2019 KNUCH UNESCO Chair International Conference



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# part 1

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Traditional Gold Leaf in Myanmar

-Research on Materials and Techniques in Asia-Pacific Regions Survey of Weaving Technique on the Vietnam Border Region A Survey and Scientific analysis of natural adhesives in Myanmar The Construction of Database for Asia-Pacific Traditional Materials and Technique -DB Construction for Asia-Pacific Traditional Materials and Technique

# Traditional Gold Leaf in Myanmar - Research on Materials and Techniques in Asia-Pacific Regions

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Gold leaf is an ornamental material used in various fields, including architecture, painting and crafts, and religious art, regardless of whether it is from the East or the West. Although it has been used in various types of Buddhist statues, paintings, and textiles in Korea, its craftsmanship production has been cut off. Therefore, it is necessary to study the techniques, materials, and tools of handmade gold leaf for restoring and reproducing traditional one.

"Myat Par Yat," located in Mandalay, Myanmar, is an area packed with handmade gold leaf workshops. It produces gold leaf of 100 percent purity through intensive manufacturing processes, sold throughout Myanmar, widely used in buildings, crafts and cosmetics. In particular, it is used mainly to decorate Pagoda, the important Buddhist structure of Myanmar, where Buddhists visit Pagoda to put the gold leaf on the Buddha statue and offer worship services."

In Myanmar, only men gild Buddha statue.

Thus, gold leaf is closely related to the religious life of Myanmar people. Today, however, handmade gold leaf faces a number of problems, including the import of machine-made gold leaf and the operation of unstable workshop caused by rising gold price.

Myanmar's handmade gold leaf is an important intangible cultural heritage that must be maintained and preserved because it is built with traditional tools, materials and unique technique. But now Myanmar lacks state or government-level support for intangible cultural heritage. Therefore, continuous and systematic research, studying and archiving of these materials should be used to leave a record of handmade gold leaf and its craftsmanship to be passed on to future generations.

Furthermore, based on this, we will prepare basic data for use in the restoration and reproduction of Korean craftsmanship manufacturing technique.

#### I Introduction

#### 1. Purpose of research

Gold leaf is a very important decorative material that has long been used for religious purposes, as well as for symbolic values of royal authority and dignity. Therefore, it can be easily found in many relics and cultural heritage such as royal relics, religious artworks, and architectures.<sup>2</sup>

It is also easy to find various examples of gold leaf used in relics of paintings, royal robes, and Buddha statues in Korea, including Cranes and Peaches (Haehakbandodo in Korean)(pair of sixfold screens, the Honolulu Museum of Art in the U.S.), National Treasure 119, Gilt-bronze Standing Buddha with Inscription of "Yeonga Chilnyeon"(the National Museum of Korea) and Ceremonial Robe of the Consort of Imperial Prince Yeong (the National Palace Museum of Korea).

Gold leaf is thin gold sheet that is mainly used for gilding. Gilding is any decorative technique for applying a very thin coating of gold to solid surfaces such as metal (most common), wood, porcelain, etc.

However, there are no specific records of the nation's traditional gold leaf, making it difficult to restore and reproduce traditional techniques as the tools and techniques used in handmade gold leaf manufacturing are different from before.



Myanmar is a leading Buddhist country, its Buddhist architectures such as Shwedagon Pagoda and Mahamuni Pagoda, and the wall decorations are world-famous. Also, its art craft using gold, such as guilt Buddha statue and lacquer ware with the Shwe zawa technique<sup>®</sup>, has advanced.

- Cranes and Peaches (Haehakbandodo in Korean) (pair of six-fold screens, the Honolulu Museum of Art in the U.S.)
- National Research Institute of Cultural Heritage. Revitalizing Korean Cultural Heritage around the World, Selected Reports on Overseas Korean Collection Conservation Projects. n.p.: National Research Institute of Cultural Heritage, 2015. p.32
- Pic 2 (left) National Treasure 119, Gilt-bronze Standing Buddha with Inscription of "Yeonga Chilnyeon"(the National Museum of Korea)
- Pic 3 (right) Ceremonial Robe of the Consort of Imperial Prince Yeong (the National Palace Museum of Korea)
- "Gilding technique: drawing a pattern on a lacquerpainted surface and carving with a very thin needle, then attaching a gold leaf or gold powder with the lacquer and drying for 24 hours." Ina Kim. "Myanmar Lacquerers:

Their Historical Tradition and Sociocultural Meanings." The Southeast Asian Review 20 no.1 (2010): 181-210.

Pic 4 Shwedagon Pagoda Pic 5 (right) Applying gold leaf on lacque rware with Shwe zawa technique

G the above paper, p.189

Pic 6 Myanmar gold leaf

Based on this culture, a large amount of gold leaf is produced and distributed, especially Mandalay is a major producer of handmade gold leaf. It is actively used in various fields, including religious buildings, religious events, crafts and cosmetics, and is still produced in traditional ways.



Therefore, through the field research of Mandalay, Myanmar, it's aiming to prepare systematic data on the craftsmanship manufacturing techniques so that they can be used as basic data to compare and study differences from the reality of Korea's gold leaf manufacturing, and to restore the lost craftsmanship technique.

#### 2. Method of research

There is a district that handmade gold leaf workshops are clustered in Mandalay which is called Myat Par Yat. This is the birthplace of country's gold leaf industry and the center of handmade gold leaf sold throughout Myanmar. The field research mainly carried out in King Galon and Aung Tagon, two representative workshops of Myat Par Yat, photographing to record. At the same time, Thindar Htwe Win(professor, the University of Mandalay), Zin Mar(professor, Yadanabon University) interviewed spoke on the gold leaf industry overall in Myanmar: the gold leaf manufacturing methods, its features, tools and the current situation etc.

Subject	Handmade Gold leaf in Myanmar	Table 1	Outline of research
Date	August 5th 2019(Mon.) ~ August 15th 2019(Wed.)		
	(10days 9nights)		
Cooperation	Intangible Cultural Heritage Center Asia -Pacific		
	University of Mandalay, Myanmar		
	King Galon Gold Leaf Workshop, Myanmar		
	Gold Leaf Aung Tagon, Myanmar		
Participant	Korea National University of Cultural Heritage,		
	Graduate School of Cultural Heritage,		
	Department of Heritage Conservation and Restoration.		
	Sanghyun LEE(Professor in Dept. of Heritage Conservation		
	and Restoration)		
	Jeeyeon KIM, Hyesu PARK, Sehee SONG(Degree Program in		
	Cultural Heritage Conservation)		

Content	Detail	Site and Method	Table 2	Method of research
Range of use	• Myanmar gold leaf • Korean gold leaf	• Site -Myat Par Yat		
Manufacturing Process	<ul> <li>Handmade manufacturing process</li> <li>Materials</li> <li>Tools</li> </ul>	- (King Galon, Aung Tagon) -Yangon National Museum -Pagodas		
Current Situation	• Myanmar gold leaf industry • Korean gold leaf industry	- • Method -Internet -Interview		
Preservation of gold leaf	• Ways to preserve traditional gold leaf	-Visit -Photo shoot		

Date	Region	Visit	content	Table 3	Schedule of field research
5th Aug.	Incheon Yangon		- Depart from Incheon - Arrive in Yangon		
6th Aug.	Yangon Mandalay	Mahamuni Pagoda	- Depart from Yangon - Arrive in Mandalay		
7th Aug.	Mandalay	University of Mandalay King Galon workshop	<ul><li>Interview with professors</li><li>Visit workshops for</li></ul>		
8th Aug.	Mandalay	Aung Tagon workshop Gold ribbon shop	research on gold leaf manufacturing process		
9th Aug.	Mandalay	Aung Tagon workshop	and tools		
10th Aug.	Mandalay Bagan	Aung Tagon workshop Other small workshops	_		
11th Aug.	Bagan	Lacquer ware workshop Pagodas	- Depart from Mandalay - Arrive in Bagan		
12th Aug.	Bagan Yangon	Ananda Temple Shwesando Pagoda			
13th Aug.	Yangon	Shwedagon Pagoda	- Depart from Bagan - Arrive in Yangon		
14th Aug.	Yangon	Yangon National Museum	- Arrive in Incheon		

Gold Leaf in My

#### II Traditional Myanmar Gold Leaf

#### 1. Range of research 1) Country and region



Mandalay(မနတလး), Myanmar(မန်မာ) is selected for the 2019 UNESCO Asia-Pacific Research on Traditional Materials Myanmar. It is located between

Myanmar is a leading Buddhist country with a strong Buddhist faith, with the composition of its members accounting for 89.4 percent of the population as well as historical sites and cultures. The Buddhist history of Myanmar is more than 2,000 years old, with a high proportion of monks among the population, and about 500,000 monks in Myanmar, and about 10 percent of Myanmar's total population as of 2019. There is a high percentage of household income spent on religious life. Also, gold leaf is a representative cultural offering to Buddha by worshipers. Myanmar

Gold leaf has been developed in the care of Myanmarese over a long period of time along with Buddhist history. The Myat Par Yat in Mandalay, Myanmar, is main area where gold leaf production is concentrated and

the Indochina Peninsula and the Indian Continent in Southeast Asia.

Geographical location of Mandalay (©google maps)





Pic 13 Lacquer ware workshop in Bagan

the technique is being transfered. Thus, the field research focused on Mandalay, Myanmar, and also conducted touring the Pagodas and Yangon National Museum in Yangon and lacquerware workshop in Bagan in order to understand their culture and actual examples.



Applying gold leaf on the Buddha statue

**6** "A washout ceremony in The Buddhist Statue of Mahamuni Temple ." EBS Clip Bank (https://clipbank.ebs.co.kr/ clip/view?clipId=VOD\_201709 10 00125)



Pic 9, 10 Yangon National Museum

13

#### 2) Brief information of Myanmar

Myanmar, officially the Republic of the Union of Myanmar(ပြည်ထာော်စ် သမ္မ မတ မန်မာနို င်ထံတင်ာ)is a country in Southeast Asia. Myanmar is bordered by Bangladesh and India to its northwest,



Myanmar national flag

Pic 14

China to its northeast, Laos and Thailand to its east and southeast, and the Andaman Sea and the Bay of Bengal to its south and southwest. With a size of 676,578 square kilometres (261,228 square miles), Myanmar is the largest of the Mainland Southeast Asian states by area. As of 2017, the population is about 54 million. Its capital city is Naypyidaw, and its largest city is Yangon(Rangoon). Myanmar has been a member of the Association of Southeast Asian Nations(ASEAN) since 1997.

Early civilizations in Myanmar included the Tibeto-Burman-speaking Pyu city-states in Upper Burma and the Mon kingdoms in Lower Burma. In the 9th century, the Burma people entered the upper Irrawaddy valley and, following the establishment of the Pagan Kingdom in the 1050s, the Burmese language, culture and Theravada Buddhism slowly became dominant in the country. The Pagan Kingdom fell due to the Mongol invasions and several warring states emerged. In the 16th century, reunified by the Taungoo dynasty, the country was for a brief period the largest empire in the history of Mainland Southeast Asia. The early 19th century Konbaung dynasty ruled over an area that included modern Myanmar and briefly controlled Manipur and Assam as well. The British East India Company seized control of the administration of Myanmar after three Anglo-Burmese Wars in the 19th century and the country became a British colony. Myanmar was granted independence in 1948, as a democratic nation. Following a coup d'état in 1962, it became a military dictatorship under the Burma Socialist Programme Party.

For most of its independent years, the country has been engrossed in rampant ethnic strife and its myriad ethnic groups have been involved in one of the world's longest-running ongoing civil wars. During this time, the United Nations and several other organizations have reported consistent and systematic human rights violations in the country. In 2011, the military junta was officially dissolved following a 2010 general election, and a nominally civilian government was installed. This, along with the release of Aung San Suu Kyi and political prisoners, has improved the country's human rights record and foreign relations, and has led to the easing of trade and other economic sanctions. There is, however, continuing criticism of the government's treatment of ethnic minorities, its response to the ethnic insurgency, and religious clashes. In the landmark 2015 election, Aung San Suu Kyi's party won a majority in both houses. However, the Burmese military remains a powerful force in politics.<sup>®</sup> The current president(2019) is Win Myint.

 "Myanmar" Wikipedia (https:// en.wikipedia.org/wiki/ Myanmar)

#### 2. Contents of research 1) Pre-research

UNESCO Chair program aims to develop a network and mutual understanding with recipients of the program with enhancing Asia-Pacific Cultural Heritage preservation.

Based on these goals, it is deemed necessary to research for Korean traditional gold leaf crafts in order to bring Myanmar gold leaf technique into Korean gold leaf restoration. The next pages will touch on 'Geumbakjang', intangible cultural heritage in Korea, and gold leaves which are found in paintings and documents prior to field research.

#### (1) Myanmar gold leaf and workshops

A preliminary study confirmed that Myanmar's gold leaf is a very important traditional industry, as it is used in the construction of Pagoda

Mandalay's Handmade Gold Lea

Gold leaf making business faces competition, disruption

and crafts in connection with Buddhism, the national religion. However, data on gold leaf production was mostly about manual gold-beating in Myanmar, the place was limited to the King Gallon workshop. There were difficulties in finding additional data, but with the help of Myanmar's National Intangible Cultural Heritage Center, it was able to get an overview of the area of the "Mugt Par Vat" and the state of M

"Myat Par Yat" and the state of Myanmar traditional gold leaf industry.

Pic 15, 16 Articles on the state of Myanmar traditional gold leaf industry

(up) Mandalay's Handmade Gold Leaf Industry Under Threat, The Irrawaddy, 2014 (https://www.irrawaddy. com/features/mandalayshandmade-gold-leafindustry-threat.html)

(down) Gold leaf making business faces competition, disruption, MYANMARTIMES, 2018 (https://www.mmtimes. com/news/gold-leafmaking-business-facescompetition-disruption.html)

15

#### (2) Korean traditional gold leaf crafts

Gold was the most convenient, safe commodity, having the invariability that did not change over time.<sup>(9)</sup> It has symbolized the Owng Kim The wealth and power of the rulers. Humans have made various ornaments based on these natures of gold and expressed p.292. the sense of life and art.

Scythian gold from the Hermitage, Chosunilbo, 1991.

Jungmi Kim. "A study of gold applied in the fabric." M.A. degree, Graduate school of Ehwa Womans University, 2001. p.1.

The Korean people also valued gold, and the methods and scope of its use were very pioneering. It can be found through various works of art<sup>®</sup> such as National Treasure 87, Gold Crown form Geumgwanchong Tomb(Gyeongju National Museum), National Treasure 90, Gold Earrings(the National Museum of Korea), Gold Earrings from Gongju.

An example of a paper cultural asset is 'Nanggeumji'. It is a paper decorated with gold leaf, which was imported mostly from China in the past. It was used in many art works such as Self-praise of Mukso Geosa Written by Kim Jeong-hui(the National Museum of Korea), Butterflies and Flowers draw by Nam Gye-u(the National Museum of Korea).



Pic 17 (left) National Treasure 87 Gold Crown form Geumgwanchong Tomb (Gyeongju National Museum)

Pic 18 (right) National Treasure 90, Gold Earrings (the National Museum of Korea)



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- Pic 19 Gold Earrings from Gongju, South Korea
- "the Essence of Baekie" Craftsmanship… Gongju Sukchon-ri Ancient Tombs-Gun gold Earrings" Chungcheong Today, last modified n.d., accessed Dec ,2019, http://www.cctoday. co.kr/news/articleView. html?idxno=2038622
- Pic 20 Self-praise of Mukso Geosa Written by Kim Jeona-hui (the National Museum of Korea)



1) National intangible cultural heritage in Korea'Geumbak jang'(Gold Leaf Imprinting)



Pic 22 (left) Late Deok-hwan Kim (03.14.1935-10.10.2019) National intangible cultural heritage No.119, Geumbakjang

Nam Gye-u, Butterflies and Flowers (the National

Museum of Korea)

(right) Ki-ho Kim, Pic 23 National intangible cultural heritage No.119, Geumbakjang

Today, Geumbakjang is the master or the technique of printing letters or patterns on a fabric with thin gold leaf. The names, gold leaf and Geumbakjang, are first identified in the records of the Goryeo Dynasty. Until the Joseon Dynasty, Geumbakjang meant nothing more than a master of making gold leaf and the gold leaf meant a material itself. In modern times, however, the machine-made gold leaf became common, in fact, the technique of handmade gold leaf has been cut off, Geumbakjang actually does not mean a master of manufacturer.

#### ② Traditional gold leaf manufacturing process on record

First, prepare pure gold or the combination of gold and silver by 8:2. Place gold on an anvil and beat it for three days with a hammer to make it thin.

Second, put pieces of gold(2x2cm, 1000 sheets) between each sheet of black paper(15x15cm, 1,100 sheets), then wrap the package with a sheet of paper, and then beat it. The first day, only beat the center of the paper, but from the second day, have to beat all around for three days. Should be careful not to let a hole.

Third, divide gold leaf into quarters with a bamboo knife.

Fourth, cut the very thin white paper into 1/4 the size of the black paper.

Fifth, make 10 sheets package with thin strips made of the white paper.

Currently, the pure gold gourd used by Geumbakjang uses machinemade ones in Korea.

#### 2) Field research

#### (1) Interview

Based on pre-research, the interview was conducted with local experts and workshop officials in myanmar. The questions are below:

#### <Questions>

Where do you get the gold ?
Is there a standard for gold leaf quality?
Does the use of gold leaf vary depending on the quality of the gold leaf?
What is the difference between handmade and machine-made gold leaf?
Why maintain the handmade gold foil production debate?
Where are the tools for manual work from?
Is there a record of handmade gold leaf techniques?
Is there government support to maintain traditional industries such as handmade gold leaf?

· Are the trustees of the Shwedagon Pagoda related to government officials?

Through the interview with Thindar Htwe Win(professor, University of Mandalay), Zin Mar(professor, Yadanabon University), it is told the detailed stories about the controversy over the decision to use the machine-made gold leaf by Shwedagon Pagoda in 2014, the crisis which the traditional gold leaf industry is facing, and the difficulties in running a workshop due to rising gold prices. Also, from Aung Tagon, the president of the workshop, it was able to obtain information and base data on the differences between handmade and machine-made gold leaf.



#### 1) State of traditional gold leaf industry

There are some factors that threaten Myanmar's traditional gold leaf industry: The reduction in the number of workers due to hard labor and low wages, the unstable operation and maintenance of workshops with a rise of gold price and the influx of machine-made gold leaf.

Among other things, the influx of machine-made gold leaf was decisive to the traditional industry. Since 2014, the situation has become even more difficult, as more and more people have imported and used machine-made one from Thailand and China.

Myanmar's Pagoda has been decorated with handmade gold leaf made of pure 100 percent gold, but after the import of the machinemade gold leaf, the trustees of Shwedagon Pagoda decided to repair it using the machine-made. Most of the entire gold leaf industry is used for the construction and repair of Pagoda, which foretold a sharp drop in demand for handmade gold leaf if it no longer uses it. In response, people in Myanmar voiced concern that the use of the machine-made may undermine the value of the pagoda in the future and cause a threat to the gold leaf industry, and as a result, the trustees of Shwedagon Pagoda withdrew its decision to use the machine-made gold leaf.

In addition to these problems of machine inflow, the soaring gold prices (during local survey in August 2019) caused the temporary shutdown of many of the small workshops in Myat Par Yat.





Pic 26, 27 Temporary closed workshops in Myat Par Yat

Pic 24, 25 Interview with professors

#### ② Handmade vs Machine-made gold leaf

<Table 4> shows the reason why the gold leaf craftsman insist that handmade gold leaf should be used.

	Handmade	Machine-made	Table 4	Handmade vs Machine-
Pros	· Pure 100% of gold · Persistent · Lustrous	· less price (39,000Kyat/100sheets)		made gold leaf
Cons	·pricey (43,000Kyat/100sheets)	• Mixed with chemical materials • Less persistent • Less lustrous		

Handmade gold leaf is made of pure 100 percent gold, but machinemade gold leaf is made by mixing 18k gold with chemical materials, which is inferior to the handmade. Also, the polishing, weight, and duration of the gold leaf vary depending on the content of the gold.

1yun LEE | Je

KIM | Hyes





- (left) the difference of luster between handmade(left) & machine-made gold leaf(right) (©Aung Tagon)
- Pic 29 (right) the difference of luster between machinemade(left) & handmade gold leaf(right) (©Aung Tagon)
- ODSeg
   005eg
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   137000
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   0

   BIDB35
   0
   0
   0

   BIDB35
   0
   0
   0
- Pic 30 the weight difference between handmade gold leaf(loft) & machine-made gold leaf(Right) - after make gold leaf to pill. (©Aung Tagon)

In the pictures above, the difference between the handmade and the machine-made gold leaf is obvious: visual difference in luster, 1.1 mg difference in weight and uncertain content of pure gold used in the machine-made. Also, the machine-made attached to Pagoda with lacquer was found to fall off the surface 3 years later.

#### (2) MYAT PAR YAT

"Myat Par Yat" is the name of the area where the gilt workshops are clustered in Mandalay. Mandalay is the birthplace of Myanmar's gold leaf industry. Gold leaf made at the Myat Par Yat is sold throughout Myanmar, and is used in Pagoda and lacquer ware, medicine and cosmetics. Currently, there are about 134 workshops on a large and small scale.



#### **1 KING GALON**

King Galon Gold Leaf Workshop is the largest one in Myat Par Yat, and Mandalay's signature workshop. Located on the main street in the center of Mandalay, it is most popular among foreign media and tourists because it is more accessible than other workshops and can be easily found through Internet.

It also has a showroom with materials and tools of handmade gold leaf for free, helping to understand the overall process. In particular, it runs an experience program for tourists and sells gold leaf as a souvenir. It operates a shop in the capital city of Yangon as well, focusing on the tourism industry along with the gold leaf distribution.

With the democratic government in Myanmar in 2016, an exhibition of cultural heritage was held in Yangon as part of efforts to develop and maintain cultural heritage. King Galon was invited to the Cultural Heritage Exhibition in recognition of his contributions to maintaining tradition for 60 years, promoting Myanmar's traditional gold leaf to the public, and also visited by the culture minister himself.



