activities and represents a mutual relationship with the immediate neighbors. The main house also has a space to house public and collective activities with the permission from the owner. This space is located in front of the main house and is widely known as the *pendopo*. [10]

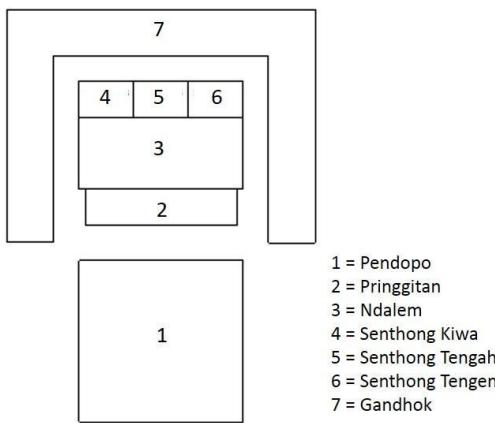


Fig. 1. Schematic Plan of *ndalem*, source: [11]

Numbers of *ndalem* in Yogyakarta have various plans but similar spatial concepts. They had social interaction with the community in relation to the landowner and mutual dependency. The noblemen provided the surrounding yard for community settlement, and moreover, they had given the land to the people. The local people worked in *ndalems* to serve the family without any financial reward. Considering the community and their activities, conservation efforts inevitably cover the certain peripheral area around *ndalems*.

B. Conservation

Conservation is the action that is taken to prolong the life of cultural and natural heritages by preventing them from both gradual and sudden decay and by managing the dynamic changes experienced by the aforementioned heritages. The listing in the legislation in regard to conservation suggests a minimum effective action by conducting regular inspections and documentation, and by developing a town planning and conservative action in order to prevent a particular conserved heritage from inevitable potential decay [12].

Cultural heritage is defined as a record of human civilization with specific characters in each place and materials [13]. Cultural heritage is divided into two aspect of forms; which is tangible and intangible form [14]. Buildings or monuments as tangible heritage must have relation to history and in addition, have good design or aesthetic characteristics.

Conservation of traditional buildings usually has to face obstacles relevant to responsibility, ownership, and maintenance. The need of financial sources is part of the critical burden need to be solved in advance in order to financing the strategy to inject the old buildings with a new function and activities. The favorable recent actions in conservation usually propose adaptive reuse of an old building, either vacant or obsolete, by employing the architectural quality of the building as a valuable heritage [15].

Old buildings are usually located in the city center. Although the area is densely populated; however, the old buildings in this area are frequently vacant and being left-over due to their questionable quality in terms of structural safety. Problems of the city center, such as unemployment, over-density population, outdated infrastructure, old housing, poor services, and facilities, affect the existence of old houses or buildings. However, depopulation and economic decline also frequently exist inside this neighborhood and are followed by deterioration and demolition of traditional houses because the occupants give up the old houses and neighborhoods. Decisions for renovation or gentrification possibly lead to false transformation or displacement. Buildings can be useful by altering the function and reinforcing the structure. The main pillars of adaptive reuse are building preservation, the successful re-use of the building with the new activities and functions, and the successful inclusion of participatory empowerment of the local community in the process of the revitalization of the traditional building. [15] [13]

Regulation of Yogyakarta Special Region No. 6 in 2012 explains about cultural heritage and preservation. The areas of preservation are building, cultural structure, cultural heritage sites, and cultural heritage area. Zoning system is divided into 4 categories namely core zone, buffer zone, development zone, and supporting zone. Asset with high cultural value must be preserved by considering socio-cultural aspects, spatial planning, spatial layout, and original cultural landscape. [16]

C. Sustainability

Sustainable development, according to the “Brundtland Commission”, is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs [17]. The four pillars of sustainability are economic growth, social inclusion, environmental balance, and culture [4].

The concept of sustainable development is frequently associated with the decisions to protect the natural environment than with decisions to preserve the built forms and infrastructures of cultural heritage. However, at least two logical reasons supports the needs to include the preservation and conservation of cultural heritage in a sustainable development approach. First, human always interact with the natural world, and second, people always live in continuous adaptation to its surrounding environment. Therefore, the existence of human civilization is closely connected and depends on the quality of sustainability factors.