Pic 36, 37 Visit and interview in King Galon

Pic 38, 39 Attend an official event



Pic 40 Visit to King Galon

#### **2** Gold Leaf Aung Tagon

Gold Leaf Aung Tagon also belongs to a large-scale workshop where the work of beating gold and packing is done together. Unlike the King Galon, however, it is putting more effort into preserving and conserving traditional handmade gold leaf rather than engaging in activities to attract foreign tourists.

The owner also manages construction projects to put gold leaf on Pagodas and Buddha statues, so he knows the importance of the handmade gold leaf. Since 2014, it has participated in protests against the use of the machine-made gold leaf in Pagoda and has been steadily engaged in activities to preserve tradition.

He is not only the owner or seller of traditional workshop but also is the one who requested numerical value to a research institute to build up a base data the superiority and the differentiation of handmade gold leaf. He is also at the forefront of the activities of preserving traditional gold leaf that are threatened by actively sharing articles, materials, or work on handmade gold leaf with SNS services.







#### **3 Other workshop**

In fact, there are not many large scale workshops such as King Galon and Aung Tagon, it is easier to find small workshops. Usually the workplace for beating gold and packing is separated. Several workshops has only the small room for work. Most workshops are following their cottage industry, they run workshops under two names, one is from their parents and the other is their own, so that they can maintain the family tradition and acquire more works from the market.



#### (3) Manufacturing process

Depending on gender, their role is different for a religious reason: only men can participate in gold-beating and women can take part in the packing. According to the survey, male workers pray to the Buddha while beating gold and women are banned from accessing to the beating area. Exceptionally, Boys also participate in the packing work in case of small workshops. Most workshops are run on a family basis.

#### **1** How to produce the gold ribbon

The gold leaf is made from a small gold piece. To get this, the workshop needs to buy a gold ribbon from the gold shop, for example, Aung Tagon purchases it from Thar Htoo.(Shwe Naing Ngan: the gold shop)



Pic 47 Thar Htoo, gold ribbon shop





Pic 56, 57





Pic 54, 55

Use the machine in pairs

(2) The setup for the beating

The gold ribbon is cut into 800 pieces. First of all, put the pieces between the sheets of bamboo papers. From this process, it is domain of men(Shwe Kat). requires various of tools and skills. It is important to be fasten up the package to make a proper gold leaf.

#### The tools for the package







Pic 60, 61

Pic 58, 59





2 Palm tree leaf



④ The package contents

Pic 62, 63



5 Toolbox



Heat the gold stick to beat



How to produce a gold ribbon 1. Beat in the hot gold stick to soften the gold.

approx. 0.02mm, which was 2.5mm.

3. Put the gold stick into a rolling machine to have a gold ribbon. 4. As the above process is repeated, the gold stick passes through

the rolling machine about 13 times. the thickness of the stick becomes

5. The gold ribbon(10.625g) is cut into 800 pieces(approx. 0.013g/1 piece)

2. Dip the gold stick in cold water

in a gold leaf workshop.

Rolling machine



Dip it in water to cool it down



Use the machine in pairs



Pic 52, 53

Pic 48, 49

24

(IM | Hy



The setup for the beating consists of Leathers, straw papers and bamboo papers.

When the gold pieces get bigger through the beating, change the package to the big size of leather and papers and repeat the beating. The contents of package is same with previous one.

	•	Leather	•
1	•	40 Straw paper	
	•	1000 Bamboo paper	
		40 Straw paper	

Leather

Pic 65

Order of package

#### Fixing the gold pieces

1. A small piece of gold(1cm x 2cm) is made into a bundle of 1,200 sheets of bamboo paper

2. Put 40 sheets of straw paper on the top and the bottom of the package to prevent damage to the gold pieces during the beating, then cover it with leather(deerskin or cowhide) and secure it firmly with palm tree leaf and bamboo sticks.

3. put the leather covers as crosswise.

4. To firmly fix the package, pack the palm tree leaves into the inside of the cover. and put the bamboo sticks in parallel. it is important to be fasten up the package.





The package with first gold pieces



Fix the package with palm tree leaves





Put the leather covers as crosswise

Hit the package everywhere with hammer to make it flat





Add the Palm tree leaves on the side

Put the bamboo sticks in parallel

Finished fixing

After the fixing, proceed the next process with wooden apparatus on marble.



Pic 66, 67

Pic 68, 69

Pic 70, 71

Pic 72, 73

ghyun LEE | Je

KIM | Hye

PARK | Se

#### ③ Beating the gold leaf

Man who makes the package and beats it is called Shwe Kat. They work with 7 pounds hammer for beating in a hot and humid climate of Myanmar so they put only the bottoms at the workplace.





Pic 75, 76 Shwe kat

Pic 77 Workplace for the beating

#### **Beating process**

1. Beat the package of gold pieces for 3 minutes and turn it. Hit it from top to bottom and repeat so that all sides can be beaten. (about 1 hour)

- -Apply water little by little with a toothbrush during the beating to soften the leather.
- -The coconut has small hole at the bottom and sinks into the water slowly in 3 minutes.
- 2. Hit everywhere to flatten the swollen paper and remove the leather.
- 3. Cut the large gold pieces into 1/4 and make them back for the package again.
- 4. Beat it in the same way with <1> for 1 hour.
- 5. After beating, transfer it to a larger bamboo paper and make a package and repeat <4> the beat it again 4 more times. (about 5 hours required)

#### Total 5 steps of beating for 7 hours





Apply water on leather cover





Pic 82 Working Shwe kats (Aung tagon)





Pic 83

Pic 78, 79

Pic 80, 81

Sanghyun LEE | Jeeyeon KIM | Hyesu PARK | Sel

#### Untie the package





Beat the everywhere with

Untie the package



Separate the contents

\* The bamboo paper used in the beating is stored in traditional refrigeration facilities to prevent the heat from escaping and drying rapidly.



Organize the bamboo papers



Pic 89, 90 Traditional refrigeration facilities and bamboo papers

Gold leaf after the beating

Pic 84, 85

Pic 86, 87

(4) the packing

The package, which has finished beating, is transferred bamboo paper, and women transfer the delicate gold leaf onto pieces of the straw paper,



Shwe pyin vic 91

producing ready-to-use packages for. women who pack the gold leaf are called Shwe pyin.

Shwe pyin use the buffalo stick and lime power to handle the gold leaf. 1. Move the half size of gold leaf from the package to recycled paper using buffalo stick.

2. Blow wind on the moved gold leaf to make smooth it.

3. Put the gold leaf on the straw paper for the package.

In advance, put the big size of gold leaf and bring it to skilled Shwe pyin. 4. Skilled Shwe pyin covers the empty space of straw paper with spare parts of gold leaf.

5. Tie the set of gold leaves with sheet of workshop's logo and red threads. Young girls who help the family's work(even boys) take part with simple work which is putting on lime powders to the bamboo papers to prevent the gold leaf from sticking to the paper.

packing 1





Gold leaf after beating

Put up recycled paper

Packing 2





Pic 94, 95

Pic 92, 93

Pic 96, 97



Fill the holes



nal Gold Leaf



Apply lime powder on bamboo papers



Move gold leaf with the stick.

Pic 98, 99

Pic 100, 101



Pic 102, 103

Pic 104, 105

Pic 106, 107

Gold leaves on straw papers





The gold leaves with red thread

#### The package

Most of workshops sell gold leaf in two ways. One is 5 sheets of gold leaf (5 pyar kwal) for the prayers in Pagodas and the other is a package of 100 sheets of gold leaf(yarsign) for repairing the Pagodas and gilding the Buddha statues.

The product for selling



cີ່ເບິ່ງະອີ (5 pyar kwal) 2"x2", 5 sheets of gold leaf



ရာဆိုင်္ဇ (yarsign) 2"x2", 100 sheets of gold leaf

#### (4) Tools



Pic 108 Tools for beating

1 Name Korean 롤링 기계

Burmese

English Rolling machine

Feature It stretches up the gold as 0.02mm thickness.



2 Name Korean 가죽 커버

Burmese

English Leather cover



Feature It is made of deerskin or cowhide.



Burmese

English Leather

Feature Cowhide, it protects gold leaves beneath.



4 Name Korean 야자수나무 잎 Burmese English Palm tree leaf Feature It is used for fastenig up the package.



### 5 Name Korean 대나무 스틱 Burmese 교 호화과 아 (Thitthar chaung / wachan pyar) English Bamboo Stick Feature It fixes the package itself and is tied with wood appratus during beating.



Name	Korean	대나무 종이(죽지)			
Burmese		)			
	English	Bamboo paper			

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FeatureIt keeps the gold leaves in the whole manufacturing<br/>process and is produced in Sagaing, Myanmar.





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#### Name Korean 재생지 8

Burmese

English paper

Feature Mixture of bamboo and other pulps, it is used for packing.

#### 9 Name Korean 대리석 받침대

Burmese စကျင်ကျဓာက် (Sajinkyut)

English Marble beating stand

Feature The gold leaf is beaten on this marble stand, it is trimmed by Shew kat.

#### 10 Name Korean 나무 지지대

Burmese သစ်သား (Thitthar) English Wood apparatus

11

Feature It is installed on the marble stand with a chain above to fix the package.



Name Korean	나무(대나무) 막대
Burmes	<b>se</b> သစ်သးတုတ် (Thitthar chaung / wachan pyar)
English	Wood(Bamboo) stick
Feature	It is installed on the ground with a piece of metal to

#### 12 Name Korean 코코넛 그릇(3분 타이머)

Burmese English 3mins coconut timer It has a hole in the bottom and takes 3 minutes to Feature sink into the water.

fix the package and other tools for beating.

#### 13 Name Korean 망치

English Hammer

Burmese

Feature 7 pounds (3.2kg)

#### 14 Name Korean 버팔로 뿔(헤라) Burmese **English** Buffalo stick(folder) Shwe pyin's tool, using for packing Feature





:122

15	Name I	Korean	석회 가루
	-		

Burmese

English	Lime powder
Feature	It helps that the gold leaf does not stick to fingers or bamboo papers



#### Making process for Bamboo stick





Pic 124, 125



Pic 126, 127

Pic 128, 129







Finishing

Bamboo sticks

#### III Conclusion

### 1. Result\_ the necessity of preseving Myanmar traditional gold leaf

In a rapidly changing society, maintaining traditional industries is obviously difficult. Many traditional cultures around the world, including traditional gold leaf manufacturing techniques, are easily cut off and replaced by new technologies under the influence of modernization and globalization. Myanmar's handmade gold leaf is also facing the same crisis. The influx of machine gold is an example of the future changes in Myanmar's traditional industry. The recent economic growth in Myanmar is also expected to continue and accelerate the crisis in the traditional industry.

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The lack of government support for the preservation of Myanmar's intangible cultural heritage is a problem, while following the traditional methods of Myanmar's gold leafing requires a lot of manpower, time and money.

Myanmar's traditional gold leaf is still closely related to the lives of Myanmarese, and the people are more aware of the value of traditional gold leaf than anyone else. But without continued efforts, there is the possibility that it could be forgotten. Therefore, it is necessary to carry out the research and detailed record of handmade gold



Pic 130 Applying the gold leaves in Mahamuni Pagoda

Mahamuni Buddha Temple (https://www.wikiwand.com/ en/Mahamuni\_Buddha\_ Temple)

Pic 131, 132

Pic 133 134

leaf technique as Myanmar's important intangible cultural heritage.

#### 2. Future plan

Research on tools for gold leaf making



Bamboo paper



Making bamboo stick



Trimming the marble

Tools, such as Bamboo paper, Straw paper, Bamboo stick etc., used for gold leaf making, these are also handmade and traditional. In order to understand the gold leaf making process, it is necessary to leave the record of tools.

Especially, as numerous bamboo papers are used in the making process, bamboo paper will be a subject of research for the next step. It is produced and distributed from Sagaing, Mynamar. Although the bamboo paper is known as Chinese traditional paper, it is also the main source of many paper relics found in Korea today. Therefore, it is deemed necessary to study the process and the features of the bamboo paper made in Myanmar.



#### **3. Conclusion and Application**

Demand for gold leaf to repair many pagodas in Myanmar will be continued. While some say the machine-made gold leaf cannot replace the handmade gold leaf, it is highly likely that the machine-made gold leaf will gain the upper hand due to Myanmar's market-opening and economic growth. This is in light of the fact that the technique for traditional gold leaf has been virtually cut off in Korea and the machinemade gold leaf is used for traditional crafts.

In Myanmar, however, gold leaf is not just a decorative material. Pagoda, used most of gold leaves, is authorized by its trustee to decide on how to preserve Pagoda. And the residents around Pagoda are obliged to donate money to buy gold leaf each year. That means, the gold leaf in Myanmar is not only for decoration, bus it also reflects the nation's care for the tradition and the culture.

As a result, the influx of machine gold is slowing down, but without efforts to preserve the craftsmanship, Myanmar's gold leaf will eventually disappear into the back of history. Therefore, the original technique of handmade gold leaf is intangible cultural heritage as a valuable in Myanmar and it needs records and preservation.

Lastly, by archiving on handmade gold leaf techniques based on a survey conducted in Mandalay, the research data will be used for the

restoration of the original technique for gold leaf making in Korea and be organized into basic data to preserve and restore the craft techniques for traditional painting and textile.



Pic 136 Shedagon Pagoda(left) Pic 137 Mahamuni Pagoda(right)

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# Survey of Weaving Technique on the Vietnam Border Region

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Vietnam shares a borders with China, Laos, Cambodia.<Pic. 1>. Because these countries are composited by several minorities, they has a various cultures for each minorities. Especially in Vietnam, there is a 54 minorities. Among them the Tay[傣] peoples has composed 3.8% of whole population on Vietnam, and they are most popular peoples among a minorities. Because Vietnamese geographical feature is long, the cultures of a North, Middle and South has a different features. And the almost Tay is living on the Northern Vietnam.

Vietnamese Tay and Nuong[依] peoples has been known a branch of Zhuang[壯] peoples which is based on the Baiyue[百越], Xiou[西甌], Luoyue[駱 越] 〈Pic 2〉. And because Tay, Nuong, Zhuang peoples is belong to Zhuang-Tay Languages, they are using a similar languages. Chinese Zhuang peoples is most popular minorities on China, and almost of them are living in the Guangxi province where share a border with Northern Vietnam.



Vietam Tay has weaved a Tho Cam, and Chinese Zhuang has weaved a Zhuangjin[壯錦]. These two textile is weaved by using vivid coloured yarns, and the patterns which is presented on them are based on geometric and flower patterns. Especially the Zhuangjin of Chinese zhuang peoples is one of the 4 best silks of China with Nanjing-Yunjin(南京雲錦), Chengdou-Shujin(成都蜀錦), Suzhou-Songjin(蘇州宋錦). Among the 4 best silks, the Zhuangjin is the only textile which is made by minorities. Because of this reason, Zhuangjin is very valuable on the textile histories.

#### 1. Index and Schedules of Survey

Even a names and countries of Zhuang and Tay peoples has changed, they has same origin. Because of these reasons, survey has aimed these two peoples. The survey regions are Cao bang where Tay people is living and Guangxi where is sharing border with Vietnam. This Survey is for the weaving techniques of Tho Cam and Zhuangjin of Vietnam and China.

The survey was progressed on two times, August and November, for each countries<Table 1-2>. It is the particular regions of survey that 6 cities of Guangxi of China, 2 cities of Hanoi and Cao bang of Vietnam. This survey is focused on the weaving techniques and looms, kind of textiles.

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	Object : Chinese Zhuc Date : 2019. 08. 19(Mon Guangxi provin Method : Interview, Pro Subject : Major of Trac Sim Yeon Ok	angjin of Zhuang Peoples ) ~ 2019. 08. 28(Wed) ice, China(中國 廣西省) actice, Taking a Photo. etc ditional Textile, KNUCH (Professor)		Table 1	Index of Survey - 1st Servey
	Lee Sun Yong	g, Park Geun II, Roh Ji Hee(Res	searcher)		
_	Contents	-	Objects		
1	Loom Types	<ul> <li>Zhulongji of Nanning,</li> <li>Xincheng, Binyang</li> <li>Loom of Jingxi</li> <li>Loom of Longzhou</li> </ul>	Several Workshops     and Museum		
2	Zhuangjin Weaving Technique	Materials and Tools     Weaving Technique	-		
	Object : Vietnamese T Date : 2019. 11. 20(Wed) Method : Interview, Pro Subject : Major of Trac Sim Yeon Ok Lee Sun Yong	Tho Cam of Tay Peoples ) ~ 2019. 11. 26(Tue) actice, Taking a Photo. etc ditional Textile, KNUCH (Professor) g, Park Geun II, Roh Ji Hee(Res	searcher)	Table 2	Index of Survey - 2nd Servey
	Contents	-	Objects		
1	Vietnamese • • Minorities	Vietnam Ethnic Museum	Several Workshops     and Museum		
2	Tho Cam Weaving • I Techniques	Luong noi villages, Ha quang Cao bang, Vietnam			
				Pic 3	Survey Regions of Vietnam,



### II The Survey and Features of Traditional Textiles on Vietnamese Tay

#### 1. Tho Cam of Vietnamese Tay

Tay, Nunog, Zhuang is a branch which is originated from Baiyue, Xiou, Luoyue. Practically, the traditional costume of Tay, Nuong, Zhuang is very similar, and even they are located on differnet countries, they are very close. Recently, the region where is weaving a Tho Cam by using traditional way is Luong Noi village, Ha Quang, Cao Bang, Northern Vietnam. This village is very close with Chinese border.

The favorite pattern of Tay people is a flower. Occasionally, animal pattern was weaved but there is no many crafter who can weave the animal pattern these days. The way which is composing pattern of Tho Cam<Pic 4> and Zhaungjin<Pic 5> is very similar.



(left) Vietnamese Tho Cam (right) Chinese Zhuangjin

Pic 4

This Vietnamese traditional Tho Cam weaving is passing down only in Luong Noi village, Ha Quang, Cao Bang, Northern Vietnam. Ha Qunag Tho Cam Loom is a one-person pattern loom<Pic 6>. The structure of loom is similar with Nuong<Pic 7>. These two types of looms is saving a patterns on the heald yarns by using a bamboo. The heald yarn is used to weave patterns. If the pattern is getting more complex, the number of bamboo is increasing.





(left) Loom of Tay (right) Loom of Nuong

#### 2. How to Weave of Tho Cam Loom 1) Names



#### 2) Structure and Principle

Actually, Tho Cam means a Vietnamese textile crafts, but the textile which is weaved in Luong Noi village is also called Tho Cam. On the loom which is weaving a Tho Cam is installed 2 khau tắm(healdes of structure) and 1 Hwabon which is structure to weave pattern<Pic 8>. This Hwabon is constructed with khau sung and hoa vặn(the bamboo stick), and the form of Hwabon is that hoa vặn is mounted on khau sung in accordance with pattern. A cylinder shaped bamboo which is installed between a khau sung makes a hoa vặn in order. And it can make a pattern repeat by moving a hoa vặn from back to front or from front to back.

2 treadles is installed to each khau tắm. A đôi gua, long bamboo made treadle is installed between the treadles. This đôi gua is related in V shaped cáp rạp which lift the khau sung. When crafter want to weave a pattern, the crafter make a place to put a yarn by lifting a khau sung by using the đôi gua.

ın II Park | Ji



#### 3) Weaving Procedure

- 1. To take a hoa vặn down and arrange a khau sung.
- 2. To lift a warp by treading a đôi gua and put a pan in.
- 3. To make space of warp wider by standing a pan and put a yarn by using hand.
- 4. To put hoa vặn off and put it in front and arrange a khau sung by using a pan.
- 5. To lift a warp according to structure by treading a đôi guốc, put a structure weft yarn in.





Takina a hoa văn down





Making space by standing a pan





Heating a textile by using a vùng



Arranging a khau sung by using a pan

ting g họg văn in front



Putting structure weft yarn

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### III The Survey and Features of Traditional Textiles on Chinese Zhuang

#### 1. Zhaungjin of Chinese Zhuang

The Zhuangjin of Guangxi province was a gift for the Emperor. Because it is still remained of the Beijing's palace museum, it show us the excellent weaving techniques. Zhuangjin was not only a gift for the Emperor, but also it is used in normal life of normal peoples.

Zhuangjin has been very famous for their durability and elaboration, unique and beautiful pattern. The technique of Zhuangjin weaving has long history, and it is designated for intangible cultural national heritage in China at 2006.

At present, there is 3 types of loom which is used to make Zhuangjin, and this is differently used in each regions. In Nanning[南寧市], Xincheng[忻成 縣], Binyang[宾阳縣], Zhulongji[竹籠機] which is most famous Zhuangjin loom is used. But in Jingxi[靖西縣], Longzhou[龙州縣], they has different types of looms for each regions. The material which has been mainly used is ramie[麻], cotton[綿] for weft, and silk[絹] for weft, but recently, it is changed to use a cotton for weft, silk for warp. The vivid and fancy coloured weft is the feature of Zhuangjin. The pattern of Zhuangjin is basis on geometric pattern and mixed with several patterns like plant or animals as main pattern<Table 3>.