Sustainability in cultural heritage viewpoint is close to the meaning of resilience. The discussion shall take into account of vulnerability and adaptation factors. An identification of vulnerability shall go to the next stage, which is relevant to the identification of the characteristics of cultural heritage and its situation in responding to and withstanding to the influence of disaster. A successful adaptation leads to the fulfilment of a correct developmental path and maintenance. Therefore, there is a need to establish a guideline of measurement to evaluate the adaptation quality of cultural heritage. [18]

The relationship among cultural heritage, sustainability, and conservation can be explored in the design of sustainable adaptation planning based on community values and traditional knowledge [19]. Built environmental cultural heritage has significant role in establishing sustainable development. However, to maintain its existence, historical conservation shall incorporate the aspect of socio-economic revitalization into its planning strategy. The success of built-environmental heritage conservation in the perspective of sustainable development deeply relies on the incorporation of various factors. These factors are as follow: the conservation shall generates the increasing economic condition of the immediate neighborhoods and communities; it shall be improving the social interaction and unity of the immediate neighbors, and it strengthens local identity through the recreation of a positive memory. [13]

Collaboration and networking between the government at a different level and location must be conducted based on both municipal master planning and regional planning. Local community are involved in residential development to improve their knowledge, identity, and sense of cultural characteristics. [20]

City renewal is also an act of collaboration between people, planner, architect, and government. Most cities in Indonesia have an ongoing master plan. There are lack of guidelines to look after old and historic building [21] The disruptive changing function, the changing lifestyle of the

societies, the changing demographic tendency, the changing tradition, and the destruction and the replacement of an old construction with the latest ones are amongst the actual thread that usually face the existence of old and historical buildings and the city [22]. Therefore, the process to develop the city and neighborhood masterplans holds the key of the survival of the aforementioned old buildings. Prior to the preparation of a new master plan, an evaluation must be taken by considering the factors of health, safety, livability, and sustainability of an old buildings in a built environment. The reuse of old buildings can support sustainable development principles [23].

IV. RESULT AND DISCUSSION

A. The Tangible Architectural Data of Ndalem Tedjokusuman

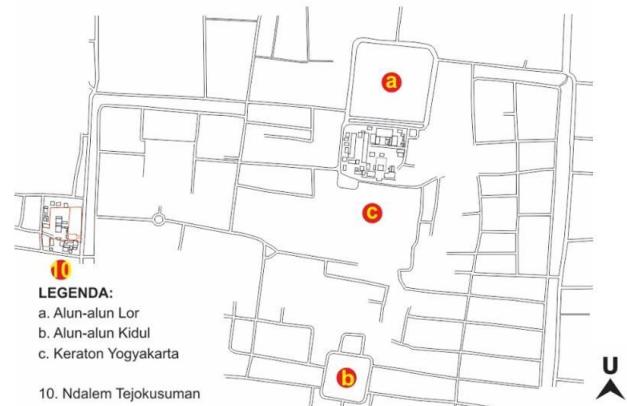


Fig. 2. Location of *Ndalem Tedjokusuman* to Keraton Yogyakarta, source: Author, 2017

Ndalem Tedjokusuman is located extra *muros*, outside the palace-fortress. The Prince Tedjokusuman owned the land from the father. The building is located in the old city of Yogyakarta. The buildings cover 406 sqm on the 9.210 sqm of the site. It still accommodates communal and cultural activities. Back then, it was functioned as a residential house for Tedjokusuma and his family. It was also an alternative place for practicing Javanese dance apart from that of the Sultanate Palace. Therefore, it was also a house for *Krida Beksa Wirama* Foundation which was established on 17th August 1918.

Today, the development and the maintenance of the *Ndalem* encounter many difficulties because the owner and the users are different parties. The owner never uses and never conducts activities in the *Ndalem*. But it is the immediate community who lives nearby the *Ndalem* are the users of the *Ndalem*. The activities take place in the *pendopo* after the owner granted permissions to the users to conduct cultural activities at the *Ndalem*. However, the needs of the community and the concern of the owner [or the authority who regulate the heritage] sometimes are not corresponding. In the past, the occupant of the *Ndalem* was also the owner. However, the heirs could not afford its long-term maintenance expenses even though their loyalties to the place still persisted. Therefore, the building has gradually defected and deteriorated due to its long-term abandonment and lack of sufficient and proper

maintenance.



Fig. 3. *Ndalem Tedjokusuman* a) wooden construction at *Pendopo*, b) View to *Dalem* (private space), c) *Senthong* (private space), source: Author, 2017

Based on the field observation on the physical quality of the *Ndalem*, the *pendopo* remains in a reliable condition. The communal and cultural activities take place in the *pendopo*. However, the *Ndalem* and its private spaces are under maintenance or lack of maintenance. The *gandok* area, which is the rear part of the *pendopo*, is being rented for an office activity and function. Therefore, its façade appearance is renovated in a modern outlook with a humble design by installing a simple form and less architectural details. The *gadri* and other service areas are already ruined. Almost all parts of this *gadri* are barely left, leaving only the part of its foundation. The floor is constructed in raised plastered cement. Initially in its original form, the *pendopo* and the terrace of the *ndalem*, namely *pringgitan*, was guttered by the circulation of the cart. The owner of the *Ndalem*, PT Gramedia, used the *Ndalem* space to store their property. The *pringgitan* was basically divided into three parts that were being functioned as rooms in the right and left, while the center was for the entrance to the private spaces of the *Ndalem*. (Interview to Mr. Tedjo Kaneka)

In regard to the land occupation of the *Ndalem*, the *magersari* system was implemented in the past. The system possibly affected neighborhood community in maintaining the existence of the *Ndalem*. The *magersari* land occupation system was attached to a social tradition, representing the close relationship among the landlord and the servants. The previous owner implemented the *magersari* system by allowing his servants and their families lived in the land plot of the *Ndalem* and at the surrounding immediate neighborhood. In the previous era before the changing of ownership, the Prince likely gave part of his land to be possessed by his subordinates and citizen. Since then, the attachment of the servants to the *Ndalem* was gradually reduced. After the changing of *Ndalem* ownership from the previous owner to the new one, the *magersari* is no longer exist. Today, the major condition of the building experiences decreasing physical quality. Only the part of the building that are frequently being used for activities that remains having a better physical quality.

TABLE I. THE VISUAL ASSESSMENT BASED ON OBSERVATION

The Spaces of the Ndalem	The Evaluation	The Visual Documentation
The <i>Regol</i> : The gate to enter the site	Construction Condition: Intact, sturdy Space: Room for guard Materials: Bricks, iron	

The Yard	Vegetation: Sapodilla tree (sawo kecik, sawo manila), mango tree, and bushes	
The <i>Pendapa</i> : Semi-open space without partition with additional terrace	Construction Condition: Intact, sturdy Space: Without partition, timber columns, additional space for Javanese musical instruments Materials: Timber Function: Social meeting place, Javanese dance	
The <i>Pringgitan</i> : Between the <i>pendopo</i> and the <i>ndalem</i> , attaches to <i>dalem ageng</i> , the foyer of <i>dalem ageng</i>	Construction Condition: Intact, sturdy Space: additional rooms right and left sides, entrance to <i>dalem ageng</i> in the middle Materials: Timber, bricks Function: puppet show, entrance or terrace to the <i>dalem ageng</i>	
The <i>Dalem Ageng</i> : The core of <i>Ndalem</i> , in middle position, and private place	Construction Condition: Intact, sturdy, unclean Space: three rooms called senthong (left, middle, right), wide room in the center Materials: Timber, bricks Function: private meeting room, living room, sitting room	
The <i>Gadri</i> : Space located behind the <i>Dalem Ageng</i>	Construction Condition: defect Space: terrace behind the <i>dalem ageng</i> Materials: Timber, bricks Function: family room, dining room	
Surrounding barrier	Boundary or fence around the site	

B. The Intangible Data of the Community Living In/Nearby Ndalem Tedjokusuman

To collect data and to analyze the intangible aspect relevant to *Ndalem Tedjokusuman*, questionnaires was distributed to the community members living nearby the *ndalem*. The questions are as follows:

1. Age is the age of the participant
2. Length of stay is the duration to live in the area of *Ndalem Tedjokusuman*
3. Family relation is the explanation about the kinship relationship among the participants who filled the questionnaires to the former owner of the *Ndalem*
4. House status is the landowner of the house
5. The role of the participant is to inform the contribution of the participant and their ancestor to the *Ndalem*.