Table 3 The Patterns of Zhuangjin

#### 2. How to Weave of Tho Cam Loom 1) Names



16	Shasuo(紗梭)	17	Shadiaoshou(紗吊手)	18	Zengshaliang(綜線梁)
13	Huacaijiao(花踩脚)	14	Shacaijiao(紗踩脚)	15	Rongsuo(絨梭)
10	Aizengxian(矮綜線)	11	Zhongtong(中筒)	12	Quanjingshajidou(卷經紗機頭)
7	Fenjingtong(分經筒)	8	Zhukou(竹筘)	9	Gaozengxian(高綜線)
4	Zhongchui(重錘)	5	Yaodai(腰帶)	6	Budouzhou(布頭軸)
I	Zhulong(竹龍)	2	Plannuaznu(編化们)	3	Huddidoshou(化市于)

#### 2) Structure and Principle

Zhulongji is typical Zhuangjin loom which weave pattern by installing Zhulong(竹籠)<Pic 9>. *Hwabon* is installed on Gaozengxian(高綜線) by using a Pianhuazhu(編花竹). After Gaozengxian is hanged on Zhulong, the *Hwabon* is completed by inserting a Pianhuazhu to Gaozengxian according to a textile pattern. A size of Zhulong is depending on a size of textile pattern. If a 1 repeat pattern getting bigger, the number of Pianhuazhu is also getting bigger and the size of Zhulong is getting wider. In Zhulongji, there is 2 treadles, the one is connected with Shacaijiao(紗 踩脚) which is installed with structure headles and the other one is connected with Huacaijiao(花踩脚) which is installed with Zhulong. Zhongchui(重錘) is hanged behind of this loom, It is connected with Zhulong, and help to maintain a tension by their weight.



Zhulongji

#### 3) Weaving Procedure

- 1. To take front Pianhuazhu down and arrange Gaozengxian by using Pianhuazhu.
- 2. To put Bamboo stick in a space between Gaozengxian and insert to behind Zhulong.
- 3. To tread Huacaijiao which is connected with Zhulong.
- 4. To push a Bamboo stick which is put and insert a Fenjingtong(分經筒) in the space.
- 5. To let a Zhukou(竹筘) go back and insert a weft yarn.
- 6. To arrange a weft yarn by using Zhukou(竹筘).
- 7. To pull Bamboo stick out and put in space between Gaozengxian, get rid of Fenjingtong.
- 8. To tread a treadle which is connected with Aizengxian(矮綜線) and put weft yarn in.









Putting bamboo stick









Pulling bamboo stick out

Putting a Fenjingtong in the space











Treading a Shacaijiao(紗踩脚) Maintaining space by using Fenjingtong





Putting structure weft in

Using Zhukou

#### 3. How to Weave of Longzhou Loom

#### 1) Names

Name Zhuangjin Loom of Longzhou Location Zhuangjin Association of Longzhou



16	Syengpenglu	17	Huengchuk(橫軸)	18	Hwalgan(活杆)
19	Apgyunggan(壓經杆)	20	lyepom(竹筘)		

#### 2) Structure and Principle

In Longzhou loom, instead of Zhulong, Tangrou which is cylinder shaped Hwabon is installed to weave textile<Pic 10>. because Hwabon is repeated on the basis of tangrou which is hanged on Koushui itt is called to circulation type Hwabon[環式花本]. Seating on a seating board, Hwabon is designed on Gongxian[高綜線] by using a Erei[編花竹] on the spot.

Nouke[提綜擺杆] which is hanged on Tangmai[機架] is related on Hwalgan[活杆] and Muxian[矮綜線]. When crafter tread a treadle, Kouten[矮 綜軸] which is connected with Hwalgan[活杆] is getting down put warp down, and Muxian[矮綜線] which is connected with Nouke[提綜擺杆] is lifted, it makes space between a warps. When crafter weave pattern, the crafter makes space by using a 2 Pan which is made by split bamboo.





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#### 3) Weaving Procedure

1. To put Erei which is located on front side down.

2. To arrange Gongxian by using Erei.

- 3. To put a Pan behind Gongxian and push to arrange a warp.
- 4. To put another Pan to space where is made on the situation 3, and maintain the space and the make space wider by using lyepom[竹筘].
- 5. When crafter weave brocade structured pattern, lifting a warp by using hands, putting a cut weft by using hands.
- 6. To put a pattern weft by using Tuim[絲梭] and hit it by using Iyepom.
- 7. To pull Pan which is front of Gongxian out and move it between X-shaped Gongxian.
- 8. To pull 2 Pan to front of weaver and take Erei off.
- 9. To let pulled Pan go back and insert this to lower side. 10. After putting a Pan of low of Pan, arranging Gongxian, take Pan off. 11. To tread a treadle and maintain a headle of Kouten[矮綜軸].
- 12. After maintaining a space by putting Pan in front of lyepom, to put structure weft yarn and hit by using lyepom.



Putting Erei down



Making space by pushing weft



Putting pattern weft yarn in



Arranging Gongxian



Putting another Pan in space



Putting structure weft yarn in











Arranging Gongxian

After Make space wider by using lyepom, Putting

of We

#### 4. How to Weave of Jingxi Loom 1) Names

Name Zhuangjin Loom of Jingxi Location Exhibit Hall of Intangible Heritage of Jingxi



#### 2) Structure and Principle

There is several headles to weave pattern. Because of this reason, Jingxi loom has structural difference with another Zhuangjin Loom<Pic 11>.

There is 2 Gakdappans[脚踏板] of Jingxi loom and it is connected with Koupai[平紋線], used to weave structure. Koupai[平紋線] is connected with the front and back of Yungyulgan[連結杆]. This Gakdappan[脚踏板] is used to make a space to weave structure. When weave pattern, crafter lifts a Kouwa[花本線] which is located on the back of Koupai and put Anmuk[中桶] inside to maintain space. In Jingxi, There is 3 types of weaving technique.



#### 3) Weaving Procedure

1. To maintain a space by using Anmuk after lifting a Kouwa.

- 2. In the situation 1, to make space by treading Gakdappan and put structure weft yarn in.
- 3. To pull Anmuk which is put on the situation 1 and put pattern weft yarn.
- 4. To let Kouwa go back again.

#### ► Weaving Procedure of Jingxi Loom ①





Lifting Kouwa

Putting Anmuk in



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Treading Gakdappan



Pulling Anmuk





Putting pattern weft yarn in



Hitting Zhangkouzu

Hwabon pattern

Hitting Zhangkouzu(Side)

► Weaving Procedure of Jingxi Loom ②

This is same procedure with Jingxi Loom (1) but in this case, brocade structure is used to weave textile.

Repeated pattern is installed in Kouwa. And the part of pattern which is used partially is weaved looking the pattern. At this time, weft yarn which is twisted with several thread is used by hands





Putting pattern weft yarn



Putting pattern weft yarn 2, 3

#### ► Weaving Procedure of Jingxi Loom ③

- 1. Following Hwabon pattern, to make a pattern by using a stick and make a space.
- 2. To maintain a space by using Anmuk.
- 3. To tread a treadle, weave a structure.
- 4. To weave brocade pattern.
- 5. To stand the stick and putting Anmuk in the space.
- 6. After putting a pattern weft yarn and putting structure weft yarn.
- 7. After putting different coloured pattern weft yarn,
- putting with structure weft yarn again.
- 8. To repeat for 6~7 times to weave 1 line of pattern.





Making pattern by using stick



Putting pattern weft yarn in

Making a space by standing stick



Putting structure weft yarn in

r of We

#### IV Comparing with Tho Cam Loom and Zhuangjin Loom

#### 1. Similarity and Difference

In Guangxi, China, Zhuang peoples use 3 types of looms to weave Zhuangjin. In Nanning and Xincheng, Binyang, Zhulongji is used, but in Jingxi and Longzhou where is close with Zhulongji area, Zhulongji is not used, but there was different types loom. On the other hand, In Vietnam, traditional Tho Cam loom was used only in Luong Noi village which is Tay people lives<Pic 12>.



There is a similarities that structure is unified with pattern weaving and structure weaving with Tho Cam loom and Zhuangjin loom. But if we focused on Hwabon, among 4 types of Zhuangjin loom, Jingxi loom is most different with Tho Cam loom. Except Jingxi loom, in 3 types of Zhuangjin loom, we will focus on similarity and difference of structure of Hwabon structure.

In Vietnamese Tho Cam loom, cáp rạp which is made bamboo to V-shape maintains a tension of Hwabon. It is same role with Huadiaoshou of Zhulongji. But there is 2 peadles, Shacaijiao and Huacaijiao, Shacaijiao is to weave structure and Hwacaijiao is connected with Zhulong to weave pattern<Pic 13>. While Tho Cam loom has 2 peadles, dôi guốc, it is for weaving structure. When weave pattern, the Tho Cam loom is operated by treading đôi gua, long bamboo, which is connected with cáp rap<Pic 14>. In other words, Hwabon of Tho Cam loom and Zhulongji is maintained by V-shaped cáp rạp and Huadiaoshou but the operating way is different to weave pattern.



The most similar Hwabon with Tho Cam loom is Longzhou loom. In case of Longzhou loom, Tangrou which is hanged on Koushui(upper side) is rotated to use *Hwabon* continuously. It is some kind of automatic structure, <Pic 15>. On the other hands, *Hwabon* of Tho Cam loom of Tay is fixed on the V-shped cáp rạp. Although the cylinder shaped bamboo is installed below *Hwabon* of Tho Cam loom but it is not rotated. When crafter weave every front hoa văn, let it hoa văn go back again<Pic 16>. It is some kind of manual structure. The Hwabon shape of Tho Cam loom and Longzhou loom is similar, but operating way is difference.



Pic 15 The Hwabon and Pattern Weaving of Longzhou Loom

> The Hwabon and Pattern Weaving of Tho Cam Loom



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As a result, There is difference of operating way of *Hwabon* between Tho Cam loom and Longzhou loom but the structure and figure is most similar than the other Zhuangjin loom. Actually, Luong Noi village where is located in Haquang of Cao bang province is close to Chinese border. And among the 6 regions which is objected to survey, Longzhou is most closest region to Vietnamese border than other 5 regions. A names of parts of Longzhou loom is too similar to make confusion that the their pronunciation looks like vietnamese<Table 4>. For these reasons, There is a possibility that the similar structure loom is passing down in Cao bang and Longzhou. Although Vietnamese Tay and Chinese Zhuang have different nationality now, but because they are basis on same ethnical origin, they have homogeneity of traditional textile craft.

> Names of Tho Cam Loom and Zhuanaiin Loom

Korea		China	Vietnam		
Hansan[Eng]		Zhulongji	JIngxi Loom	Longzhou Loom	Haquang Loom
		Zhulong[竹籠]		Tangrou	
		Pianhuazhu[編花竹]	•	Erei	hoa vặn
		Huadiaoshou [花吊手]			cáp rạp
		Zhongchui[重錘]	•		
부테[Belt]	]	Yaodai[腰帶]	•	Tablang	
말코[Loor	n Roller]	Budouzhou[布頭軸]	Mairuntang	Shampan	rằm vặn
		Fenjingtong[分經筒]	•		
바디[Reed	d]	Zhukou[竹筘]	Zhangkouzu		vùng
임아 [Headle]	문조직 [Pattern]	Gaozengxian [高綜線]	Kouwa	Gongxian	khau sung
	지조직 [Ground]	Aizengxian [矮綜線]	Koupai	Muxian	khau tắm
		Zhongtong[中筒]	Anmuk		
도투마리 [Warp be	eam]	Quanjingzhou [卷經軸]	Kongnak	Kouhuaki	cóc nạc
발판 [Treadle]	문조직 ][Pattern]	Huacaijiao[花踩脚]	Gakdappan (脚踏板)		đôi gua
	지조직 [Ground]	Shacaijiao[紗踩脚]	_		đôi guốc
북 [Shuttle]	문조직 [Pattern]	Rongsuo[絨梭]	Numsa	Tuim	sợi len
	지조직 [Ground]	Shasuo[紗梭]	Swaptaung		con thoi
		Shadiaoshou [紗吊手]			ngọc ngạch
		Zengshaliang [綜線梁]			
최활[Tent	er]	Gongzi[弓子]		lyepom	
		Jijia[機架]	Tiaokou	Tangmai	
앉을개[Stall]			Pagan(擺杆)	Тара	
		Zuoban[坐板]		Tuinang	ghế
·		Yahuachi[壓花尺]	•	Pan	pan
			•	Koushui	
				Nouke [提綜擺杆]	
				Huengchuk(橫軸	).

# 2. Textile historical Meaning of Tho Cam Loom and Zhuangjin Loom

Although there is a difference of structure with Tho Cam loom and Zhuangjin loom, there is also common feature that Hwabon is installed. Hwabon is some kind of database which is saved a textile pattern. Every single bamboo stick of Tho Cam loom and Zhuangjin loom has same role with a Pattern card of Jacquard loom which was used in modern times<Table 5>.



Table 5 Hwabon of Tho Cam Loom and Jacquard Loom

In case of Korea traditional loom, because it is not installed a Hwabon like Tho Cam loom and Zhuangjin loom, it is possible to weave only plane structure<Pic 17>. Actually, pattern weaving loom is painted on the *"Imwongyungjeji*(林園經濟志)』which is literature of Joseon dynasty<Pic 18>. But it is different the loom which is remained now.





Pic 17 (left) Loom(Hansan, Korea) Pic 18 (right) <sup>e</sup>Imwongyungjeji(林 國經濟志)。

Vietnam Tho Cam loom of Tay and Chinese Zhuangjin loom of Zhaung can weave plane structure likes Korea traditional loom, and pattern also by installing *Hwabon*. In the other words, This simple pattern loom is so unified pattern weaving and structure weaving that crafter can weave pattern by himself<Table 6>. These pattern weaving loom is called oneman patern weaving loom. Because crafter can weave both of structure and pattern, it seems that the origin of a draw loom. The loom which is printed on *"Imwongyungjeji*(林園經濟志)』 is classified with draw loom.



Because draw loom is composed with complex structure, loom is bigger than other type loom. Even the pattern is very small, it needs 2 persons to operate. But because the structure of Tho Cam loom and Zhuangjin loom is unified with pattern and ground, and by using brocade technique to weave, it is simple to operate a loom.

Colourful weft is used to overcome a monotony of pattern<Pic 19~20>. Although it is simpler that a way how to weave textile, and composition of one-man pattern weaving loom of Tho Cam loom and Zhuangjin loom than a draw loom, but it is very meaningful on a textile history.



Pic 19 (left) Chinese Zhuangjin Pic 20 (right) Vietnamese Tho Cam

### **V** Transmission

This is common feature of Vietnamese Tho Cam and Chinese Zhuangjin that they are weaved by traditional textile of minorities. These minorities textile and culture is rapidly vanished today because of change of use, uncleanness of market, decreasing of economic value. Especially traditional textile is related with minorities unique culture. If it is vanished away, the unique culture will be faded away.

In present, All of the world is trying to safeguard a traditional culture. Among them, Unesco is the most global institution. Among the textile culture of China and Vietnam, only 3 of them is designated on the list, and all of this 3 heritage is Chinese one<Table 7>. Although Zhunagjin of Zhuang people was one of the chinese 4 best silk, it is not involved in Unesco intangible heritage list.

	Nation	Year	Heritage	Table 7	List of Intangible Heritage of Unesco
1	China	2009	Craftsmanship of Nanjing Yunjin brocade		
2	China	2009	Traditional Li textile techniques: spinning, dyeing, weaving and embroidering		
3	China	2009	Sericulture and silk crafsamanship of China		

To protect and preserve a traditional textile, the government of Vietnam and China is trying to support. First, In Vietnam, they made a law in 2002 and started to manage a culture following this law. In 12th list of 2016, there is 160 heritage, among them, there is 12 crafts, and 3 textile. The "Traditional textile craft of the Tay ethnic people" is designated on the list and safeguarded <Table 8>.

	Nation	Year	Heritage	Table 8	List of Vietnam Intangible Heritage	
1	Dhinh Yen Commune	2011	Mat weaving		nentuge	
2	Dong Giang District	2012	Brocade textile craft of the Co Tu ethinic People			
3	Bac Kan Province	2012	Traditional textile craft of the Tay ethnic people			

In China, the heritages which is designated is 8,327(National culture is 1,218, Local 7,109). Among them the there is 30 textile heritages. Zhuangjin is designated as national cultural heritage and safeguarded<Table 9>.

Among the Chinese national intangible cultural heritage, there is 4 Chinese best silks like Nanjing-Yunjin, Suzhou-Songjin, Chengdou-Shujin. And the minorities(Tu[土], Li[黎], Miao[苗], Bai[白], Zhuang[藏] etc.) culture is majorities among the list.

In spite of these effort, Tho Cam and Zhuangjin is rapidly vanished away. In Luong Noi village, Haquang, Vietnam, 85 whole families weaved before 1990 but only 10 around families are weaving now. These situation is also progressed in Chinese Zhuangjin.

There is 3 reasons why Tho Cam and Zhuangjin weaving is rapidly vanished. Firstly, demand of traditional textile is decreasing. In China and Vietnam, these textile is weaved only for display or tourism product or speciality<Pic 21-22>.

	La a sublic u	Manu	Havitara	Table 0	List of Ching Intendible
NO	Location	Year	Heritage	TUDIE 9	Heritage
1	江苏省南京市	2006	南京云锦木机妆花手工织造技艺		
2	江苏省苏州市	2006	宋锦织造技艺		
3	江苏省苏州市	2006	苏州缂丝织造技艺		
4	四川省成都市	2006	蜀锦织造技艺		
5	上海市徐汇区	2006	乌泥泾手工棉纺织技艺		
6	湖南省湘西土家族苗族自治州	2006	土家族织锦技艺		
7	海南省五指山市	2006	黎族传统纺染织绣技艺		
8	广西壮族自治区靖西县	2006	壮族织锦技艺		
9	西藏自治区山南地区	2006	藏族邦典、卡垫织造技艺		
10	青海省湟中县	2006	加牙藏族织毯技艺		
11	新疆维吾尔自治区吐鲁番地区	2006	维吾尔族花毡、印花布织染技艺		
12	江苏省南通市	2006	南通蓝印花布印染技艺		
13	湖南省凤凰县	2008	蓝印花布印染技艺		
14	贵州省丹寨县	2006	苗族蜡染技艺		
15	贵州省安顺市	2008	蜡染技艺		
16	四川省珙县	2011	蜡染技艺 (苗族蜡染技艺)		
17	贵州省黄平县	2011	蜡染技艺 (黄平蜡染技艺)		
18	云南省大理市	2006	白族扎染技艺		
19		2008	扎染技艺 (自贡扎染技艺)		
	_				



Pic 21 (left) Zhunagjin Sailing, 1972

Pic 22

(right) Zhaungjin Exhibit Hall of Jinaxi

Secondly, the decreasing of demand causes severance of technique. In the past, whole families of village weaved and used traditionally. But the minimum families are just passing traditional way down in present. Actually, in Xincheng, only 3~5 families were weaving Zhuangjin, and Zhuangjin factory is failed today<Pic 23>. In Jingxi, there was dozens of persons who participate in Zhuangjin weaving but the number of crafter was rapidly decreased today<Pic 24>. 

 Pic 23
 (left) Zhuangjin Factory of Xincheng

 Pic 24
 (right) Zhunagjin Factory of Jingxi, 1970

Thirdly, the material is very important part of transmission. Traditionally, silk had been used but cotton or wool or chemical yarn is used now. And dyeing method has been changed from natural to chemical. And bamboo which was used to make parts of loom was changed to plastic. Traditional material has been vanished away.

Both countries of Vietnam and China is trying to safeguard a Tho Cam of Tay and Zhuangjin of Zhuang by making a law. But it is not going well that detail survey, information gathering and documentation of traditional weaving technique. It is need that efforts for secure of materials and tools, transmission of technique, management of crafter, academic survey and research, It is urgent time to make scientific polish now.

#### **VI Conclusion**

Zhuang people is living in several countries with various names. Although they are most popular minorities in both countries of Vietnam and China in present, there isn't an in-depth study. Especially, the research of relationship about these 3 peoples is a few.

Because Zhuang people which is spread in several countries has same origin, they has clear similarities on several parts from costume and textile to language and faith. Especially, textile is so essential part of human life that it places from normal life to awareness. It is also important evidence that similarities of the patterning and weaving techniques and of Tho Cam weaved in Vietnam and Zhuangjin weaved in China.

In this survey, it is focused on the weaving technique of Zhuang who lives in Guangxi, China and Tay who lives in Cao bang, Vietnam. The loom of Zhuang and Tay is a one-man pattern weaving loom which can weave pattern and ground. The most characteristic part of one-man pattern weaving is how to use a Hwabon. Unlike a different pattern weaving loom that draw boy should help to lift a Hwabon, crafter who use one-man pattern weaving loom uses Hwabon himself to weave pattern. Among them, the most similar structure of loom with Tho Cam loom is Longzhou loom. There is a cylinder shaped bamboo below Hwabon which is role of standard point. On the other hand, the cylinder shped bamboo is on the top. It is most significant difference that make a structural difference.

Both of Zhuangjin and Tho Cam is designated as intangible heritage. But it is vanishing away now. This survey has meaning that it is a information gathering of traditional textile craft which is severing. The database which is made by using this survey will be a base information to revive this traditional weaving technique when it was vanished. References

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# A Survey and Scientific analysis of natural adhesives in Myanmar

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#### | Introduction

#### II Myanmar traditional lacquer materials and techniques

- 1. Research on lacquer workshops
- 2. Research on lacquerware museum

#### III Scientific analysis of Myanmar traditional lacquer materials

- 1. Collection of Myanmar lacquer materials
- 2. Scientific analysis

**IV Conclusion** 

#### I Introduction

The Republic of the Union of Myanmar (henceforth Myanmar) is located in the northwest of the Indochina Peninsula and borders India, China, Bangladesh, Laos and Thailand. The size of the country is approximately 670,000 square kilometers, which is three times the size of the Korean peninsula, and the population is about 54 million. As for religion, Buddhism accounts for 88% of the population, although Christianity (5%), Islam (4%) and other religions are observed as well. The nation is composed of 130 ethnic groups including the Bamar (70%), Shan (9%) and Karen (7%), etc. The major cities are Naypyidaw, the administrative capital city of Myanmar, Yangon, the economic center of Myanmar, and Mandalay. Bagan, located east of the Irrawaddy River, which is 150 kilometers southwest of Mandalay, is an ancient city. The city was the capital of the Bagan dynasty, founded by the Bamar between the 11th and 13th centuries(Korea International Cooperation Agency,2014).



Fig. 1 Pagodas in Bagan.
There are more than 5.000 Buddhist remains, especially paqodas, in Bagan. As one of the richest treasure house of Buddhist architecture in the world, Bagan is a famous tourist destination for visitors from all over the world. The ancient city is also very famous for traditional lacquer technique. Myanmar was isolated from the outside world for 26 years from 1962 for various political reasons. Subsequently,



Map of Myanmar and the location of Bagan.