6. Understanding of cultural heritage is the familiarity of the participants of the questionnaires to the concept of heritage

The questionnaires collect information regarding the reliabilities of the *Ndalem* that are analyzed to indicate the intangible sustainability factors of the *Ndalem*. These intangible factors also determine the tangible sustainability factors of the *Ndalem*.

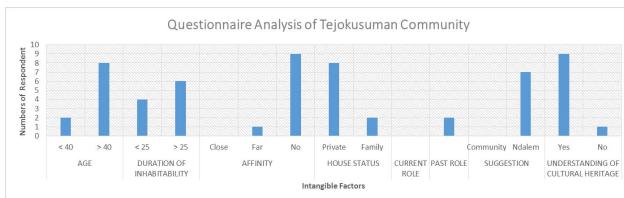


Fig. 4. Questionnaire Analysis of Tedjokusuman Community, source: Author, 2017

The dominant age of the questionnaire's participants is above 40 years-old, which constitute the 80% of the total numbers of the participants. Their age consequently delivers indication that they are emotionally and historically attached to the *Ndalem*. The 60% of these participants have been living there for over 25 years; however, 90% of them have no blood-relation to Tedjokusuma. The participants who own their houses are 80%, while 20% them is friends or relatives. In the fieldwork of this research, the role of the immediate community from various eras in engaging their life to the *Ndalem* is noted and analyzed. The result shows the role of the community declines every year. Today, the community engagements to the *Ndalem* is 0%, while the previous immediate era [that was from the era of the grandparents of today's generation] still had at least 20% of engagement. 70% of the questionnaires' participant that living in the neighborhood of the *Ndalem* offered a suggestion in regard of the sustainability of the *Ndalem*. Based on the analysis on the compilation of the questionnaires, 90% of the participants understand cultural heritage. Therefore, the community raises their voice, saying that the cultural sustainability is also their main concern and it shall be treated as a priority agenda in the policy of conservation and cultural heritage. Nevertheless, 10% of the participants do not understand the aforementioned issue at all.

C. Discussion Sustainability & Conservation

The fourth pillar of the sustainable development principle, that is culture, has a capacity to combine the concerns of both sustainability and conservation [4]. Human and nature are embedded in the core of culture. Therefore, culture has a close affiliation to environment because human interacts with and lives in the nature. This understanding leads to the concept of resilience that incorporates the knowledge on nature and disaster.

The community is indisputably a core of sustainability and conservation. Human factor is embedded in the community, while both human and community shape the culture by responding to the environment. Humans attempt to perceive their environment according to their

community value and traditional knowledge. Culture produces cultural heritage. Community value and traditional knowledge predominantly determine the existence and the value of a cultural heritage [13] [18].

Due to the close entanglement among humans, community, culture and sustainability; taking the historical interpretative method as a tool to analyze the tangibility and the intangibility of cultural heritage and sustainability aspect of *Ndalem Tedjokusuman* in this research is highly relevant. The historical interpretive method is widely used in cultural heritage research. It is also commonly used in conservation and sustainability research to explain interaction between human and its environment in a particular space or place. This method is able to unravel the positive memory of the establishment of a particular place or a built environmental product such as built environmental heritage.

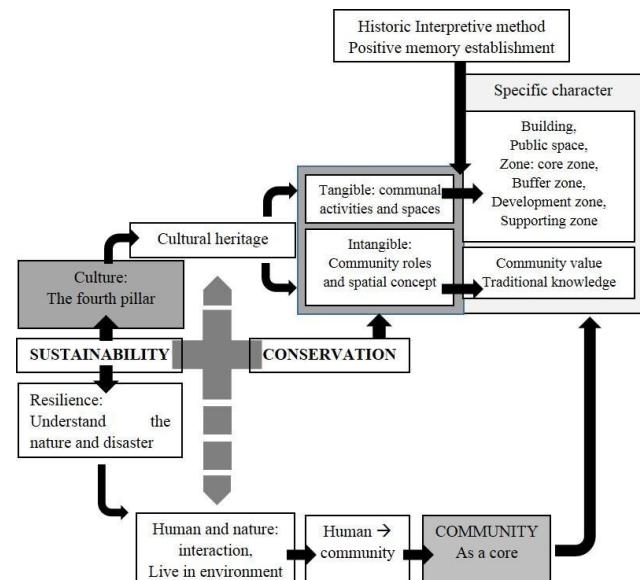


Fig. 5. The Connection between Sustainability and Conservation in the Core of Community, source: Author, 2017

A historical interpretive method in cultural heritage includes an interpretive attempt on the intangible and tangible factors of a cultural heritage subject [14]. Intangible factor is originated from community roles and spatial concepts, while the tangible factor is relevant to communal activities and spaces. Intangible characters cover community value and traditional knowledge. Specific tangible characters cover a more material evident of a culture such as building, public space, and zone. The zone consists of the core zone, buffer zone, development zone, and supporting zone. The concept of intangibility and tangibility fits to the regulation of Yogyakarta Special Region No. 6 in 2012 [16].

D. Lesson Learned from *Ndalem Tedjokusuman*

The community is the core of the nexus between sustainability and conservation. Conservation efforts must involve the community in order to drive the sustainability attempt. Community and its surroundings has a mutual symbiosis, in which altogether they develop a resilient capacity to encounter the future challenges.

Cultural heritage has particular meaning to its community. Initially, *Ndalem Tedjokusuman* was an important part of its immediate community. In the past, the owner [and its family] and the community were dependent to each other. The owner and family were served by the community and the community acquired facilities from the *Ndalem*. In accordance with mutual dependency, the activities of the community gave advantages for the *Ndalem*. Because of the kindheartedness of the owner, particular members of the community received a piece of land from the owner. Since then, the authority of the landlord to its servant decreased drastically along with the decreasing dependency among the owner of the *Ndalem* and its servants and their families. Fortunately, the today's *Ndalem Tedjokusuman* still provides its *pendopo* to be used for communal activities; however, the users and the participants are no longer the family members of the *Ndalem*'s servants or immediate community. They come from everywhere in the city and vitality and value of the *Ndalem* for the citizen remain exist.

The compilation data from this research shows an increasing numbers of private land immediate to the *Ndalem*'s area; and the trend remains increased. On the contrary, the role of the community shows a decreasing tendency. It goes down from lower in the past to an almost zero in the current days. The increasing numbers of the private lands apparently indicate a correlation with the going lower of the role of the community on the existence of the *Ndalem*. However, the increasing knowledge of the city societies on the important value of heritage has delivered an increasing concerns and ideas from the city societies and the immediate community dedicated to suggest the improvement condition of the *Ndalem*, even though these societies/community members seldom have a blood relation to the Sultanate family.

The existence of public activities in *ndalem* always correlated with the availability and the accessibility of the space and the facility of a *ndalem*. The more activities take place in *ndalem*, the more livable the space of a *ndalem*. In the case of *Ndalem Tedjokusuman*, the *pendopo* remains full with various changing activities. Therefore, this *pendopo* has the best condition and maintenance compares to the other *Ndalem*'s parts. The *pendopo* is the only area that is still actively occupied. On the other hand, the rest of the *Ndalem*, including the new constructions area, give lack of contribution to [cultural] sustainability because they are under the private use and control. The building constructions of columns and walls are sturdy and intact, except for roof construction. The major part of the roof construction has to be overhauled, while the architectural elements such as windows, doors, partitions, have to be refurbished or has to be gentrified.

I) Tangible Factors

Tangible factors consist of communal activities and the spaces for those activities. The historical interpretive method employs interviews as tool to develop 2 D (two dimensional) drawing for the presentation of the case study, followed by its 3 D (three dimensional) visualization. This approach has shaped the quantitative data to becoming a tool to visualize the qualitative data.