Fig. 2

Table 1

The Ten Flowers: Ten

Myanmai

major arts and crafts of

However, lacquerwares from the heyday of Bagan hardly remain to this day since many wooden lacquerwares deteriorated and disappeared with the passing times.



Fig. 3 (left) *Lacquerware Journeys.* Fig. 4 (center) The species of lacquer tree in Myanmar

Fig. 5 (right) Scene of collecting lacquer.

Due to the domestic and foreign political situations and relatively delayed industrialization in Myanmar, the tradition of lacquering have been preserved well and continues to this day in various techniques combined with various modern methods. The lacquering technique of Myanmar is characterized by the incised (yun/yunde) technique and various colors (red, green, yellow). Characteristics of Myanmar lacquering also include the fact that bamboo is mainly used as a base material and that, besides the use of lacquer collected from lacquer tree, materials such as sap, resin and rubber collected from other trees are used as well in various ways. In particular, neem juice and neem glue obtained from neem tree and acacia resin obtained from acacia tree are used in Myanmar lacquerwares.





As Myanmar lacquering craft reached its peak from the late 18th century, production area of lacquerwares expanded beyond Bagan to include other regions. Bagan's lacquer industry has



been handed down between family members for centuries, and there are lacquer workshops in various sizes in Bagan. There are currently more than 12 large lacquer workshops, producing lacquerwares not only for the domestic market but also for export markets. In addition to producing

leaving the country was very limited from 1988 to 2011. Because of the painful history of the state being disconnected from the outside world, the tradition of Myanmar has been preserved very well compared to other neighboring countries.

Traditional arts and crafts of Myanmar are called the 'Ten Flowers' and have been recorded in palm leaf manuscripts and handed down to this day. Lacquer sap has been used on almost all kinds of material, including stone, leather, wood, bamboo, textiles, ivory, metals and paper, to enhance durability and for waterproof and decorative effects.

Pan yun: Lacquer work
 Pan chi: Drawing, painting
 Pan bu: Sculpting
 Pan tein: Goldsmithing & silversmithing
 Pan bei: Blacksmithing
 Pan tee: Metal casting

- 7. Pan taw: Stucco work
- 8. Pan t'maw: Stone/marble sculpting
- 9. *Pan put:* Turning wood in lathe
- 10. Pan yan: Bricklaying and masonry

According to *Lacquerware Journeys*, lacquer trees of various size are produced all over Myanmar. The largest production area was Bagan, the capital city of the Bagan Dynasty that flourished in the 11thcentury.

and selling lacquerwares, these workshops are also making an effort to promote Myanmar lacquerware by holding and attending various workshops and seminars.

directly collected from the field with the permission of staff in charge. The collected materials were analyzed for components using pyrolysis-

The aim of this study was to examine the traditional lacquer materials and techniques of Myanmar. To this end, a field survey was conducted at traditional lacquer workshops and lacquerware museum located in Bagan. A variety of materials and techniques were

Categories

Lacquerware workshops



Lacquerware workshop in . Bagan region(UNIDO, 2014).

Table 2 Survey sites in Bagan



#### II Myanmar traditional lacquer materials and techniques

# 1. Research on lacquer workshops 1) Process of preparing base material

Myanmar traditional lacquerwares are characteristically made to be light with the use of inner bark of trees. Mainly used wood varieties are bamboo, teak and other trees, and the inner layer of the bark instead of the bark is used for softness and flexibility. Also, the wood is thoroughly dried before use to prevent warping. There are three types of base materials: wood for trays and furniture, bent bamboo, and bamboo and horsehair used in small flexible cups.

In the past, materials were obtained from bamboo rafts that floated down the Irrawaddy River, because the people thought that bamboo that were kept wet while drifting down the river for a long time are more durable. Bamboo collected from the river are fumigated before use to prevent biological damages from insects (Ma Thanegi, 2013).

The base materials are sometimes made without using adhesives, in which case the bottom and the body are made at once as once piece

Lacquer Lacquerware Museum & Institute museum Lacquerware Museum & Institute 0 Old Bagan O Ananda Temple Bagan Archaeological Museum

gas chromatography-mass spectrometry.

Survey sites

Bagan house, Mya Thit Sar, etc.



Conducting field survey.

by stacking up wood strips. Otherwise, the bottom and the body are made separately and later attached together. Wood strips are stacked at an angle to create a rounded bottom, and the base material is often applied with organic clay for waterproof effect. When joining bamboo, grooves are made into the wood with a knife for assembly. After assembly, the connected areas are polished with sandpaper for a smooth surface.



Making base materials.

Because the base materials made of bamboo and teak wood are highly flexible, it is important to prevent cracks in the lacquer coating and make sure that the completed lacquerwares are not affected by the external environment. In addition, lacquerwares made of bamboo and teak wood are very light, and thus have little risk of damage during transportation and use. The reason lacquered tableware and cups in Myanmar have no handles is because they are light.





Basic appearance of Myanmar traditional lacquerware without handles.

#### 2) Lacquering process

Myanmar lacquer is called 'thitsi' or tree sap. The word comes from the Melanhorrea usitata, which grows near the upper Irrawaddy River. A V-shaped scar is made on the trunk a lacquer tree, and a bamboo cane is hung at its edge as a path for the sap. The sap at this point is viscous and gray. Later, it turns black with oxidation. In the 1950s, lacquer was exported to Japan because it was collected in abundance and showed high quality. The quality of lacquer depends on the growth environment of lacquer tree (age, soil condition, altitude and location, and freshness of sap). There are three kinds of lacquer sap in Bagan. Grade 1 lacquer delivers excellent gloss and its price is approximately 5 times to 2 times higher than Grade 3 lacquer (Ma Thanegi, 2013). Large workshops make large volume purchase of lacquer, and lacquer and lacquerwares for household use are traded in traditional markets located in the north and northeastern part of Myanmar.

Artisans applying lacquer coat carry out all their work indoors to prevent cracking and keep all the works in progress in a wind-free indoor space. The best lacquerwares are those that have been applied with very thin lacquer coat many times (up to 20 layers). If lacquer is applied too thick then the piece of work is warmed up under sunlight to make the lacquer surface fluid for modification.

After the base coat, Grade 2 or 3 lacquer with lower purity is used for the first lacquering. The work is then dried for at least one month. After drying, the surface is smoothed with sandpaper and is gently rubbed with charcoal powder and water. The highest quality lacquer is used for the final layer. As the process of lacquering, drying and polishing is repeated continuously, the work is covered with many layers of lacquer. At each step, the work is dried in the basement drying room for at least 2 weeks, and then polished with charcoal powder, paper, and cloth. When the lacquering is finished, the work is delivered to the next person for other work such as decoration. In this way, separate team of workers handle respective step of lacquerware production.









Fig. 12 Basement drying room.



13 Lacquering process.

Stages of completing

Surface characteristics

according to number of lacquer coating and

material.

lacquerware

#### 3) Engraving and coloring

The engraving technique characteristic of Myanmar lacquerware involves direct incisions on the surface of an object using a sharp metal tool instead of making rough sketch with a pencil of the like. The whole picture is not engraved at once but is done in steps by staff of different levels. People who design and incise scenes such as palaces, monasteries, and forests are called yun hsin. Those who are in charge of detailed images such as clothes, face, appearance, and flower petals are called yun kwei and consists of women who have nimble hands. Once the picture has been engraved, a separate team of staff is formed to add color to the incised lines.

The work of coloring the incised lines is always carried out in the order of red, green and yellow (or orange). The workers are never confused about this order. In addition to the four colors, other colors are developed by mixing pigments together or adding indigo.

Once a color is completely dry, acacia adhesive (or acacia resin) is applied overall. When this is dry, a coarse textured cloth is used to remove the pigments on the surface other than the incised lines. This process is called yun hpaw, which means 'to open/reveal the design.' This process is carried out for each color as the acacia adhesive works as a seal to prevent colors from getting mixed (Ma Thanegi, 2013).

Fig. 16

Materials for coloring.



4) Other materials

#### (1) Clay decoration

A distinguishing technique for decorating lacquerware surface is clay decoration. Lacquer is mixed with ash made from burned animal bones or wood to make a clay-like material, which is called thayo. This material is transformed into a thin thread, which is used and attached in pieces on the surface of the lacquerware to express embossed decorative patterns.

Wood ash is usually used in modern times, and ash made from burned nipa palm leaves after they have removed of the thick bark is considered good quality ash. Thayo is used when fine work is needed. Otherwise, dry feces of cow is sometimes mixed instead of ash.









#### (2) Gilt decoration

Gold leaf or gilt is used to decorate the surface of lacquerware with gold. A yellow pigment is applied to the area not applied with gold for enhanced adhesion effect. After the gold-leaf is completely attached, the yellow coat is washed off with water.





Gilt techniques using yellow pigment.

#### 2. Research on lacquerware museum

The Lacquerware Museum is located on the campus of Lacquerware Technology College and exhibits various lacquer-related tools and materials. Entrance to the basement drying room is in the center of the exhibition hall.







Outside the Lacquerware Museum, a map showing lacquer plantation sites and lacquerware production sites is displayed along with actual lacquer trees (Melanorrhoea usitata) being cultivated. Myanmar is currently planting lacquer trees in 21 cities, including Inlay and Nat Ma Taung. Lacquer workshops are operated in four cities: Mandalay, the ancient capital city of Bagan, Kyauk Kar and Kuankion.

Fig. 19 Exhibition hall in the Lacauerware Museum.





In the exhibition hall inside the Lacquerware Museum, models showing each stage of lacquerware production and actual materials used in lacquerware are displayed along with explanation about the materials.



Materials mixed with lacquer for application include sawdust, clay powder, animal bone-ash, charcoal powder and so on.







According to the displayed items and descriptions, materials used for coloring include vermilion pigment is used for red, indigo for blue, yellow orpiment and chrome yellow for yellow, and a mixture of yellow orpiment

Map of lacquer tree plantation sites and lacquerware production sites and lacquer tree growing the Lacquerware Museum.

Fig. 20

Fig. 21

Materials mixed with lacquer for application. and indigo for green. Judging from the particle and color of the pigments and dyes, the displayed items did not appear to be traditional natural materials.





Fig. 22 Materials used for coloring.









Yellow orpiment

Titanium oxide

In addition, neem resin collected from neem tree was exhibited along with models showing each stage of lacquerware production.



Fig. 23 Neem resin.

Bone-ash





Fig. 24 Models representing each stage of lacquerware production.



III Scientific analysis of Myanmar traditional lacquer materials.

# 1. Collection of Myanmar lacquer materials

Lacquerwares currently sold in lacquerware workshops were purchased and used as specimens for analysis. The specimens collected were bamboo tray, bracelet and drinking cup. As comparison data, lacquer, acacia resin, and neem resin, which are actually used in Bagan lacquerware workshops were collected from a large lacquerware workshop in Bagan.

In addition, with the help of a staff working for the Department of Archaeology of Bagan city, resin was harvested directly from one of the native acacia tree growing in Bagan. All natural materials were collected with permission of the Department of Archaeology















BC

Fig. 25 Collected materials.

# 2. Scientific analysis

#### (1) Conditions of analysis

Materials in liquid state were respectively applied on a slide glass and left to dry and transform into a film before analysis. As for the lacquerwares, a part of them were cut out with a small tool and used for analysis, In addition to Myanmar materials, two types of Korean lacquer (raw and refined) were analyzed for comparison. The equipment and conditions used for the analysis are shown below. Analysis results were interpreted according to the data analysis and interpretation protocol for lacquer (Recent Advances in Characterizing Asian Lacquer report) by the Getty Conservation Institute using AMDIS (Automated Mass Spectral Deconvolution and Identification System).



Equipment used for analysis (pyrolysis-gas chromatography-mass spectrometry).

Fig. 26

Item of condition	Details	Table 3	Conditions applied for
Pyrolyzer	550℃		charyon
Oven	40°C (for 2min) → 320°C (20°C/min)	_	
Inlet	320°C (50:1)	_	
Gas	He gas (>99.999%, 1ml/min)	_	
m/z	33 to 600 amu	_	
MS Source	230℃	_	
MS Quad	150°C	_	
- Pyrolyzer : 3030D, Frontie - GC/MS : 3890A/5975C, Ad	er Lab, Japan gilent, USA	_	

## (2) Analysis results of Korean lacquer

Analysis results of Korean lacquer samples indicated that the main component of both raw and refined lacquer samples was Urushiol derived from Korean native lacquer tree. Because the samples were diluted materials, large amount of fatty acid compounds derived from oil were identified.



# (3) Analysis results of collected materials ① Lacquerwares produced at lacquerware workshops

The results showed marked differences from that of Korean lacquer. The main component identified was thitsiol which is found in lacquer from lacquer trees native to Southeast Asia.



#### 2 Acacia resin

A variety of compounds found in proteins, cellulose, tannins, etc. were identified in large amount. It was judged that various analysis conditions are necessary for more accurate analysis.



## IV Conclusion

Myanmar is one of the most famous countries in the world for its Buddhist remains. Traditional arts and crafts of Myanmar have been preserved relatively well due to various political reasons that prevented the nation from communicating with the outside world for about 26 years since 1962. In particular, the traditional lacquer technique called 'yun/yunde' remains intact to this day. The aim of this study was to document the traditional lacquer technique of Myanmar and to analyze the components of lacquer used in lacquerwares today by collecting materials and conducting a scientific analysis.

One of the major characteristics of Myanmar traditional lacquer technique is the engraving technique and the clay decoration, which are used on the surface of lacquerware to express relief. Myanmar traditional lacquerware is also characterized by the use of tree sap other lacquer as adhesives and sealants, such as acacia resin and neem resin.

As a result of investigating various lacquerware workshops, it was found that the base materials are made to be very light with the use of bamboo strips and horsehair. According to the 2018 research findings on Laos traditional lacquerware, plant leaves were used with adhesives to make the base materials for lacquerware. In contrast to such practice in Laos, it was found that a unique way of stacking bamboo strips without using adhesives has been adopted in Myanmar lacquerware and that this unique technique features the use of grooves and assembly. To fill the fine holes in the base material, a base coat is applied on the surface, which is then sanded with sandpaper. This technique was common in Asia including Korea that traditionally used lacquer technique.

The species of lacquer tree growing in each region differs, and the components of lacquer sap vary depending on the natural habitat. The species of lacquer tree naturally growing in Korea, China, Japan and so on is Rhus verniciflua which contains urushiol as its main component. Rhus succedanea Linnaeu containing laccol as its main component is native to Vietnam and Taiwan. The species of lacquer tree naturally growing in Myanmar, India, Cambodia, and Thailand is Melanorrhoea usitata which contains thitsiol as its main component (Rong Lu, 2015). As a result of analyzing the lacquer collected from and currently used by lacquerware workshops in Myanmar, thitsiol was identified as the main component.

When the lacquering process is completed, patterns or pictures are incised on the surface with a sharp metal tool. After the engraving process, the lacquerware is colored with acacia resin and pigment. At this time, the acacia resin serves as a seal to protect the surface, preventing the pigments sequentially applied from getting mixed. In addition to engraving technique, Myanmar lacquerware is also characterized by clay decoration. The material for clay decoration is made from mixing lacquer with animal bone or wood ash. The mixture is made into a thin thread which is used in pieces on the surface of lacquerwares to express embossed carving.

This study is meaningful in that it documented the traditional lacquer technique of Myanmar and confirmed the use and characteristics of related materials. It is expected that the findings of this study will be used in various ways in future studies on Myanmar traditional lacquerware that have not been studied extensively until now. Furthermore, the findings of this study may be useful in conducting comparative studies on lacquer by period and region by comparing Southeast Asian lacquer materials and techniques.

#### References

# The Construction of Database for Asia-Pacific Traditional Materials and Technique

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#### **1. Research Overview**

This research will discuss how to provide the digital data on the disappearing traditional materials and technique. The data had been collected and accumulated through technical field surveys for conservation and restoration of Asia-Pacific cultural heritage.

The goal of the research is to build the archiving website for constructing database and sharing the data with heritage professionals throughout the world. In cooperation with UNESCO, it is expected to support research and professional training activities in the fields of heritage conservation and restoration.

The research project of UNESCO chair programme will lead Korea National University of Cultural Heritage to serve as a hub for Asian-Pacific heritage related fields through technical fields surveys, training programs and students exchange activities in architecture, textiles and conservation science.



2. Research Methodology

In order to construct the database for Asian-Pacific traditional materials and technique and serve the data as open source, the results of previous field surveys should be examined. This research aims to discuss how to collect, categorize, register and manage the surveyed data for DB construction.

#### 1) Research Design

The research focuses on fundraising the budget for database and website construction for Asian-Pacific traditional materials and technique. So the table of contents is as follows.



#### II Data

Data refers to facts or values collected through simple observation or measurement. It includes all the raw figures before processing such as the furniture in the room, the width of the closet and the brightness of the bulb.

#### 1. Defining the Data

Defining the data is the basis to determine the data owner. So the scope and qualification requirements of data must be clearly defined and indicated in working process so that users can understand the meaning of data. In addition, data definition must enhance users' understanding by delivering what data name alone cannot express. There are three things to consider in defining the data.

First, it must be described from the view of a third party who does not know related tasks so that the data user can understand the meaning of data. Second data value must be accompanied with defining the data, when it is difficult to deliver the meaning of data. Lastly, data names must be described without using abbreviations or terminology.

# 2. Managing the Data

1) The Overview of Data Standards Management

After defining and standardizing the components of data, the management process based on data standards must be established and operated.

#### 2) The Types of Data Standards Management Process

Among many processes for data standards management, the essential ones are as follows : The process to deal with the new requirements of data standards while operating and developing the existing data standards. The process to analyze the impacts on related elements, models, and programs when data standards are changed or deleted. The process to check and verify whether the rules of data standard are being applied correctly.

#### 3) The Components of Data Standards Management Process

(1) **Process :** It ensures that defined data standards are correctly applied. It monitors compliance with the data standards and take countermeasures. It defines the overall business process when data standards are changed or deleted.

Data Change Management Process

(Source: DBguide.net)



(2) Task

- Standard New/Change Request : The person in charge requests a data manager to add or change data standard items (standard terminology, terms, domain, etc.). If there is no standard terms or domain constituting standard terminology, a new request for the standard terms or domain is requested. - Standard Compliance Review : A data manager reviews the request for compliance with the standards and feeds the results back to the person in charge. The conformity and redundancy of terminology must be checked when verifying compliance with the standards.

#### (3) Role & Task

Role	Task	Table 1	Role and Task
Business Person	Requesting standard new and change requests Applying changes as instructed by a data manager		(Source: Disguide: net
Database Manager	Cooperating to identify the impact of change and sub mitting an evaluation report Applying changes as instructed by a data manager Verifying data : notifying the result of application		
Data manager	Reviewing new and changes requested by a business person and checking compliance Establishing a revision plan after analysing and reporting the impact of change Compliance check, meta DB standard registration Disseminating new and changed standards after registration on the meta DB Checking the result of change after instructing the person in charge and a database administrator		
Enterprise data manager	Proposing the data standard guidance at the enterprise level		

# 3. Collecting the Data

The data types collected through the field surveys on Asian-Pacific traditional materials and technique are classified into text, video, photographs etc. Data classification is based on digital file extension and the characteristics of data. The surveyors must submit all the data collected during the survey to the data manager who must register the data on the database without exception.



Fig. 4 Types of the Collected Data

#### 1) Text

Text refers to the materials printed on paper in the form of documents and the data which can be recognized as text on a computer, including books, brochures, reports, etc. The Collections like pamphlets, brochures, etc. can be serviced in the form of scanned image.

#### 2) Video

Considering the characteristics of traditional materials and technique, video is very useful to record the skills, experience and knowledge of the artisans like human cultural assets. Since video is more effective than image and text in delivering information, it must be serviced on the archive website to be planned in this research programme.

#### 3) Photo Image

This includes the photos taken by researchers and all the collected images.

#### 4) Et cetera

All data types except text, photo and video are classified as the etc. where the data with the same format is sub-classified under the same name. For example, drawings are classified into the etc., but it is reclassified into "drawing".



#### III Database

# 1. Database 1) Metadata

검석

Metadata is defined as structured or semi-structured information that enables to produce, manage and use records. That is, metadata is for efficient search and use of the target data among a large amount of data. It is easy to understand when you think of a book card or tag which is based on title, author or classification code as a list of books in a library.

백결과 XML보기	출력 보관하기 컬렉션담기 북마크공유	<ul> <li>컨텐츠번호 : 297058(8/10)</li> </ul>
E지이미지	자료유형 : 기사색인(소장)	OR Code 정보
	기사명 : 국보1호 숭례문 복구 기와 연구와 제작기법	
	저자 : 박경자	
	수록 학술지 정보 : 陶藝研究 (2019년 28호) : p. 153 - 176	
	출판사 : 이화여자대학교 도예연구소	

Fig. 7 Academic Information Center Korea National University of Cultural Heritage

권호(발행일자)	소장위치	청구기호(등록번호)	상타
2019년 28호(2019/12/10)	한국전통문화대학교 도서관 종합정보자료실	631 도64 이 교	입수
한국 현대도자 전시의 경향 연구 / 전주희 (7)	7-34)		
◎ 공예·디자인 교육과 여성: 19~20세기 초 서구	공예·디자인교육기관을 중심으로 / 허보윤, 주요안나 (35-62)		
◎ 한국 도예에 내재 된 "쓰임(用)의 가치"에 관한 !	<u>탁구</u> /강상미 (63-88)		
<sup>©</sup> 리좀으로 접근한 현대공예의 분화 / 이은영	(89-106)		
마르셀 뒤샹의 레디메이드 개념이 반영된 현대	도자예술 연구 / 김미경 (107-126)		
<sup>®</sup> 조선 초 '司膳'명자기의 성격 / 김미경 (127	-152)		
국보1호 숭례문 복구 기와 연구와 제작기법 / 빅	경자 (153-176)		
💽 국보1호 숭례문 복구 기와 연구와 제작기법 / '	박경자 (153-176)		
◎ 동남아시아 페라나칸(Peranakan)자기의 조형과	성격: 문화적 혼종성과 창조적 정체성을 중심으로 / 구혜인 (177-20	4)	
매장문화재의 전시 교육 콘텐츠 활용: 도자고고	학자료를 중심으로 / 방유리 (205-224)		
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무형문화유산과 인류 보편의 공공성: 공예기술을	a 중심으로 / 이수나 (261-280)		
◎ 1890년대 대일(對日) 수입 청기와(靑瓦) 검토 /	김하진 (281-306)		
◎ 정체성과 애브젝트(abject) / 박자일 (307-	332)		
◎ 서평: 『공예의 발명』, 글렌 아담슨 지음 / 문유진	! (378-384)		
<ul> <li>전시평: '一器: 日記: 一期 Thinking Hands' / 길</li> </ul>	지은 (385-387)		

The Types of metadata include descriptive metadata, administrative metadata, and structural metadata.