The former occupant of the *Ndalem*, Mr. Tedjo Kaneka, was able to describe the complete building and its mass based on his positive memory. Media visuals, both 2D and 3D, are useful to deliver the spatial experiences of the *Ndalem* to the ordinary people/reviewer. By combining the positive memory of Mr. Kaneka on the *Ndalem* and the visualization of 2D-3D media, the past condition of the *Ndalem* and its activities, and the usual activities in the *Ndalem* can be visually reconstructed even though some rooms and parts of the building are no longer existed. This method helps the researchers and the existing immediate community of the *Ndalem* to imagine the complete plan of the building in the past and the past activities of the *Ndalem*. This aforementioned combined method also work as a helpful tool to support the prospective conservation idea in a visual media. This combined method also has capacity to illustrate the proposal idea of potential communal activities that are appropriate to be conducted in the space of the *Ndalem*. The visualization of potential future of the *Ndalem* is potentially able to stimulate the willingness of the community to participate in rebuilding the space, the use and the activities of the *Ndalem*.

The measurement of the houses was completed and followed by the development of 3D presentation in a video media. The positive memory of the former inhabitant is visualized through the 3D presentation of the building. The tangible approaches is conducted to understand of the spaces of the case study and its daily uses and realities. The visualization of the *Ndalem* shows each space of the *Ndalem*. The *pendopo* is the public space of the compound, accompanied by the existence of a semi-open space. The zone of the former core is clearly visualized by the existence of *dalem ageng* that works as a private place. However, the core of the *Ndalem* today moves to the *pendopo* due to its significant role as the main space of public activities that remains active. The 3D also constructs the existence of the yard and the gate of the *Ndalem*, which were functioned as the buffer zone. The development zone was the open space located as the part of the yard. Today, the zone is already occupied for an existing building. At the surrounding area of the *Ndalem*, there was a supporting zone that was located beyond the gate and the border. This supporting zone was occupied by the servants and their families of the *Ndalem* for living nearby their master. This way of living together and apart is called *magersari*. *Magersari* way of living is unique to Javanese culture; it develops and maintains positive memory and attachments among the noblemen and the subordinates and their families. This way of life also build a strong attachment to the *Ndalem*.

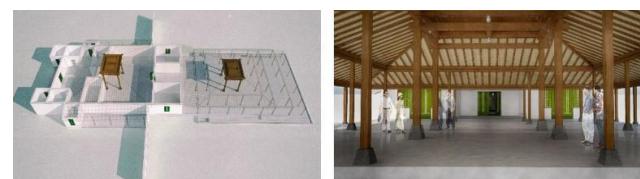


Fig. 6. 3 D Video Presentation in selected shots of *Ndalem Tedjokusuman*, source: Author, 2017

2) Intangible Factors

Intangible factors consist of community role and spatial concept. The factors also perceive a community value and traditional knowledge as significant assets. The role of the community is actions or activities demonstrated by a group of people to serve *Ndalem Tedjokusuman*. This community involvement considers to be a part of valuable asset of intangibility quality. A mutual dependency existed between the former owner and the community. The former owner allowed people to use a piece of land in his property, while in returned the people gave their loyalties to the owner. After the former owner gave the pieces of his lands to be personally possessed by each individual member of his former servants, the dependency of the community to the *Ndalem* was gradually reduced. The attachment and the engagement of these immediate community and its people to the *Ndalem* gradually vanished through times. Moreover 80% of the community have no blood relation although already live for more than 25 years in the neighborhood. It means that community roles and community value are very low. However, high understanding about heritage awakes the community to give suggestions about the preservation of the *Ndalem*.

Traditional knowledge in terms of spatial concept means knowledge about the house which has been accumulated, used, and passed down through generations with respect to natural surroundings community. The specific characters of *ndalem* as cultural heritage consist of the concept of spatial, concept of form and construction, and the concept of function.

Briefly, all concepts are similar among *ndalems*, concept of spatial comprises sacred and profane spaces, starting from the center of *dalem ageng* which is *senthong tengah*, and then go down to the *pringgitan*, *pendopo*, *gadri*, and *gandok*. The concept of form can be seen horizontally and vertically. Horizontal view apparently resembles the centric cosmos, while vertical view apparently resembles the steps of hierarchy. The specific construction is located in the *pendopo* and *ndalem* with four main columns called *soko guru*. The functional is organized by the private space in the core, then the privacy level is gradually decreased to public space at the peripheral spaces.

V. CONCLUSION

The fourth pillar of sustainable development which is the culture eventually diverges to be tangible and intangible factors. The sustainability of conceptual value will endorse sustainability of activity that involves the community, and eventually, both will address the sustainability of the built environment.