√ Descriptive metadata	The data for searching information resources
	like a book card.
√ Administrative	The data for easy management of resources
metadata	with managing access to when and how data
	was created.
√ Structural metadata	The data for describing the type, record and
	components of data.

#### 2) Database

#### (1) Definition

Database is defined as a set of operational data that is integrated and stored so that processed data can be shared and used by multiple users. It can be specified in four ways : sharing, integration, storage, and operation.



#### Integrated data

Database does not allow data redundancy where duplicate data exists.

#### Storage data

Database must be stored on the computer-accessible medium, since most data is processed by a computer,

#### Shared data

Database is the public data that can be owned and used by multiple users in a particular organization.

#### Operational data

Database is to run an organization and to perform its main functions, which requires consistency.

The software that manipulates database is called database management system (DBMS). DBMS is responsible for integrating, storing and managing data for the organization.



#### (2) Characteristics of database

Database has four characteristics.

#### ▶ Real-time access is possible

It must be able to respond to the user's data needs in real time.

#### Continuous change is possible

Data must be inserted, deleted and modified continuously to maintain the accuracy of data.

#### Simultaneous sharing is possible

It must be serviced for multiple users at the same time.

#### ▶ Reference to the contents is possible

It must be able to refer to content rather than stored address or location.

## 2. DB Construction Process

Database construction process consists of four phases, which are planning, design, implementation, operation & maintenance. In the planning phase, the scope, characteristics, and service of database are defined. The second phase is logical and physical structure design based on conceptual DB modeling. In the stage of implementation, data is registered and processed with interface with search system. In the last phase of operation & maintenance, database is managed, repaired and recovered.



#### 1) Planning

Database planning process is the stage that defines all matters related to database construction. In the planning stage, the target of database construction is selected, and the market demand survey and economic feasibility analysis are conducted. This leads to defining the scope, features and service of database. For the effective use of database in the information market, marketing strategies are established and indepth researches on database copyright, construction cost, and quality control are also conducted.

DB Construction Process

#### (1) Defining the Scope, Features and Service of Database

The scope of database is limited by the definition of the specific purpose for which database is to be built. The stage of database definition covers data content, format, scale, data analysis method, the degree and processing method of analyzed data, the content, format, size of information, and searching method. The scope of work and use are also defined with a series of processes for building the database.

Defining the features of database depends on the purpose and scope of the database for the user's effective use of the collected and analyzed data. It is defined by data format(medium), data items, DB service method, usage paths, etc.

#### (2) Copyright

In the database planning stage, database-related copyright analysis is needed.

The Copyright in a database is given to the database creator, who has collected, selected, analyzed, processed, and accumulated the information. In general, the database creator becomes the copyright holder. Copyright includes economic rights for the owner's use of the property and moral rights for the protection of personal interests such as honor, reputation, etc.

When building a database, the copyright of source data must be protected. In the case of reproducing copyrighted work, there is a possibility of illegality. Therefore, when collecting and accumulating original data in a database, it is necessary to check the copyright of data. If the copyright of source data is recognized, the database creator must obtain permission from the copyright holder to use the copyrighted work.

#### 2) Design

Database design process can be divided into conceptual model design, logical architecture design, and physical structure design. Conceptual model design simplifies, abstracts, and conceptualizes the information structure that a database wants to represent. It often applies the Entity-Relationship (E-R) model. The logical architecture design uses a data model to implement the data obtained through conceptual modeling into the database. In general, conceptual modeling and logical modeling are not clearly distinguished, which are collectively called data modeling. Physical structure design involves selecting the structure and form of data record, file storage, and record approach according to logical architecture design.

#### 3) Implementation

Database implementation is the stage to construct a database specifically. In this stage, the data to be built into the database is collected. Data processing work to classify, index and abstract data is carried out for easy and convenient use. The software is designed and installed to perform storage and search function through data input.

Software implementations include in-house development, outsourcing, and the purchase of a commercial database management system (DBMS). In the case of a large database for a large number of users, it is desirable to purchase a commercial DBMS with high reliability and functionality, and utilize its development tools, applications, and utilities. On the other hand, if a small database or simple search function is needed, the development of in-house software is advantageous for implementing the system specification. Until now, database implementation has been recognized only as the process of writing a program or installing a system. In practice, however, what is important at the implementation stage is collecting, processing and registering the data. This is because the adequacy of data collection is directly related to the quality of the database being built. In addition, data processing must be able to satisfy the user's demand for diverse and advanced knowledge by not only editing, arranging, or sorting, but also summarizing, extracting, and classifying the data with professional data analysis.

CREATE TABLE 회원 ( 회원아이디 VARCHAR(20) NOT NULL, 비밀번호 VARCHAR(20) NOT NULL, VARCHAR(10) NOT NULL, 이름 나이 INT, 직업 VARCHAR(20), 등급 VARCHAR(10) NOT NULL DEFAULT 'silver', 적립금 NOT NULL DEFAULT 0, INT PRIMARY KEY(회원아이디), CHECK (나이 >= 0), CHECK (등급 in ('silver', 'gold', 'vip') );

#### Fig. 16 Example of SQL Statements for Implementing Relationship (Source: Naver Encyclopedia)

The Construction of Datak Materials and Technique

ase for Asia-Pacific Tradit

Kim Jur

Lee | Byeongsu Ryu | Mikyong Kwon | Jihye

# 3. Database Management 1) Database Management System

In the past, the file system was used as a software for data management. It is the information processing system that has been used for a long time. The file system provides functions to create, delete, modify, and search files for data management. It is installed with the operating system. The system manages application-specific data in a separate file. The file system has the advantage that it does not cost a separate purchase. As each application requires a separate file, it has the following problems.

The data with the same content is stored in multiple files.

The application is dependent on data file.

Simultaneous sharing, security and recovery of data files is limited

Application development is not easy.

The primary solution to these problems is to integrate and store data. However, there is still a need for something new that manages integrated data and handles the data common to all applications, while providing the function of simultaneous sharing, security and recovery. And an alternative to this is the database management system.

Database management system is defined as the software system that manages the database shared by all applications, which is the mediator of applications and data.

Basically database started from the concept of data storage. However, the development of DBMS is essential to use application programs for data storage, search and management.

The essential functions of DBMS include definition function that defines the most appropriate database structure to support various data needs of multiple users in a single database, manipulation function that supports DB user interface and control function that maintains the accuracy and safety of database contents.

Definition function	Defining and modifying database structure.	Table
Manipulation function	Inserting, deleting, modifying, and searching data	
Control function	Maintaining the accuracy and safety of data	

2 Key Features of Database Management System (Source: Naver Encyclopedia) Database management system has many advantages, but it is not suitable for all situations. The following are the disadvantages of database management system.

Advantage	Disadvantage
Data redundancy can be controlled	. High cost is required.
Data independence is ensured.	Backup and recovery methods are complex.
Simultaneous data sharing is possible.	There is a vulnerability due to centralized management
Data security is improved.	
Data integrity is maintained.	
Data standardization is possible.	
Recovery from failures is possible.	
The cost for application developmer is reduced.	nt

e 3 Advantages & Disadvantages of Database Management Systems (Source: Naver Encyclopedia)

Database management systems can be developed for its own system environment or purchased in commercial package. Self-development can provide the most suitable system for the desired environment. But due to the time, cost, and reliability, the commercial DBMS suitable for requirements is usually purchased.

Database management system can be divided into three generations, which include network DBMS, hierarchical DBMS, relational DBMS and object-oriented DBMS.

Network DBMS and hierarchical DBMS used in the 1960s and 1970s belong to the first generation. A representative network DBMS is the Integrated Data Store (IDS) developed in the early 1960s. The Information Management System (IMS) developed in the late 1960s is a representative hierarchical DBMS.

Relational DBMS, which has been in use since the 1980s, belongs to the second generation. Its technology has been continuously expanded and the performance has been improved. It is still widely used and the representative relational DMBS is Oracle<sup>®</sup>, MS SQL Server<sup>®</sup>, Access, informix, MySQL, etc.

The Oracle from Oracle Corporation is a representative relationship DMBS. There are four product families: Enterprise Edition, Standard Edition, Standard Edition 1, and Personal Edition I. and Personal Edition. Enterprise Edition is ideal for enterprise environments that require high performance, scalability, security, and reliability to develop large database systems.

2 Microsoft's MS SQL Server is a representative relationship DMBS. There are four product families: Enterprise Edition, Business Intelligence Edition, Standard Edition, and Express Edition. Enterprise Edition is used to build large data centers or develop high performance data warehouse solutions. **Business Intelligence** Edition offers exceptional capabilities for browser, data decomposition and integrated management based on data exploration and visualization.

	Advantage	Disadvantage	Table 4	Advantage and
MsSQL	<ul> <li>The product price is low.</li> <li>Optimal function and performance can be obtained in Window NT.</li> <li>It's central to Microsoft's "Total Solution" strategy.</li> <li>Database function is simple</li> </ul>	<ul> <li>Microsoft is not a major DBMS company, so its development prospects are uncertain.</li> <li>There is not enough DBMS experts.</li> <li>Database function is simple.</li> </ul>		Representative DMBS Programs
Oracle	<ul> <li>Many users exist.</li> <li>Product excellence was proven.</li> <li>The installation on PC and the mainframe level is available.</li> <li>The strong support for the 3rd party is possible.</li> <li>The distributed processing function is excellent.</li> </ul>	<ul> <li>A lot of hardware resources is needed to operate DMBS.</li> <li>DBMS management is complex.</li> <li>The price is higher than similar DBMS products.</li> <li>Some features of the product are hard to learn.</li> </ul>		

#### 2) Database Management

Continuous and efficient operation following database construction plays a big role in successful database. Database operation is classified as the post-processing stage of database construction process. But it covers the whole mechanism that supports the operation and maintenance of database.

Database operation and maintenance phase includes database quality management and monitoring, database recovery measures against disasters and unexpected events, security enhancements, continuous maintenance, and lastly database overall evaluation. Operation and maintenance are typically the longest phase in the time and performance cycle of database construction and development.

#### (1) Quality Management

The quality of database service refers to the desired state of media, means, method, and source support in the process of data service to users. In other words, it is not the data itself but the concept of service that encompasses completeness, accuracy, speed, convenience, comprehensibility, ease of use and diversity. The quality of database service can be assessed by several criteria. The general quality criteria are summarized below.

Category	Quality Criteria	Core Values	Table 5	Database Quality Criteria
Database Data quality	Accuracy	Whether data in the database is the same as the actual value		
	Completeness	Whether it contains important objects and attributes from the real world that need to be represented		
	Currentness	Whether it was updated with the most recent data		
	Consistency	Whether two or more data are inconsistent		
Database Service Quality	Searchability	The speed and sophistication of search		
	Ease of Use	Database accessibility and output information utilization through interface		
	User Support	Suitability of training, documentation, help services, etc. for users		

#### (2) Monitoring

Database has goal and performance level to achieve and must be constantly monitored to check if this is being achieved. If any problems or deficiencies are found during the monitoring process, tuning action should be taken and corrected immediately.

There are three ways to monitor database performance, and the optimal method is selected according to conditions and environment. The first and most basic method is to record database operation records either directly by computer or manually by operator. The second method is to install the sensor in the computer input/output channel for information recording or to output contents according to program instructions. The third one is to survey the user's satisfaction with the service .

#### (3) Recovery

Recovery refers to restoring database to its state before problem occurred.

Problems include hardware failures due to disk or power corruption, data entry errors, program errors, computer viruses, system problems, and operator errors.

Therefore, database management system should provide backup, log, checkpoint, and recovery manager function to recover the database when problem occurs.

#### (4) Maintenance & Repair

Database maintenance is the process of adding, removing, and modifying the structural features of database to cope with changes in the organization or the business environment, to correct errors in database design and to improve the processing speed of database application. This is to ensure that the developed database is used continuously.

Database maintenance broadly involves testing, tuning, repairing, and recovering device or module to maintain the optimal condition of constructed database. Narrowly, it is limited to finding and correcting various problems and adding new functions. These processes are performed automatically by a program or manually by a maintenance worker.

#### (5) Security

The Data stored in a database is shared and used by members of the organization. If unauthorized outsiders invade the database and corrupt the data, it takes a lot of time and money to recover the damaged data. Therefore, control and security is required so that the database is accessed only by the authorized users.

There are three types to secure database and protect data.

#### Security in the physical environment

Database must be protected from the risk of natural disasters or physical damage.

#### Security through access authority management

The users with access rights are permitted to use the database. Only the user whose account is issued can access the database. And the scope of use and task must be limited.

## Security through Operation & Management

Even if a user uses the database within the authority, the user may be able to violate the data integrity due to mistakes, so that the correct constraints must be defined and controlled so as not to be violated.

# 4. Software Engineering Cost Estimation Guidelines<sup>®</sup>

 Korea Software Industry Association, 2019, Software Engineering Cost Estimation Guidelines (2019 revised edition)

The cost of database construction and management is based on the SW Engineering Cost Estimation Guidelines.

The database construction cost covers the cost of processes to preserve the original data source such as documents and provide database service for the efficient use. Digitalizing documents by text input method

Digitalizing documents by page-by-page scanning or photographing

Constructing metadata for the database service of document index

Digitalizing documentary materials

Digitalizing video and audio materials

Producing and processing specialized data contents for the advanced data service

The database construction cost is calculated based on the degree of data processing, which is divided into general process, specialized process with experts, and additional process beyond the planned construction period. The database construction cost is calculated as the sum of direct labor costs, material costs, profits, and direct expenses. of which the standard labor cost is reported in the guidelines.

What must be considered for database construction according to the guide is as follows.

Archiving the original data source

- Storing the original source in one or separated place Managing the import and export of the data source.
- Cataloging the data Producing the data
- Scanning and editing
- Video editing
- Producing the metadata
- Translation of the foreign data
- Production and input verification

# IV Case Analysis of Heritage Archive Website

Most of the heritage websites related to UNESCO Chair Programmes have provided brief information to introduce the programme and announce the news.

It was found that database construction or archiving service had not been conducted in depth on those websites.

# 1. Archive Site Cases

1) Gugak Archive, Traditional Korean Music Archive

The Gugak Archive researches, collects, manages and conserve intangible cultural heritage resources in the fields of traditional music, dance, play and performance. It has 380,000 collections including the results of more than 1,200 performances, research and education activities conducted by the National Gugak Center and the records of the private sector.

The Archive site provide the copyrighted data as open source on the website after describing, categorizing and digitalizing the collected records, of which the original and replicas are preserved safely and systematically in a constant temperature and humidity room.

The sitemap is composed of Archive Introduction, All Listings, Categorized Search, Collection (photos), and Online Exhibit.

All Listings shows the list of the data arranged by view count, date, title and accuracy with various filter criteria (record year, type, classification, record agency, etc.). Categorized Search includes search by year, search by traditional music classification and Korean traditional music thesaurus. Through searching by year, end-users can view records such as video, sound, text, composites and artifacts. Through searching by traditional music classification, it is possible to make the list of dance, folklore, folk music, banquet and Jeongak. Korean traditional music thesaurus is a kind of dictionary which defines the relation of search terms. If the end-user enter or select search term, the associated terms (synonym/ hypernym /hyponym) are extracted with increasing the accuracy of search.

Collection provides brief information about a donor and records. In Online Exhibition, various thematic stories about Korean traditional music are displayed online. If end-user login the site by membership signup, the user can have his own library and browse the data conveniently through browsing history record system.





#### 2) Seoul Photo Archive

In order to record the history of Seoul, the Seoul Metropolitan Government has collected, accumulated and digitalized the photo images taken from various city places. And the data of the Seoul Photo Archive are easily accessible, of which copyrighted images are available and free of charge for non-commercial use.

The site map is simply and clearly organized by Categorized Search, Photo Collection and Site-specific Photo. The homepage contains statistical information on year and number of registered photo images. Categorized Search is divided into Search by Year and Search by Topic which is sub-categorized into economy, transportation, culture, etc.

Photo Collection has the different classification system from Search by Year or Search by Topic, where photo images are categorized by specific name, place and concept. Site-specific Photo shows the image data categorized by the administrative district of Seoul with the pop-up photos on image map.

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If the user types search terms into the search box, relevant information including associated keywords, shooting year and map is displayed. The search function can be used more conveniently with photo sorting and viewing tools like color image, black & white image, the image with GPS data, etc.

Fig. 20

Fig. 21

Fig. 22

Homepage of Seoul Photo

Photo Collection of Seoul

Categorized Search Data

of Seoul Photo Archive

Photo Archive

Archive







3) Archive of Institute for Multicultural Studies, Daegu Catholic University

The Institute for Multicultural Studies has conducted the research on "The Value Creation of Multiculturalism in the Global World" with 3 phases of research process for 9 years since 2010. The archive was built with

the research data, which was collected and categorized on the 1st and 2nd phase of research. The data was classified into types of media, photographs, recordings, texts and papers. There is a limitation in the use of data because the data is just uploaded without sufficient description. Archiving on the website is ongoing but the database has not yet been constructed.



#### 4) Europeana

Europeana is the European Union's electronic library project. The goal of the project is to make Europe's rich cultural heritage, culture and information more available and accessible through the worldwide Internet. The user can access online more than 4.6 million books, newspapers, videos, maps, and photos from more than 1,000 cultural organizations in the European Union, including the British Museum, the Louvre and the French National Library. The menu of the archive site consists of Collections, Explore, Exhibitions, and Blog, where the archive data is serviced in 27 languages.



#### 5) Archive Website of Curtin University

The Archive homepage of the Curtin University introduces the UNESCO Chair Programme in Cultural Heritage & Visualization and the research on how augmented and virtual reality is used for heritage conservation, tourism and education.

The menu consists of case studies, research highlights, themes, groups, etc. The archive site has data and information about related researches. But it provides the data only in text form, which leads to the lack of diversity of data types.



#### 6) Archive website of Durham University

The Center for the Ethics of Cultural Heritage Section of Durham University's website provides information about the centre, news, projects, conferences and unesco chairs.

The research information is linked to references and classified by project for the convenience of search. However, it does not provide visual data such as photograph, video or map.



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#### 7) Archive Website of CATEDRA UNESCO

The archive website of CATEDRA UNESCO Paisajes Culturales y Patrimonio provides information with the aim of raising public awareness for the significance of cultural landscape and heritage conservation. The menu items are About us, Publications, Projects, Training and News. It provides only simple data such as papers and texts.



# 2. How to Design the Archive Website for Traditional Materials and Technique

The research projects of UNESCO Chair Programme includes technical fields surveys on disappearing Asian-Pacific traditional materials and technique, DB construction & management, professional training programs and conference for heritage researchers and practitioners. The website for Asian-Pacific traditional materials and technique will serve as the operation center by managing the performance of UNESCO Chair Programme research projects such as research presentations, theses and UNESCO Chair biennial reports.

The website will be designed to provide archiving service with the sitemap for various search paths. The structure of sitemap is as follows.



The menu items are Introduction of UNESCO Chair Programme, All Listings, Categorized Search and News & Communication. Introduction of UNESCO Chair Programme introduces research projects and the websites related to the programme. All Listings provides searching service with various filter criteria (record type, record year, classification, record agency, etc.). Categorized Search includes search by year, search by country, search by topic and search by data type. News & Communication is constructed with News & Events to announce conferences and training programs for Asian-pacific heritage professionals, publications to share the data of research presentation, theses and UNESCO biennial reports and FAQ.

The direction of data service is to ensure accessibility to data, intuitive search, continuity through all Listings with systematic filtering function (record year, data type, classification, data agency, etc.).

In addition, the website will be built for desktop and mobile device so that the end-user can access and understand easily the data in any access environment.



Lastly the website is expected to serve as a hub for heritage related fields by sharing research data in Korean and English and promoting communication between worldwide heritage researchers and practitioners.



#### 3. How to Build the Archive Website

There are two ways to build a website, which are installation type and subscription type. The installation type is a method of operating a website by installing a server on a computer. The representative one is WordPress. Approximately one-sixth of the world's websites uses WordPress. The installation type is highly customizable, especially for layout design, and also easy to control contents. But it requires the expert with coding skills and additional paid third-party services like domain, hosting, etc.

The subscription type uses the website builder like Wix. Naver blog is one of the representative example. The subscription type is less customizable than the installation one, where the user has some limited options in layout design. But it is independent on additional third-party hosting services with providing the server.

The installation type with flexibility and customization is considered to be suitable to build the website for this research project. It is easy to integrate because most of the installation web programs follow the MySQL standard such as WordPress, Zero Board, etc.



# V Conclusion

This is the basic research on the archiving policy & procedure, which is about collecting, validating, screening, categorizing, organizing, describing, preserving, and servicing survey records. How to archive technical field survey data and provide the data on heritage archive websites was discussed in the case analysis of this research.

The guidelines were proposed to manage field survey results, use

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the digital data and operate the archiving website for Asian-Pacific traditional materials and technique. It is expected to share the field survey results as open-source data and support research activities in the heritage related fields.

DB Construction for Asia-Pacific Traditional Materials & Technique

Fig. 37 Impact & Outcome References





Yeonhee Kim, 2013.6.30, Introduction to Database, Naver Encyclopedia Korea Software Industry Association, 2019, Guide to Estimating Software Telecommunications Technology Association http://www.tta.or.kr

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# Thesis in the 2019 KNUCH UNESCO Chair International Conference

Suggesting the Preservation and Management of Architectural and Urban Heritage UNESCO Chair on Heritage Future: a presentation of our work 2017~2019 UNESCO Chair in Cultural Resource Management, Southeast University, China Historic Urban Landscapes and Heritage Impact Assessments Sustainable Cultures in times of transition

# Suggesting the Preservation and Management of Architectural and Urban Heritage

KNUCH, Division of Architecture-Landscape-architecture, Department of Heritage Conservation and Restoration

Cities play an important role not only in sustainable conservation and utilization (management) of intangible and tangible cultural heritage but also in the development of human welfare and health, social creativity and cultural diversity. In this sense, a city can be recognized as an important resource for the future. On the other hand, cities are dynamic organisms. They are constantly evolving, adapting to social structures and needs, and adapting continuously to the physical structure. In the future, it is necessary to develop an approach to preserve and manage the diversity of cultural heritages in future cities and to adapt them to the characteristics of changing and living cities.

Recently, the philosophical principle on the conservation and management of historic cities has focused on operating an integrated system of conservation and utilization rather than protecting cultural heritage. Even conservation principles related to urban heritage preserve cultural heritage in historic cities, due to the conceptual change in value, based on value of cultural heritage, cultural significance of cultural heritage, and priorities, authenticity and integrity related to development and preservation Principles continue to evolve. With this in mind, this study deals with conceptual definition and development of historic cities, development of conservation management principles, and international trends.

# 2. The Concept of Historic Cities 1) Etymology of the notion of 'urban'

Ildefonso Cerda y Suner (1815–1876) is known as the founder of the term 'urbanism'. In the Barcelona Expansion Plan (1859), Cerda focused on the major needs. The need for smooth transportation of goods, energy and information, and the need for effective waste disposal, including good sewage, and the need for greenery in people's environments, largely due to the need for sunlight, natural lighting and ventilation (greatly affected by sanitation).



Cedar's design believes in a network-centric approach ahead of his time. His street layout and lattice plan were optimized to accommodate large capacity sewers in consideration of pedestrians, carriages, wagons, trams, urban rail lines, public sewers and private gardens to prevent gas supply and frequent floods, and major amenities. The latest

the word 'urbanized' to artificially cultivate an open area (rural area) technological innovations have been incorporated into his design, if they can develop the driving force of better integration, and presented a new concept, including a logical land reclamation system that is essential to the success of his project. He chose the Latin "urbs" referring to the 'urbum', and the legend that the Romans used plows (using sacred bulls) to leave a range of settlements. If you follow this boundary, the term 'urbanized' has been used in the sense that it is separated from the previously open free place (furrow) and artificially developed. Thus, 'Urbanism' means a planned area associated with an urban area other than an open area. On the other hand, the urban area includes an open space that is 'urbanized', which is clearly part of the urban settlement. The ninth-century Spanish city planner, Cerda, drafted a useful boundary delimitation bill, created a detailed geomorphological survey map around Barcelona, and produced a theoretical paper to support each major project. He actually created several important words in Spanish, including 'urbanización'.

According to Cerda, other terms such as 'city' and 'town', which are used as synonyms, are also discussed. But the word 'town' (ancient English tun) is known to mean an artificially created 'enclosure'. Later generations are distinguished from 'villages', which are generally derived from 'villa (cottage house, italian)' and which represent a smaller resident population than the city. 'City' relates to the Latin word 'civis', which means a townsman who is a resident of a city settlement. In medieval times the city (derived from 'civitas') was a cathedral city and was distinguished from a 'normal' ordinary city. The archbishop, which dominates other bishops, was called a 'metropolitan', and the place of the metropolitan was called 'metropolis'. In recent years, this word has evidently meant 'a very vast urban area' surrounding the adjacent municipalities around the metropolis. Urbs (polis in Greek), a city area that has been around for centuries, are clearly distinguished from the open territories of the surrounding rural areas. A landmark change in the etymological concept is the result of industrialization and population growth in the late 19th century. A suburban area is a suburban area that is built mainly on the outskirts of an existing urban area. In the early days, these areas were interspersed rather than rural, and there were no distinctive service facilities comparable to urban centers. Over time the suburbs provided many services and the quality of their homes was highly appreciated.

#### 2) Concept of Historic City

"History' is defined in two ways: the transient progression of large-scale human events and actions; this course is designed to gain knowledge about human past."

Philosophy of history can be located under either of these two, and would thus be called 'speculative' when examining the progression, or 'critical', i.e. the epistemology of historic knowledge, when searching for knowledge of the human past.

 Audi, R. (ed.). 1996. The Cambridge Dictionary of Philosophy. Cambridge, Cambridge University Press, pp. 584f

Thus, 'historic' can be understood not as old, but as material for historic subjects, that is, to be associated with a particular meaning and ultimate value. From the cultural heritage point of view, the term 'historic' can be said to have been verified as a legacy. Likewise, urban areas of diversity are the product of the process that is still underway. It reflects not only existing circumstances such as the environment, economy and social culture, but also the intention and necessity of other times. The resulting urban structure reflects the diversity of human creative minds, provides a specific identity for each region, connects each region, has a systematic skeleton, and has a form of continuity. Being regarded as 'historic' is not automatic, but is a result of continuity to seek true value over time. Meanwhile, according to Patrick Geddes, the historic city, along with ancient cities, monuments, old streets and homes, said that the historic city, a "past world heritage," could not be preserved as it was, Since the physical structure of the 'City of Evolution' is not static,

'people in evolution' adapt to 'claims and demands' within the social structure.<sup>©</sup> Geddes, P Cities in Evolution: An Introduction to the Town

Geddes, P Cities in Evolution: An Introduction to the Town Planning Movement and the Study of Civics. London: Williams & amp; Norgate, 1915. p.214.

The historic city area is an area where the people concerned are recognized history and reality. This is an area worthy of special care to monitor and control all the changes that could compromise recognized properties, and even a protected area.

For this reason, authenticity cannot be a fixed concept. Rather it means evolving with the people and cities that develop together. Following these consecutive thoughts, 'cities of evolution' can be composed of equally true strata that can well reflect the claims and demands of 'people of evolution'. Thus, reconstruction can be understood as a layer of truthfulness in the introduction of reconstruction in the historic city landscape approach, just as other human interventions (which are believed to be meaningful to people) have been in the past and are headed for the future. Understanding the authenticity as a dynamic concept is also related to the understanding of the city as a living organism that reflects the paradigm of historic city landscape.

# 3. Development on International Principles for Urban Conservation

The basic principle of the conservation philosophy of archaeological sites was the SPAB Statement in 1877, the Madrid Declaration in 1904. the Athens Charter in 1931, and the 1964 Venice Charter showed the ideological change of the perception of the preservation of the remains. The SPAB was concerned with subjective restoration behavior and presented guidance and handbooks related to this, and practical examples of approaches. The Madrid Declaration discussed the maintenance and meaning of the original function based on the SPAB 's point of view in restoring the monument. The Athens Charter and the Venice Charter discussed the significance of the surrounding context and the use of new materials such as concrete in restoration of the repair, along with monuments before and after World War II. It should be noted that the Venice Charter refuses to deal with archaeological remains as individual independent entities and there is an increasing frequency of use of terms related to city size in the International Conservation Charter since the 1960s.

Concerning the "Venice Charter", Article 11, on conservation and restoration, criticizes the reunification of the monuments in the restoration of monuments. This was influenced by Giovanoni's "Carta del Resauro", which covered the respect of historical monastic depletion.

- 3 L. Veldpaus, A.R. Pereira Roders, B.J. Colenbrander, Urban Heritage: Putting the Past into the Future The Historic Environment, 4 (1) (2013), pp. 3-18
- Claudine Houbart, 2014 "Deconsecrating a Doctrinal Monument-Raymond M. Lemair {1921-1997} and the Revision of the Venice Charter", Change Over Time vol.4 no'2, The University of Pennsylvania Press

Jukka Jokilehto, 2009, (A)

162, 322.

history of architectural

conservation, pp.26-29, 49,

When he examined the repair and restoration of historic structures before the appearance of "Venetian scene", Giovanoni tried to maintain the original materials and style of the structure, although this is not common. At the time of ancient times, the purpose of restoration was to improve

the function and artistic appearance of the building, and many times the buildings were restored in the style of each era. Due to these causes, many ancient buildings had various styles, despite this upheaval situation at the beginning of the nineteenth century when the influence of historicism was intensified, the ultimate goal of restoration was related to the unification of culture. However, as the values of modernity changed over time, the critique of the unification of the culture was amplified as "specificity and relativity" which largely influenced on the restoration theory later.

Gradually, all ages and all forms were recognized as worthy of protection, and as a result, the site of repair and restoration works preferred the coexistence of various styles rather than the unification of styles. This is the most modern concept that has emerged since the end of the nineteenth century, and is associated with the aged value linked with the times.<sup>6</sup>

#### 6 Ibid., p.25.

In the enactment of the Venice Charter, the Gumi region has undergone a major change in the cultural preservation movement. There has been a revision of the concept of historical significance. Conservationists no longer focus on historical monuments, like museum exhibits, but begin to pay attention to historical sites that encompass cultural heritage and the surrounding environment. The Article 14 of the Venice Charter states deals with the preservation and restoration of historic monuments and monuments, states that the above provisions on preservation and restoration work have been fulfilled. This means that the second clause, "securing all scientific and technological means"

 Article 14 states that the above provisions on conservation and restoration work are to be complied with, which is related to the second provision of "securing all scientific and technological means".

B Petzet, M. 2009. International principles of preservation. Monuments and Sites, pp.20. 25.

In the 1970s, the purpose of the reconstruction of historical monuments and cities, which have been damaged for more than ten years after the Second World War, and the enormous damage, is the principle that can be applied to individual monuments respectively. On the other hand, the place where the monument remains is extended not only to archaeological sites, but also to historic villages and cities.<sup>®</sup> Historic ruins should be more widely recognized as a problem of urban and regional planning, along with changes in social structure. In the case of complex monuments for the preservation process of the ruins, sociological and economic variables were sought to find appropriate remedies for local communities. However, the contents of the Venice Charter do not address the intangible and spiritual aspects of the consideration of the local community and the cultural heritage, but as mentioned in the preface to the Venice scene, "the integration of human values" It is clear that the interpretation has had a considerable impact on the charter, declaration, and recommendation.

Based on the Venice Charter, the Norms of Quito (1967) contains preservation tools and measures based on cities that consider archaeological

integration as the basis for effective conservation.<sup>®</sup> Action 8d requires the regulation of the area adjacent to the site (the need for a buffer zone) as well as the provisions on "land use, density and quantity relationship". In 1972, the World Heritage

 L. Veldpaus, A.R. Pereira Roders, B.J. Colenbrander, Urban Heritage: Putting the Past into the Future. The Historic Environment, 4 (1) (2013), pp. 3-18

Convention suggested the preservation of the historical environment, the integrity of buildings and their components, the social usefulness of monuments in the daily lives of living communities. The 1973 ICOMOS proposed<sup>®</sup> that the diversity of activities on the street (street) should be preserved by maintaining a certain scale for the urban organization, recognizing that this is due to regional characteristics.<sup>®</sup> The concept of adapting historical cities in a way that does not destroy urban organization and urban structure was advocated. In 1975, the European Charter of the Architectural Heritage and the Declaration of Amsterdam was adopted at the European Architectural Heritage Conference. In the former, the practice of "integrated conservation", which includes the preservation of physical and social structures at the core and in historical cities, becomes an important issue. Integral conservation does not preclude the introduction of modern architecture into areas with old buildings, if the existing situation, style, form, size and scale are respected in the use of traditional materials are used. To contrast, in the latter, an approach to "integrated conservation" as a measurement tool to ensure the continuity of heritage is developed by defining the role of modern architecture in archeological sites based on cooperation between legal, administrative, financial and technical support systems.

- International Council on Monuments and Sites (ICOMOS). 1973. Resolutions of the Symposium Devoted to the Study of "The Streetscape in Historic Towns" Lausanne, Switzerland, 17th to 22nd June 1973. http://www. international.icomos.org/ publications/lausanne1973/ lausanne1973-10.pdf
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- R. Shipley, J. Kovacs, 2005, Principles for the Heritage Conservation Sector in Canada: Lessons from the International Experience, Heritage Resources Center.
- K. Taylor, Cultural heritage management: a possible role for charters and principles in Asia, Int. J. Herit. Stud., 10 (5) (2004), pp. 417-433; R. Shipley, J. Kovacs, Principles for the Heritage Conservation Sector in Canada: Lessons from the International Experience, Heritage Resources Center (2005)

In the 1976 Nairobi Charter, focusing on the protection of cultural heritage due to modern urbanization, the Charter proposed that all historical areas and their surroundings be considered as a whole as a coherent whole. Further, in 1979, the Burra Charter has a unique perspective on archeological terms and defined the concept of "place" instead of "monument".<sup>®</sup> Recognizing a monument as a place has expanded the preservation notion of historic cultural environment by including physical and social organization as well as archeological monuments. According to the UNESCO Operational Guidelines (1980), the cultural heritage devastated in World War II recognized that the grounds for restoration were suggested in accordance with authenticity, especially if they exist clearly in the original form.

Likewise, in 1982, the Dresden Declaration at the ICOMOS General Assembly in Europe recognized the restoration as a complete restoration based on the highly reliable evidence of the pre-destruction of monuments. In 1985, the Granada Convention developed the awareness of archeological assets in order to achieve the protection of archeological sites and the optimal management of cultural properties.<sup>®</sup> As regards the protection procedures under the statute, Article 4 requires that each party to the convention. That is to say, it required substantial changes that would damage the properties of the building or land, such as demolishing plans, building structures, new constructions, or buildings affecting the building group or parts thereof. The protection through laws on architectural heritages and their relevant sites should be submitted to the competent authorities.<sup>®</sup>

The Yamato Declaration (2004) on the Integrated Approach for the protection of intangible and tangible heritages states that "authenticity cannot be applied to intangible cultural heritage because it is constantly recreated through generations."<sup>®</sup> Following the Vienna Memorandum (2005) and the Declaration on the Conservation of Historic Urban Landscapes (2005), Xi'an Declaration on the Conservation of the Setting of Heritage Structures, Sites and Areas (2005) emphasizes a cultural significance and unique characteristics on each locality, Also, historic areas have unique characteristics in meaningful relationships with physical, visual, mental and cultural contexts and environments.<sup>®</sup> Therefore, it was suggested that appropriate planning tools and strategies should be developed for the conservation and management of the region that creates the local environment. The Recommendation on the Historic Urban Landscape (2011) completed through the St Petersburg

 Council of Europe. 1985.
 Convention for the Protection of the Architectural Heritage of Europe

ß The Washington Charter (1987), ICAHM is the abbreviation for the International Scientific Committee on Archaeological Heritage Management. Charter (1990), Nara (1994), Krakow Constitution (2000), Articles 6 and 8-10 are particularly relevant to topics on appropriate new developments in the historical environment. International Conference on Conservation "Krakow 2000." 2000. The Charter of Krakow 2000: Principles for Conservation and Restoration of Built Heritage. http://lecce-workshop. unile.it/Downloads/The%20 Charter%20of%20 Krakow% 202000.pdf

- UNESCO., 2004. Yamato
   Declaration on Integrated
   Approaches for Safeguarding
   Tangible and Intangible
   Cultural Heritage. UNESCO.
- ICOMOS. 2005. Xi'an Declaration on the Conservation of the Heritage Structures, Sites and Areas. Article 1, Article 2, http://www. international.icomos.org/ charters/xiandeclaration.pdf

Conference (2007), the Orinda Conference (2007), and Preliminary report on the draft Recommendation on the Historic Urban Landscape (2010), integrates historic remains with intangible and tangible values, and the city was recognized as the accumulation of history. In the 1996 Mexico Mérida World Heritage Conference, it was argued that the architectural heritage was built on a dynamic concept and that the issue of preservation should be addressed in a sustainable framework.



2 Primary Changes from Cultural Landscapes to Historical Urban Landscape It also recognizes social frameworks concerned with the environment, economic activity, and cultural life, and that preservation methods should be determined in the same sense as the community. This emphasized the importance of social values according to regional identity. Furthermore, in 2001, the Helsinki World Heritage Conference proposed the possibility of cooperative coexistence in urban context as a cultural heritage through suggestion that the connection between conservation and development should also be established within social framework and city. Recognizing the city as an accumulation of historical stratification that continues to change over time with respect to the place, it integrates the non-traditional values of the place. The Report of the World Heritage Committee also speaks the role of international documentation and regional policy on the heritage management process. It has also addresses the role of international documents and local policies on the heritage management process.

As a result, these international documents present the sequential evolution of conservation ideology on the theoretical, scientific and practical levels. Jokilehto examines the progression of the urban-scale related terminologies pointing out that these terms are changing from being explicitly appointed sites towards less defined names, from monument (1930's), setting (1960's), historic settlements (1970's), urban areas (1980's), places (1990's) to landscapes and cities (2000's).

#### 5. Conclusion

Patrick Geddes said that a city is a living organism experiencing experiences birth, growth, maturity, decline, decay and rebirth. The history of human intervention is likened to the PALIMPSEST of the urban landscape, which corresponds to the concept of 'context', which is often referred to in architecture, and includes the conditions of buildings, roads, Background, and so on. In the stratification of historic cities, some strata can be maintained in good physical condition, but some strata can be degenerated or disappeared by surrounding circumstances such as hardening, neglect, natural disaster or armed conflict. Even if the historic city is unfortunately destroyed, a new stratum may appear, so the wheel of life is not over. Some may resemble the old to meet the needs of contemporary society. This stratification process reflects the thinking that supports the recommendation for 2011 historic urban landscape. <image>

(left) the Yukjo geori Avenue (Avenue of Six Ministries) in Joseon Dynasty

Fig. 4 (right) Present state of the Gangwhamun Square

Fig. 5 Reconstruction Competition for the New Gwanghwamun Square (the author's work)

Based on the discussions so far, we can see that the international trends and major issues of the historic city preservation and management principle have continued to evolve and evolve with the methodological framework of inheriting the past tradition and modifying it to the modern nature. Therefore, the assemblage of "history + city + landscape" has confirmed that the buildings, roads, and gardens that are placed on the cities based on the city are constantly evolving and transformed like creature. It has also confirmed that these accidents have been developed into a unified system supporting the historic cityscapes through constitutions, declarations and recommendations at numerous international conferences.

As in the case of the Gwanghwamun Square, the Sejongdaero Avenue itself has been continuously changed in the balance of development and preservation from the Joseon Dynasty, via the Japanese colonial period, throughout the present. In the future, Sejongdaero Avenue should be a meaningful place to accept the needs of citizens and provide rest, and should be a space of organic networks that can tie the historic places and various events around them.

Finally, the ongoing conservation and management principle is constantly embracing global trends. Actively reflecting on the transition of this paradigm and through the Urban Regeneration Initiative, we should actively reflect on the problems we face the conservation rehabilitation of architectural assets such as historical hanok (Korean-style houses), revitalization of urban areas in the historical city, development around cultural heritage, reconstruction, and the intervention of modern buildings in the historic district.

# UNESCO Chair on Heritage Future: a presentation of our work 2017~2019



Linnaeus University, Sweden

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In 2017, Linnaeus University was awarded a UNESCO Chair on Heritage Futures. This is one of eight UNESCO Chairs in Sweden and the only one in Sweden in the area of culture.

Heritage futures are concerned with the roles of heritage in managing the relations between present and future societies, e.g. through anticipation and planning. Our work is dedicated to developing professional strategies for enhancing how heritage shapes the future. We ask questions such as: Which future do we preserve the heritage for? Which heritage will benefit future generations most? How can we build capacity in future thinking (futures literacy) among heritage professionals worldwide?

These questions are fundamental to the cultural heritage sector but not often seriously considered. The protection of cultural heritage and the desire to restore and reconstruct cultural heritage are commonly based on a perceived need (often explicitly formulated) to preserve the cultural heritage and cultural traditions for the benefit of future generations. However, it is not usually asked which future generations are the intended beneficiaries or why we believe the cultural heritage and the cultural traditions we preserve will benefit them (Högberg et al 2017). Given that history has always been about change, that our contemporary world is changing fast, and that society's resources are scarce with many pressing needs, we need to be sure that we acting responsibly and sustainably in preserving and managing the cultural heritage. It is not self-evident that the cultural heritage we preserve will be appreciated and used by future generations in the way we intend and hope. Our Chair is therefore committed to capacity-building in future thinking. We are guided by the spirit in which the Agenda 2030 has been defining the priorities of global development and committed the nations of the world to do their utmost in achieving the 17 sustainable development goals.

Over its first two years 2017-2019, the UNESCO Chair on Heritage Futures at Linnaeus University has been engaging in an extensive programme of national and international collaboration in research and training. We presented our work and agenda on many occasions in Sweden and around the world. We established contacts to various programmes and activities in UNESCO, to the Swedish Delegation to UNESCO, the Swedish UNESCO Commission, and began collaboration with other UNESCO Chairs in Sweden and internationally. By now, our Chair and its agenda are widely recognized in the global cultural heritage sector and beyond, and we have begun to make an impact through training and academic research.