The contribution of *Ndalem Tedjokusuman* in conservation and sustainability was already pioneered by the heirs of *Tedjokusuman* by maintaining the existence of public activities in the *pendopo* of the *Ndalem*. The 3D visualization method helps to understand the space of the *pendopo* and its changing uses through times. Conducting this 3D method is a part of developing a conservation and sustainability actions on the *Ndalem*. The case study of *Ndalem Tedjokusuman* provides a valuable lesson relevant

to the useful methods of positive memory to rebuild the space and situation. Tangible and intangible efforts are actually a singular entity. Altogether, they formulate the holistic process of understanding, following the substance of cultural heritage, leading to find the subject's embedded meaning. In order to understand the intangible meaning of the cultural heritage subject, the process to dig the understanding begins from understanding its tangible matters. The process of conservation undergoes from its tangible to its intangible aspect/understanding. On the other hand, the process of sustainability starts from intangible aspect, which is from the conceptual approach, to tangible aspect, which is to the built environment.

The existence of heritage or cultural building, on the one hand, is very much depending on the government regulation and public commitment. On the other hand, its existence is also very much depending on the concerns and the vision of its owner and the heirs of the object. The owner of a cultural heritage has rights and capacity to alter the function of a *ndalem* in any periods of time. However, the attachment and the engagement of the community shall be maintained forever. The community shall maintain four important aspects; namely activity, role, understanding, and visit; in order to sustain the relationship between a *Ndalem* and its immediate community. The periphery of a *ndalem* in contemporary era follows its existing zoning division, which emphasizing the concept of public domain.

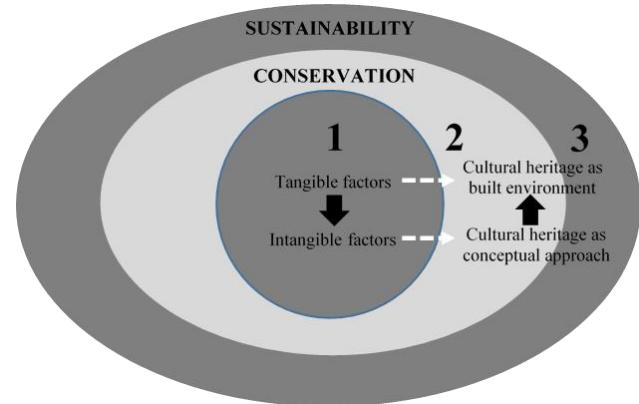


Fig. 7. The Process of Conservation for Sustainability, source: Author, 2017

Sustainable development requires decision making that recognizes the relationship between human actions and their influences on the environment, economy, and society. Heritage is our past that have been preserved for the present and it shall be inherited to the future generations.

The value of heritage is conceptualized by the meanings attached from the past to the present. The knowledge of heritage is defined by a particular social, political and cultural contexts. Heritage is not about the past; it is about understanding today and the future. Government must constitute the boundary of change in the building. Responsive community are willing to change and understand the change through appreciation of the past in the new way of life and needs.

Acknowledgment

The research for this paper is funded by the Ministry of Research, Technology and Higher Education of Indonesia. Special thanks is given to Mr. Tedjo Kaneka who provided access to collect data and information; and is representing the heir of *Ndalem Tedjokusuman*. He had also invited the researchers to participate in the public activity of Krida Beksa Wirama Foundation. Thanks to the support from The Office of Research and Public Service, Universitas Atma Jaya Yogyakarta; as the realization of this research and its extended second-year fund could only be conducted due in part of the support of the Faculty of Engineering UAJY.

VI. REFERENCES

- [1] Kementrian Dalam Negeri Republik Indonesia, *Keistimewaan Daerah Istimewa Yogyakarta*, Jakarta, 2012.
- [2] Ikaputra, "A Study on the Contextuallity of the Palace Environment," Osaka University, Osaka, 1993.
- [3] G. O. Ida Cahyandari, S. Pramudito and F. P. D. Putra, "Strategi Perkuatan Peran Bangunan Ndalem sebagai Keistimewaan Yogyakarta (DIY)," Universitas Atma Jaya Yogyakarta, Yogyakarta, 2016.
- [4] Unites Cities and Local Governments, "Culture: Fourth Pillar of Sustainable Development," Institut de Cultura, Barcelona, 2010.
- [5] S. MacDonald and N. Headlam, *Research Methods Handbook*, Manchester: CLES, 2009.
- [6] A. Bhattacherjee, *Social Science Research: Principles, Methods, and Practices*, 1st ed., Florida: University of South Florida, 2012.
- [7] A. B. P. Wirymartono, *Seni Bangunan dan Seni Binakota di Indonesia*, Pertama ed., Jakarta: PT. Gramedia Pustaka Utama, 1995.
- [8] A. Surjomihardjo, *Kota Yogyakarta 1880-1930 Sejarah Perkembangan Sosial*, Yogyakarta: Yayasan untuk Indonesia, 2000.
- [9] Djono, T. P. Utomo and S. Subiyantoro, "Nilai Kearifan Lokal Rumah Tradisional Jawa," *Humaniora*, vol. 24, no. 3, Oktober, pp. 269-278, 2012.
- [10] S. Pramudito, G. O. I. Cahyandari and V. R. V. Surya, "Analisis VGA: Sebuah Pendekatan untuk Membaca Nilai Integrasi Ruang pada Bangunan Yogyakarta," in *Prosiding Seminar Heritage IPLBI 2017*, Cirebon, 2017.
- [11] G. O. Ida Cahyandari, "Tata Ruang dan Elemen Arsitektur pada Rumah Tinggal Jawa di Yogyakarta sebagai Wujud Kategori Pola Aktivitas dalam Rumah Tangga," *Jurnal Komposisi*, vol. 10, no. 2, pp. 103-118, 2012.
- [12] B. M. Feilden, *Conservation of Historic Buildings*, London: Architectural Press, 2003.
- [13] M. G. ÇÖTELİ, "Renewal and Rehabilitation Projects of Historic Town of Tavlusun," *Megaron*, vol. 11, no. 2, pp. 551-564, 2016.
- [14] S.N.Harun, "Heritage Building Conservation in Malaysia," *Experience and Challenges*, vol. 20, pp. 41-53, 2011.
- [15] A. Botros, "Towards the Comprehensive and Systematic Assessment of the Adaptive Reuse of Islamic Architectural Heritage in Cairo," *Journal of Cultural Heritage Management and Sustainable Development*, vol. V, no. 1, pp. 14-29, 2015.
- [16] A. Suprapti, S. Kim, E. E. Pandelaki and S. W. Firmandhani, "A Spatial Dialogue of Heritage Village Between Kauman in Semarang and Seochon in Seoul Toward Preservation Development," *Journal of Architecture and Urbanism*, vol. 42, no. 1, p. 16–23, 2018.
- [17] United Nations, "Report of the World Commission on Environment and Development: Our Common Future," United Nations, Geneva, 1987.
- [18] G. O'Brien, P. O'Keefe, J. Jayawickrama and J. R. , "Developing a model for building resilience to climate risks for cultural heritage," *Journal of Cultural Heritage Management and Sustainable Development*, vol. V, no. 2, pp. 99-114, 2015.
- [19] S. Fatorić and E. Seekamp, "Are Cultural Heritage and Resources Threatened by Climate Change? A Systematic Literature Review," *Climate Change*, vol. 142, no. 1-2, May, p. 227–254, 2017.
- [20] T. Skjeggedal and K. Overvåg, "Cultural Heritage Management and Local Development in A South Sámi and Norse Mountainous Borderland," *Norsk Geografisk Tidsskrift–Norwegian Journal of Geography*, vol. 71, no. 1, p. 30–45, 2017.
- [21] S. P. N. Febriyanti, "Documenting Living Monuments in Indonesia: Methodology for Sustainable Utility," Strasbourg, France, 2013.
- [22] I. Adrisijanti, "Kota Yogyakarta sebagai Kawasan Pusaka Budaya, Potensi dan Permasalahannya,"

- Diskusi Sejarah " Kota dan Perubahan Sosial dalam Perspektif Sejarah", 11-12 April, Yogyakarta, 2007.
- [23] P. F. Cherchi, "Adaptive Reuse of Abandoned Monumental Buildings as a Strategy for Urban

Liveability," *Athens Journal of Architecture*, vol. 1, no. 4, pp. 253-270, October 2015.