Our team currently consists of the following:

- Dr Cornelius Holtorf, Chairholder and Professor of Archaeology, Linnaeus University
- Dr Anders Högberg, Professor of Archaeology, Linnaeus University
- Dr Sarah May (affiliated), Senior Lecturer in Public History and Heritage, Swansea University, UK
- Dr Annalisa Bolin, Post-doctoral Fellow, Linnaeus University
- Dr Claudio Pescatore, Research Coordinator VINNOVA project, Linnaeus University
- Ulrika Söderström, PhD student, Kalmar County Museum and Linnaeus University
- Helena Rydén, Assistant to the Chair, Linnaeus University

Major landmark achievements to date have been

(1) the completion of the international Heritage Futures Research Programme (2015-2019) in which we had responsibility for investigating how the uncertainty of the future is conceived and managed across different domains of heritage (see https://heritage-futures.org and Harrison et al forthcoming); (2) the organization of two international workshops promoting knowledge exchange and discussion within different domains of heritage, with a view to influence policy development in two different sectors: one on Information and Memory for Future Decision-Making: Radioactive Waste and Beyond (Stockholm, May 2019), the other as an ICOMOS University Forum on Thinking and Planning the Future in Heritage Management (Amsterdam, June 2019); and

(3) the development of Future Workshops as an effective training method for professional capacity-building in futures literacy for heritage managers and others.

## **Education and Training**

Over the past two years, the Chair established several new courses at University level. One new course entitled "Heritage, the future, and how to create a more sustainable society, 7.5 credits" was approved at Linnaeus University in March 2019. The course was created by Anders Högberg and Cornelius Holtorf and is designed for students at advanced level. It addresses the following issues: How are heritage and future-thinking connected with each other? What does it mean to preserve heritage for the benefit of future generations? How can we plan for the future in present-day heritage management? How might future society be improved through heritage and become more sustainable? The course has not been taught yet at Linnaeus University. Recently, a revised version for undergraduate students has been designed. It will be taught at the University of Poznan, Poland in spring 2020.

At Swansea University (UK), Sarah May developed a new course at advanced level on "Toxic Heritage" (20 credits) and taught it during spring 2019. The course is partly based on insights gained from the Heritage Futures project and involves students considering how the management of toxic waste and the management of heritage entwine in the creation of futures.

In addition, we developed and carried out a range of training activities for various audiences in our region in SW Sweden and beyond, involving both students in higher education and professionals in the cultural heritage sector. This included not only lectures, presentations and supervision but also a card game and in particular very successful halfday future workshops that we conducted on almost a dozen occasions, mostly for professionals in heritage management and urban planning.

#### Research

Cornelius Holtorf (Co-Investigator), Sarah May (Research Associate), and Anders Högberg (Affiliated Researcher) have been involved in substantial research in the area of Uncertainty, which was one of four themes in the AHRC-funded Heritage Futures research programme led by Professor Rodney Harrison at University College London, UK (https:// heritage-futures.org). Our work focused on how the uncertainty of the future is conceived and managed across different domains of heritage and conservation involving nuclear waste (mostly in Sweden and the Netherlands), a space message (global, co-ordinated from the US), a long-term storage site (in Austria) and a world heritage site (in the UK). They are each managing deep time frames that reach into the distant future. This work involved among others major contributions to the 19th ICOMOS General Assembly held in New Delhi, India (2017) and the 4th Association of Critical Heritage Studies Conference held in Hangzhou, China (2018). This research also contributed to a number of significant academic publications by members of the Chair (see references below). Ulrika Söderström, supervised by Högberg, completed her Licentiate dissertation as part of her ongoing Doctoral research which aims at improving our understanding of how heritage and archaeological knowledge can be applied in practice to meet the aims of Agenda 2030, in particular Goal 11 on Sustainable cities and communities.

Cornelius Holtorf and Anders Högberg have been co-editing a volume on "Cultural Heritage and the Future", to be published with Routledge in 2019/20. Cornelius Holtorf has also been editing a special issue of International Journal of Cultural Property on Authenticity and Reconstruction (to be published in 2020). The papers derive from the ICOMOS University Forum pilot workshop on "Authenticity and Reconstructions. A contemporary provocation: reconstructions as tools of future-making" which Holtorf co-organised and which was held at ICOMOS Headquarters, Paris in March 2017.

Cornelius Holtorf is currently Project Director of the project "Memory across Generations", funded by VINNOVA (Sweden's Innovation Agency) as a Stage 1 Challenge-Driven Innovation. Claudio Pescatore serves as Project Coordinator and Anders Högberg participates in the project. Together we are aiming at establishing a common platform for exchanging ideas among major stakeholders concerning the management of cultural heritage and toxic waste, especially nuclear waste. We are committed to knowledge exchange and capacity building that will contribute to making long-term strategies for taking care of toxic waste (and indeed cultural heritage) more sustainable through innovation in collaborative practice and revised policy. This work is based on an interpretation of long-lived toxic waste as a very particular form of cultural heritage. The connection we see between cultural heritage and toxic waste is unusual but central for our work and therefore deserves more discussion. The following section of this presentation contains a summary of some of our work in that context, focusing on nuclear waste in particular.

 A full version of this text will be published elsewhere soon.

# Research case-study: Nuclear waste as cultural heritage

Cultural heritage is commonly understood in positive terms. It is the legacy of past generations that we value today and wish, in turn, to transmit to future generations. Cultural heritage often expresses a sense of tradition and belonging; it tends to be flavoured by a certain amount of nostalgia. When such notions of cultural heritage are combined with the imagery of nuclear power stations, we are immediately struck by a strong visual tension. The silhouettes of nuclear power stations may be a familiar part of our landscapes but they are associated with values that could not be farther removed from nostalgia. They may remind us of long-term health risks, environmental destruction, the power of large corporations, and the arrogance of politicians. If anything, the waste produced by generating nuclear power might in the light of this juxtaposition be characterised as anti-heritage – it's what contradicts and ultimately threatens the values and emotions we associate with heritage. But not all is as it seems at first glance.

Actually, there are many similarities between nuclear waste and cultural heritage. In fact, there are so many that we can say that nuclear waste is a very particular form of cultural heritage:

- both nuclear waste and cultural heritage are ambiguous and may be considered either as meaningless waste material from the past (best discarded) or as something valuable and powerful (best kept);
- nuclear waste may not make people proud or provoke much nostalgia but it is nonetheless part of the human legacy, precisely like other examples of what has become known as 'difficult heritage', like battlefields, concentration camps or sites associated with the Cold War;
- nuclear waste and its repositories are material evidence of 'Atomic culture' that not only – through the energy generated – contributed to a distinct development of the global economy during the second

half of the 20th century but also – through the associated risks – led to the emergence of the global environmental movement and a widespread concern for the well-being of future generations and our ethical responsibilities on this planet;

- nuclear waste demands safe conservation to minimise future risks just as cultural heritage demands safe conservation to maximise its future benefits;
- both realms are concerned with objects but it is paramount to preserve even relevant associated information about these objects so that it will always be clear what they constitute;
- nuclear waste and cultural heritage are both best managed by experts who possess the necessary knowledge and skills to handle them responsibly in a secure environment;
- both realms are subject to legislation stipulating what may and may not be done to nuclear waste and cultural heritage respectively;
- they are also both subject to ethical demands and responsibilities, although these remain under constant reconsideration as sensitivities and values evolve;
- they both demonstrate how local sites and processes are connected to global policies and concerns (and vice versa);
- just like cultural heritage reminds us of our distant past, with the oldest remains taking us back millions of years to the first emergence of human beings, nuclear waste evokes distant futures, with some of the material going to retain radioactivity for more than a million years, thus considerably extending and even challenging our ordinary timeframes in daily life;
- both realms are ultimately concerned not with the longevity of charged objects but with a concern for human welfare now and in the future;
- they remind us in equal measure of the way in which nature and culture, physics and society, biology and history, chemistry and art are inseparably connected and dependent on each other;
- nuclear waste and cultural heritage are also both demonstrating how tangible (material) and intangible (non-material) properties and values influence and reinforce each other so that it makes little sense to focus on one without the other;
- in both cases it has also become clear in recent decades that human behaviour towards them is to a large extent dependent on particular interpretations and values,
- so that some very contested meanings have come to the fore and led to conflicts between different factions of people disagreeing with each other,
- while also revealing how these perceptions and the resulting

conflicts are highly variable, changing over time, and to a large extent dependent on particular socio-cultural contexts.

It can therefore be said that whether we are concerned with nuclear waste or cultural heritage, we are in the same business of Heritage Futures. Heritage Futures are concerned with the roles of heritage in managing the relations between present and future societies, e.g. through anticipation and planning. As discussed, nuclear waste can be seen as a particular form of cultural heritage. It is being managed in the present through planning and in anticipation of future events and processes. The longevity and toxicity of nuclear waste raise profound questions not only on the general responsibility of living generations for their descendants' interests but also on the challenges of addressing concerns in the future that will be affected by parameters we know nothing about. The creative inspiration deriving from long-term nuclear waste management is the reason why the UNESCO Chair on Heritage Futures at Linnaeus University has been developing research in close collaboration with various partners and stakeholders in the nuclear waste sector.

Sometimes, the most profound contribution University research can make to society is adding additional complexity to the way we perceive and manage certain issues, such as cultural heritage and nuclear waste. In cases like these, it may very well be one role of academic research not to provide all too simple solutions but to remind us of complexities that our society will need to address in order to do justice to us being Homo sapiens. Surely, we must aspire to display thoughtfulness in all decisionmaking processes, thus avoiding unnecessary errors and mistaken judgements.

With that in mind, let us consider a simple proverb that nevertheless sums up a considerable amount of thinking and indeed wisdom, with profound implications for how we ought to perceive and manage nuclear waste and cultural heritage. It might be called the Paradox of Social Time:

# "Nothing ages faster than the future. Nothing is more difficult to predict than the past."

This formulation poignantly reminds us of the surprising speed at which perceptions of the future become dated. For example, futures described in science-fiction novels and films from the 1960s now tell us much more about the time in which they were written and made than about any future we recognize today. Likewise, the optimism and unbroken trust in technological progress at that time made society not worry at all about major issues to do with nuclear waste, and certainly not in the way we worry now. Clearly, the future isn't what it used to be.

By the same token, over the last century narratives about the past have changed in unpredictable ways. Today, it seems perfectly ordinary that accounts of the past are connected prominently with issues that were not on the agenda several decades ago, for example gender, sustainability, multiculturalism and decolonisation. What will future accounts of the past of nuclear waste be like? Nuclear technology is relatively new, but within the timespan of only one generation expected future pasts of nuclear waste have already managed to change drastically. During the 1980s and 90s, nuclear waste was expected to represent a past of shame and embarrassment which the future was to be warned of. Accordingly, the first messages about nuclear waste repositories designed to reach future generations intended to communicate that "this is not a place of honour, you should not have come here". By now, the picture has changed. The sector speaks about the challenge of maintaining or recovering records, knowledge and memory, in short RK&M. In other words, the future past is no longer connected with emotions and behavioural instructions but with a set of facts providing information that is intended to help future generations to avoid inadvertent exposure to radioactivity and make their own knowledgeable decisions and judgments based on relevant information. The Paradox of Social Time suggests that every generation will have its own past and future. Therefore, future generations may not associate the repositories we construct with waste nor may they share our judgment that long-term radiation is one of the most profound threats to human welfare. Future generations may not consider the cultural heritage, which many value so much today, as a major asset either, and instead they might even see it as an unwanted gift, as Sarah May put it. Stories about the past will be linked to different kinds of evidence, and they are likely to become significant for different reasons than they are today. A few centuries onwards, nuclear waste repositories from the 21st and 22nd centuries, if they are being remembered and maintained at all, could become monuments of stories we cannot even fathom today. Therefore, answering the question in my title – "what's in it for us?" – in relation to nuclear waste repositories and various (other) forms of cultural heritage is anything but trivial, even on the literal level. Concerning the management of records, knowledge and memory of nuclear waste over long periods of time, it is very unclear what it may

mean to develop strategies that allow for continuous development, change and renewal in the way our 'nuclear waste' will be conceived. But such transformations of the perceived content of our repositories is precisely what we can expect will occur over time.

Did I just relativize the risks associated with nuclear waste, suggesting that maybe they are smaller than they seem to many of us today? Let me make it clear that I do not doubt any of the physics or health science that makes us all extremely concerned about living creatures being exposed to radioactivity. My point is about human social and cultural development over time.

Human legacies are passed on from one generation to the next but in this process, they are also re-interpreted and frequently put to new uses. A pyramidal structure that was a pharaoh's grave at one time, may be an international icon and tourist site in another. A detailed ship model that once was a masterwork of craft could today be a half-forgotten item of a museum collection. In the same way, our nuclear waste will not always and for all be nuclear waste.

The American artist James Acord (1944-2011) once said that "Nuclear technology is like the music of Mozart – it belongs to us all". Acord was a sculptor and the only private individual in the world who possessed a license to own and handle radioactive materials. Originally exploring how metal and stone may be combined in sculptures, he became interested in radioactive substances and how they may be contained. Acord saw radioactivity in terms of pursuing a very old human dream: alchemists had been trying to turn one substance into another, for centuries. Nuclear waste was radioactive because of exactly one such process of transformation of one substance into another. Acord's radioactive art did not enter many galleries or public places but it does offer us a glimpse of how differently nuclear waste may be interpreted, whether by artists in the present, politicians in 50 years or scientists in 500 years. Various recent research outcomes, whether papers or exhibitions and events associated with the "Nuclear Culture" project (https://nuclear.artscatalyst.org), have begun to manifest an emerging richness of approaches to nuclear waste - far beyond physics and nuclear engineering. The approach of the present paper, considering the implications of interpreting nuclear waste as a special kind of cultural heritage, fits into this context.

There are actually two more crucial affinities between cultural heritage and nuclear waste that deserve to be discussed. Like nuclear

waste, cultural heritage is not scarce but abundant. Today, we have protected far more archaeological sites than will probably ever be fully appreciated by archaeologists or indeed others. By the same token, present-day museum collections are full and there are many items whose future value is unclear. At the same time, ever more items are to be accessioned while associated resources do not increase at the same pace. Terms that are used to describe this situation (not the least in the Heritage Futures project) are "profusion" and "storage crisis". We can only wish that there were plans for storing cultural heritage as sophisticated and extensive as those for nuclear waste.

Even more significantly, like nuclear waste cultural heritage poses many threats. To date many more people have died as a result of the way cultural heritage has been employed in human hostilities than as a result of exposure to nuclear waste. Recent conflicts and wars in the Balkans during the 1990s, in Afghanistan and Iraq during the 2000s, in Syria during the 2010s, and in Palestine and Israel for many decades are prominent examples. In all these places, we have seen how particular stories of the past and associated heritage sites have played an important role in legitimizing violence and war. Such uses of history may focus on seemingly justified territorial claims or on a desire to destroy or save heritage sites strongly associated with distinct cultural values and specific communities. Cultural heritage is deeply implicated in many other political and social conflicts too, for example about racism, colonialism and gender equality. Moreover, in the present we are experiencing nearly on a daily basis how cultural heritage is used in public life throughout the world to maintain social divisions between 'us' and 'them'. Yet the truth is, in the words of Amin Maalouf, that "we are all infinitely closer to our contemporaries than to our ancestors". When will we start celebrating human commonalities rather than cultural diversity? Who is going to protect us from the political fallout of cultural heritage?

In a unique collaboration between institutions managing cultural heritage and nuclear waste in the Netherlands, some of these issues are addressed in interesting ways, obliterating clear distinctions between riskful nuclear waste and beneficial cultural heritage. COVRA is the central organisation for radioactive waste in the Netherlands, located near Vlissingen in the southwestern region of Zealand. COVRA's HABOG building for high-level radioactive waste treatment and storage is itself a work of art and its outer appearance was designed by the artist William Verstraeten. Over the course of a century (2003–2103), every twenty years the outside facade is due to be repainted in lighter colours in order to

**JNESCO** Chai

visualise the process of decay of what is stored inside. Similarly, the new storage facility for depleted uranium was transformed by Verstraeten into a large sundial marking the course of time. Nearby is the building for storing low- and medium-level radioactive waste. Here you find not only many drums filled with nuclear waste but also some museum artefacts. Among them is a sample of radium prepared by the later Nobel Prize recipient Marie Sk odowska Curie (1867-1934) for experiments at Leiden University. She carried the piece in her purse, not knowing about the dangerous impact of radioactive radiation on human bodies, which ultimately caused her death.

A decade ago, Hans Codée, then COVRA's director, had heard a local museum director lamenting the fact that his collection was running out of storage space. This led to the creation of an intriguing collaboration with the Association of Museums in Zeeland. Now, the gap spaces in the large concrete halls that house thousands of tons of nuclear waste contain dedicated storage areas that are used by a number of museums in the region to house some of their collections. The service is offered free of charge for one hundred years, which is longer than any other storage arrangement involving Dutch museum collections (Codée and Verhoef 2015). One object now being stored next to radioactive waste is the decor model of a three-masted caravel, probably from the 16th century and the kind of armed ship used by the Dutch in colonial trade relations with the Dutch East Indies, now Indonesia. Christopher Columbus had been using similar ships during his transatlantic explorations. Might it be more explosive and potentially harmful to manage and interpret such an historical object than the drums containing nuclear waste behind it? Narratives of colonial relations, especially when they are silenced or told selectively, may become toxic as they can threaten core values in contemporary society such as peaceful coexistence and equal rights and opportunities.

In COVRA's approach, cultural heritage and nuclear waste are mutually drawing attention to each other. But blending the two realms and breaking down the various barriers between them also raises interesting issues we may not have been aware of previously. It makes us wonder about the cultural significance and variable meaning of nuclear waste while it also makes us realize the rate of decay and indeed the risks we are exposed to from cultural heritage and its interpretations.

In sum, combining cultural heritage and nuclear waste (as an example of toxic waste) in relation to the future is less strange than it may at first seem. Tying together these realms stimulates innovative perspectives and approaches to each of them – not despite but because of the initial tensions we perceive. Cultural heritage holds risks we probably should guard us against. Nuclear waste is cultural heritage and its meanings are variable. The future is being created in each present over again. This kind of thinking that transgresses existing boundaries will be significant in meeting our shared responsibility to make the world a better place. Reaching the United Nations' Sustainable Development Goals involves many complex challenges that will require broad collaborations between countries and indeed between sectors. The cultural heritage sector can make significant contributions to this important work.
#### Outlook

#### The coming two years of our work (2019-2021) will primarily be dedicated to

(1) consolidating the establishment of the UNESCO Chair, building on what we have achieved already,

(2) an extension of our research into new areas (with our Post-Doctoral Fellow Dr Annalisa Bolin and additional work in the Memory across Generations project), and in particular to

(3) the development of professional training courses and resources to build capacity in futures literacy throughout the global heritage sector, enhancing the ability of the sector to contribute to achieving the Sustainable Development Goals.

#### Appendix

During the first two years of its operation, the UNESCO Chair on Heritage Futures published the following works, among others:

 Harrison, R., C. DeSilvey, C. Holtorf, S. Macdonald, N. Bartolini, E. Breithoff, H.
 Fredheim, A. Lyons, S. May, J. Morgan and S. Penrose, with contributions by A. Högberg and G. Wollentz (forthcoming) Heritage Futures. Comparative Approaches to Natural and Cultural Heritage Practices. London: UCL Press.

Högberg, A., C. Holtorf, S. May and G. Wollentz (2017) No future in archaeological heritage management? World Archaeology 49 (5), 639-647. https:// doi.org/10.1080/00438243.2017.1406398

Holtorf, C. (2018) During the 2018 European Year of Cultural Heritage, the heritage sector has much to learn from nuclear waste. The European Archaeologist 55 (Winter 2017/18). https://www.e-aa.org/EAA/Publications/Tea\_55/Debate/EAA/Navigation\_ Publications/Tea\_55/Debate.aspx#55\_ nuclear

Holtorf, C. (2018) Conservation and heritage as future-making. In: C. Holtorf, L. Kealy, T. Kono (eds) A contemporary provocation: reconstructions as tools of future-making. Selected papers from the ICOMOS University Forum Workshop on Authenticity and Reconstructions, Paris, 13–15 March 2017. Paris: ICOMOS. http://openarchive.icomos. org/1857/

Holtorf, C. (2018) Embracing change: how cultural resilience is increased through cultural heritage. World Archaeology 50 (4), DOI: https://doi. org/10.1080/00438243.2018.1510340

Holtorf, C. and L. Colomer (2019) What is Cross-Cultural Heritage? Challenges in identifying the heritage of globalized citizens. In: C. Holtorf, A. Pantazatos & G. Scarre (eds) Cultural Heritage, Ethics and Contemporary Migrations, pp. 147–164. London and New York: Routledge.

Holtorf, C. and A. Högberg (2018) Archaeology and the Future. In: C. Smith (ed.) Encyclopedia of Global Archaeology, https://doi.org/10.1007/978-3-319- 51726-1\_2792-1. Cham: Springer.

Holtorf, C. and A. Högberg, eds (forthcoming) Cultural Heritage and the Future. London and New York: Routledge.

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Holtorf, C., A. Pantazatos and G. Scarre, eds. (2019) Cultural Heritage, Ethics, and Contemporary Migrations. London and New York: Routledge.

May, S. (2019) Heritage, endangerment and participation: alternative futures in the Lake District. International Journal of Heritage Studies, DOI: https://doi.org/10.1080/13527258.2019.1620827

Söderström, U. (2018) Contract Archaeology and Sustainable Development. Between Policy and Practice. Licentiate Thesis, Linnaeus University. http://lnu.diva- portal.org/smash/record.jsf?pid=diva2%3A1239387& dswid=-3083

# **UNESCO Chair in Cultural Resource Ma**nagement, Southeast University, **Chi**na

Nanjing, known as Jinling in ancient China, is the capital of Jiangsu Province, which lies on the lower reaches of the Yangtze River. The ancient city, surrounded by mountains and the river, was the capital of ten dynasties. Southeast University is one of the oldest institutions of higher learning in China. Its origin can be traced back to 1902 and from 1927. School of Architecture was the very first architectural program on the university level (Figure 1).

Location of Nanjing



SEU-UNESCO collaboration starts in 1998. SEU has three UNESCO-related platforms for heritage conservation, namely, SEU-UNESCO GIS Centre, UNESCO Chair in Cultural Resource Management and Secretariat of UNESCO-ICCROM Asian Academy for Heritage Management (AAHM). Asia and the Pacific Historic City and Heritage Conservation Archives is under construction. Several research fields, such as the direction of urban heritage conservation, the research of historical cities, the research on waterfront urban agglomeration and the 'Belt and Road' historical city research under the framework of UNESCO, are under the guidance of UNESCO and Southeast University. Each direction has corresponding research results. We have organised a series of thematic seminars. The themes comprise 'water and city', 'urban planning history and theory', 'early settlements and cities' and 'UNESCO working meeting and cultural heritage management'.

#### 1. Waterfront urban agglomeration

'Frist International seminar on Water and Historical Cities: Interaction and Morphological Transition' was held in November 2015 in Nanjing. The seminar invited experts from China, England, Belgium and Germany to discuss the theme of 'water and city'. We invited Prof. Roland Fletcher, the director of Greater Angkor Project, from the Department of Archaeology, University of Sydney, to give a keynote speech on 'Low-Density Urbanism and the Risk of Climatic Instability: the case of Angkor 9th-16th century CE'. The experts from China discussed the interaction of water and city from varied aspects. Prof. Chen Wei told the story about the city and the canal: For River Town When Willow Down and Flowers Region-Mapping of the Canal and Yangzhou City of the Tang Dynasty (7–10th century). Mr. Lin Liugen gave a speech regarding 'Archaeology of Early Settlements and Cities in Jiangsu-Development of a Water Civilization'. Prof. Chen Wen discussed water-sensitive cities and future development. Dr. He Zhining presented a water city of liveable and endogenous attraction from sociology view. Perspectives of the foreign scholars that discuss the interaction between water and city were also diverse. In general, the scholars probed into the theme of 'water and historical city' mainly from the historical changes, environment, sociology, research method and so on.

Following first Asia–Europe seminar on urban development and water management at Southeast University of Nanjing on the 28th–29th of

November 2015, Ghent University host the second seminar focus on Global Metropolitan Delta's on the 29th–31th of March 2017 in Belgium. The seminar attracted experts from China and Europe, where they discussed the interaction of water and city from Global Metropolitan Delta's perspective on six sections: Historical Urban Water management in China, Urban Water management in Europe, Urban Water Management Compared throughout the world, Water-Urban Space Network Developments, Practices and Governance of Urban Water Management and Urban Water Experience (Figure 2).

Similar to those of the Yangtze, Pearl River, Mekong, Irrawaddy, Ganges, Indus and Eurodelta—faced the same challenges with regard to climate change, water management, irrigation and food production and (as gateways to their hinterlands) transport and distribution. Moreover, as intensive polynuclear urbanised regions of big and smaller cities along the estuaries of the world-famous rivers, they had to deal with the same kind of economic, mobile and environmental issues [1]. Therefore, we focus on the waterfront urban agglomeration, and we will hold the international seminar every 2 years.



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第二届"水与历史城镇-全球大都市三角洲"国际研讨会

international seminar on water and city

First and second

#### 2. Historical cities

The International Forum on Planning History and Theory aimed to provide an open platform for Chinese and foreign scholars to exchange, cooperate and contribute to the study of interdisciplinary planning history and theory from the perspective of innovation and international vision. The forum would grasp the current urban planning discipline from an international perspective, focused on the historical process of urban planning and extensively study the planning ideas, development contexts and practice of different regions, countries, periods and personalities. The objective is to build a planning history and theory system with universal significance. 'The First Forum on International Planning History and Theory' was held on the 8th–11th of November 2019 in Nanjing. The forum invited Editor of Planning Theory Prof. Angelique Chettiparamb, President of International Planning History Society (IPHS) Prof. Christine Garnaut, Editor of Planning Perspectives Prof. John R. Gold, Head of the Bangkok Centre and the Yangon Centre, Ecole Francaise Extreme Orient (EFEO) Prof. Jacques P. Leider and experts from China. They discussed the planning history, theory and ideas in China, Asia and South Australia (Figure 3).



3 International Forum on Planning History and Theory

'Seminar on Early settlements and Cities' focused on urban origin and evolution in China. We have held five sessions in different early sites in China, to explore the origin of Chinese cities and the protection and development of heritage sites. The first seminar on 'Early settlement and urban civilization' was held in Shimau, Shaanxi. The other four were organised in the following places, namely, Taosi in Shanxi Province, Erlitou in Henan Province, Liangzhu in Zhejiang Province and Panlong Site in Hubei Province (Figure 4).



Southeast University also contributed to studies on the conservation and inheritance of Chinese historic cities. Examples include the 'Planning of Suitang Luoyang National Historical and Cultural Park', 'Planning of Suitang Luoyang National Archaeological Park', 'Study on the Conservation and Utilization of Ancient Cities Based on Spatial Information System' and so on (Figure 5).



Planning of Suitang Luoyang National Archaeological Park

Fig. 5

#### 3. Urban heritage conservation

'UNESCO 2018 Expert Meeting on Strengthening Higher Education for Cultural Heritage Management in the Asia—Pacific Region' came to a successful conclusion after 2 days of intensive discussions and reports from the 3rd to 4th of November 2018. The main theme of the meeting was the 'Competency framework for the Management of World Cultural Heritage sites'. On the 4th of November 2018, the second day of the meeting, participants witnessed another landmark event, following a seminar on the existing platform for education and training in the management of cultural heritage in the Asia-Pacific region, UNESCO formally decided to place the Secretariat of AAHM at Southeast University in view of the outstanding contributions of the university (Figure 6).





UNESCO 2018 Expert Meeting on Strengthening Higher Education for Cultural Heritage Management in the Asia— Pacific Region

In 2001, the AAHM was established by UNESCO and ICCROM, as requested by the summary of the 19th session of the UNESCO World Heritage Committee. The objectives are as follows: to bring into play the advantages of many high-education institutions in the Asia-Pacific region with a long history, advanced concepts and well-equipped facilities within the framework of UNESCO; to improve the overall level and capacity of heritage conservation management in the Asia-Pacific region; to promote cooperation among relevant departments of various countries. The AAHM promotes systematic research and training on heritage conservation management in the Asia-Pacific region and builds an international platform for education, research and exchange on historic cities and heritage conservation. In June 2019, the secretariat of AAHM moved to Southeast University.

According to the request of UNESCO and ICCROM, the secretariat held the 2020 working meeting of the AAHM executive committee on the 9th of January 2020. The purpose of the meeting was to promote comprehensive, integrated and multidisciplinary research on various cultural resources in different countries and to discuss relevant work in 2020. The meeting discussed the issues proposed by AAHM members, AAHM flagship collaboration activities and focus areas in 2020–2021 and the planning that for short-, medium- and long-term. The meeting confirmed the establishment of Asia Pacific Historic City and Heritage Conservation Archives Centre and the inauguration of the first Asia Pacific academic symposium on heritage management. The members from Culture Unit of UNESCO Bangko, National University of Singapore, Cultural Heritage Center for Asia and the Pacific of Deakin University, Macao Institute for Tourism Studies, Tongji University, SouthWest JiaoTong University, Peking University, Tsinghua University, Ahmedabad University and four delegates from Korea University of Cultural Heritage participated in the meeting. The meeting recognised activities included international collaboration and training on 'conservation and development of historic urban areas with high density', Nanjing International design-studio on Conservation and development of Historic districts and Nanjing youth forum for conservation and development of historic cities (Figure 7).

#### 2020 Working meeting of the Executive Committee of Asian Academy for Heritage Management(AAHM)

2020 Working Meeting of

the Executive Committee

of Asian Academy for Heritage Management

(AAHM)

Fig. 7

#### Agenda

Time: January 9, 2020 Venue: Lecture Hall, 2nd floor, Lidong (the Great Hall), Southeast University,China Host: Ms. Montira Horayangura Unakul, Prof. Dong Wei			
		Time	Content
		08:30-09:00	Welcome and Group Photo
09:00-09:30	Recap of previous AAHM meetings (Ms. Montira Horayangura Unakul)		
09:30-10:00	Tea Break		
10:00-12:00	Discussion on proposed activities by AAHM members		
	-Opening ceremony of Asia Pacific Historic City and Heritage Conservation Archive Center/The first Asia Pacific academic symposium on Heritage management		
	-International collaboration and training on "conservation and development of historic urban areas with high density"		
	-Nanjing International design camp for Conservation and development of Historic districts		
	-Nanjing youth forum for conservation and development of historic cities		
	-Other activities		
12:00-14:00	Lunch		
14:00-16:00	Discussion on AAHM flagship collaboration activities and focus areas in 2020-2021		
	-Asian Academy Field School by NUS		
	-Executive training by ThinkCity		
	-Asian Academy Research Conference by TBC		
	-Asia Pacific Historic City and Heritage Conservation Archive Center		
16:00-16:30	Tea Break		
16:30-17:00	New membership applications		
17:00-17:30	AAHM website construction and other updates from Secretariat		
17:30-18:00	Summary		



# 4. 'Belt and Road' historical city research under the framework of UNESCO

Implementing China's 'Belt and Road' national strategy, based on the background of rapid urbanisation in Southeast Asia and the UN sustainable development goals, the team of Prof. Dong Wei of Southeast University conducted numerous field works on a series of Asian historic cities, such as Mrauk U\Innwa in Myanmar, Hanoi in Vietnam and Ahmedabad in India. The team was invited to provide technical support and preparation for the official declaration of the World Cultural Heritage in the ancient city of Mrauk U in Myanmar, supported by UNESCO and NCHA. This project was the first to work on the world heritage nomination and complete urban planning abroad (Figure 8).



Fig. 8 Historic Cities and Heritage Conservation in Asia

#### 5. Future

2020 working meeting of the AAHM executive committee made a great success at the beginning of this year. In 2020, several main events will be launched in Nanjing.

(1) China–Africa cultural heritage protection cooperation forum world cultural heritage protection during the process of rapid urbanisation. The experience from China in urbanisation over the past 40 years and the development momentum of African will serve as an important basis for China–Africa cooperation. The forum will focus on rapid urbanisation under the condition of heritage conservation challenges.

(2) Opening ceremony of the Asia Pacific regional historic city and heritage conservation archive centre and the first Asia Pacific academic seminar on heritage management. The Asia Pacific regional historic city and heritage conservation archive centre main stores up the UNESCO prizes for cultural heritage conservation in the Asia-Pacific region, the cities' related historical archives and so on. This centre provides a consulting, research, study and communication place for scholars and experts from all over the world. The first Asia Pacific academic seminar on heritage management is an important opportunity for the centre to play its role in international exchanges.

(3) Nanjing international design camp for historic district

conservation and development, Nanjing youth forum for historic city conservation and development. The planning bureau, Cultural Relics Bureau and other departments will cooperate to carry out the research block protection and renovation design, and specific design strategies and schemes will be put forward according to the requirements of urban development.

(4) International training course on 'conservation and development of historic urban areas with high density'. International and domestic well-known experts are invited to give lectures, and typical traditional blocks, such as Nanjing Yihe road, Nanpu hall, Zhenjiang Xijindu and Suzhou Pingjiang road, are selected as practical cases for on-site investigation and analysis.

Relying on international platforms, the UNESCO Chair of Cultural Heritage Management and the Secretariat of AAHM, and taking full advantage of the national 'Belt and Road' strategy, School of Architecture of Southeast University will gradually promote cooperation with various historical cities in South Asia and Southeast Asia, deepen the research on historical cities and architecture in Asia with Chinese experience and eastern thoughts, promote global cooperation and exchanges and contribute to the deep internationalisation of Asian cities under the new historical conditions.

#### Note:

Pieces of information are derived from conferences and studies.

[1] Second International Seminar on Water and Cities—Global Metropolitan Delta's.

UNESCO Chair in Cultural Re Southeast University, China

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#### Dr. WANG Yan

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 Director, Academic Committee of Urban Planning History and Theory, UPSC
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# Historic Urban Landscapes and Heritage Impact Assessments

RheinMain University of Applied Sciences in Wiesbaden, Germany

#### World Heritage Cultural and Urban Landscapes and UNESCO's paradigm shift towards sustainable development

UNESCO's decisions to include Cultural Landscapes as a separate category of cultural sites into the World Heritage Programme, to approve the Recommendation on the Historic Urban Landscape and to use cultural heritage as a pillar of sustainable development, have resulted in a paradigm shift with regard to the implementation of the World Heritage Convention.

Due to the introduction of the concept of Cultural Landscapes in the year 1992, the Outstanding Universal Value of cultural World Heritage sites was for the first time defined by the mutual relationships between humankind and nature. World Heritage now embraced non-monumental sites and intangible associative values which social communities attributed to them as cultural heritage. Additionally, vernacular architecture could be recognized as cultural World Heritage and customary law was consciously accepted as an important management tool.

Most of these principles were similarly included in the 2011 Recommendation on the Historic Urban Landscape (HUL). In the context of urban World Heritage properties, this caused a shift from the previous emphasis on protecting designated buildings or ensembles to a wider understanding of urban heritage, which goes beyond the 'traditional' static values of built heritage and includes social, aesthetic, ecological and economical values so as to lay an "emphasis on continuity – of relationships, values and management" (van Oers, 2011).

# The impact of UNESCO's landscape approaches and paradigm shift towards sustainable development on the tasks of heritage management

Instead of focusing on the conservation of isolated monuments, ensembles or natural areas devoid of people, preservation strategies now have to concentrate on both the preservation and the sustainable development of inhabited areas on a wider scale with a high degree of complexity. Consequently, this paradigm shift also generates a large number of questions with regard to the management of transformations in World Heritage properties and their surroundings. In particular new theoretical and practical challenges have been raised regarding how ongoing and sudden transformations in cultural World Heritage Cultural and Urban Landscapes, and their environment, should be managed. Due to development pressures in many of such properties the question appears how to define the limits of acceptable change.

As a result, change management has now become a central challenge in the implementation of the World Heritage Convention. Looking through UNESCO State of Conservation Reports reveals why this is the case. 47 % of all World Heritage properties are witnessing an increasing pressure due to buildings and development, 35 % face problems due to social/cultural uses of heritage (e.g. due to mass tourism), 33 % suffer under unsustainable transportation infrastructure and 17% are compromised by utility and service infrastructure (e.g. wind turbines). Above all, however, 77% of all World Heritage Properties face problems due to management or institutional factors (Veillon 2014). World Heritage Cultural and Urban Landscapes are especially vulnerable with respect to such transformations. London's skyline is only one example which demonstrates these issues. An increase in the number of high-rise building in recent years has seen the skyline changed drastically, so that even protected vistas from and to the city's three World Heritage properties have been modified irreversibly (Greater London Authority, 2012).



St Paul's Cathedral is a widely known symbol of London's skyline but nowadays surrounded by high-rise tower blocks (©Michael Kloos)

Fig. 1

In recent years, various disputes illustrated that such transformations in or nearby World Heritage properties can easily lead to tensions between both local communities and international decision-makers. An exemplar of such conflicts was the removal of the World Heritage site Dresden Elbe Valley in Germany from the UNESCO World Heritage List, due to the construction of the Waldschlösschen Bridge which took place against the will of local and regional decision-makers of Dresden and the Federal State of Saxony (Kloos, 2015).

It can be concluded that the paradigm shift in the implementation of the World Heritage Convention has raised a large number of new challenges for both urban and regional planning practice and heritage management. This creates a need for effective tools that identify, assess, evaluate and monitor changes and which support heritage-led planning processes in World Heritage Cultural and Urban Landscapes, and their surroundings. Thereby, a stewardship in line with UNESCO's overall strategy of sustainable development has to be activated.

#### Heritage Impact Assessments

#### - theoretical standards and challenges in praxis

In this context, the World Heritage Committee and ICOMOS increasingly request State Parties to carry out Heritage Impact Assessments (HIAs) in order to assess the impact of new interventions on the Outstanding Universal Value of cultural World Heritage properties. Meanwhile, the Operational Guidelines clearly state that "Impact assessments for proposed interventions are essential for all World Heritage properties" (Operational Guidelines, 2015, para 104). In line with this development, ICOMOS published Guidance on Heritage Impact Assessments for Cultural World Heritage Properties in 2011 which is addressed to heritage managers, developers, consultants and decision-makers, but also to the World Heritage Committee and States Parties (ICOMOS, 2011). This

Guidance is going to be updated soon.

According to this theoretical background, HIAs should be conceived as process-related studies comprised of various steps that combine assessment with an in-depth analysis of the Outstanding Universal Value of World Heritage Properties. A crucial element of such studies is the scoping process, where, inter alia, all relevant stakeholders must be identified, the content, important subjects and issues, and the time corridor of the study must be defined, and potential risks concerning these factors must be discussed within the stakeholder group. A second crucial aspect of HIAs is the definition of potential mitigation measures in case of negative findings, and the feedback of crucial results into planning processes.<sup>1</sup> It is obvious that such a complex planning process causes various challenges for authors of HIAs. Especially, interdisciplinary skills are required due to the large variety of different activities.

1 The International Network of Cultural Diversity defined impact assessments as the "process of identifying, predicting, evaluating and communicating the probable effects of a current or proposed development policy or action on the cultural life, institutions and resources of communities, then integrating these findings and conclusions into the planning and decisionmaking process, with a view to *mitigating* adverse impacts and enhancing positive outcomes" (Sangria / INCD, 2004, emphasis added by the author).



Basic steps in cultural Impact Assessment processes as defined by the International Network of Cultural Diversity (INCD) (© Michael Kloos)

Fig. 2

Heritage Impact Assessment

#### Visualizations as a tool to support Heritage impact Assessments - the case of the World Heritage Property "Natural and Culturo-Historical Region of Kotor"

In particular, the generation of a constructive communication process with and between various stakeholders is a crucial step during HIAs, because this is the starting point to stimulate potential positive and to mitigate potential negative impacts in World Heritage Properties. Therefore, the former UNESCO Chair in World Cultural and Urban

Landscapes<sup>®</sup> at RWTH Aachen University in Aachen / This UNESCO Chair ceased Germany has worked since 2005 on a methodology to use precise computer-generated visualizations in order to show and discuss planned transformations in UNESCO World Heritage Properties with various stakeholders. This methodological approach requires several research steps. First of all, it is necessary to precisely investigate the formal background of World Heritage Properties. Especially, their Outstanding Universal Value (OUV) and the Attributes expressing this OUV in detail has to be analysed in a transparent manner. To achieve this goal, it is necessary

to exist in 2016 due to the retirement of the former Chairholder Prof. Kunibert Wachten. It is currently intended to establish a new UNESCO Chair with the same programmatic approach at RheinMain University of Applied Sciences in Wiesbaden Germany.

to carry out an in-depth analysis of the natural and cultural features of the properties in investigation. This should result in clear outcomes which traditional and present perception patterns are typical for such properties. Afterwards, various viewpoints and view corridors can be defined and documented with digital photographs and video shots.

Based on such a preliminary investigation, digital computer visualizations can be generated which clearly show planned transformations in UNESCO World Heritage Properties and their surroundings. An example for this is the investigation of a planned bridge in the UNESCO World Heritage Property "Natural and Culturo-Historical Region of Kotor", located in Montenegro (South-East Europe). Here, a virtual 3D computer model, which was built up on basis of a large amount of data, was used in order to show all potential vistas from and to the planned bridge project. Based on the same computer model, visualizations were generated to analyse the potential impact of the project on the OUV of the World Heritage Property.

Based on these visualizations, it could be clearly assessed which impact had to be expected by the planned new bridge. As a consequence, recommendations could be provided how to mitigate negative impacts and how to support the sustainable development of the UNESCO World Heritage Property.





Shading model of the UNESCO World Heritage Property "Natural and Culturo-Historical Region of Kotor", generation of digital computer visualizations and assessment of the planned Verige Bridge (© v-cube)

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#### Heritage Impact Assessments as a pro-active tool to combine heritage management with participatory urban and regional planning processes – the case of Cologne Cathedral (Germany)

However, HIAs can only be effective if it is possible to feedback such recommendations into the future planning processes. HIAs should therefore be considered as a tool to activate the stewardship of urban and regional planning processes. Hence, it is indispensable to combine HIA-processes with an effective communication and implementation strategy.

In Cologne, it proved possible to achieve such an active contribution to the city's sustainable development with the help of a HIA. Here, it had to be evaluated whether the so-called ICE High-Rise Cluster – an ensemble of five tower blocks planned in the immediate vicinity of Cologne Cathedral on the opposite side of the Rhine next to Köln-Deutz railway station – would have a negative impact on the OUV of this UNESCO World Heritage Property. Prior to the assessment, in 2004, the UNESCO World Heritage Committee had already included the cathedral on the List of World Heritage in Danger. This decision caused considerable pressure to assess the impact of the tower blocks on the OUV of the World Heritage Property.

Similarly to the case of the "Natural and Culturo-Historical Region of Kotor", and based on a thorough cultural and historical analysis of

Cologne's city structure and its distinctive silhouette, several of the generated computer visualizations clearly showed that the dominance of the cathedral's characteristic silhouette would suffer under the planned high-rise scheme. This referred especially to habitual views from the right bank of the Rhine, which were identified in the study as an important element of the experience of Cologne's city silhouette. As a result, it was recommended that the ICE High-Rise Cluster should be reviewed and the buffer zone around Cologne Cathedral should be enlarged by a monitored zone in order to avoid similar conflicts in the future (Kloos et al., 2005).

However, in parallel to this situation it gradually became clear that the economic concept of the tower blocks had failed because potential tenants were missing. This situation opened up the possibility for a new general approach to resolve this situation. Based on a decision of the Cologne City Council in December 2005, it was agreed that a moderated workshop should be organized by the City of Cologne. This workshop was meant to integrate some sixty representatives of relevant groups of Cologne's city population and three renowned urban planning offices. The multi-stage workshop was organized as a cooperative planning process with a time span of seven weeks. The three urban planning offices were requested to present intermediate states of their plans during three different sessions which were organized as a mixed system of panel discussions and work in smaller groups. During these sessions, the invited representatives acted as an expert panel, providing recommendations and ideas for the elaboration of the various design proposals. At the same time, the ideas and thoughts of the representatives of Cologne's city population were integrated during the working sessions, thus generating a broad consensus concerning the project.



Visualization of planned 'ICE-Highrise-Cluster', workshop to modify the originally planned scheme and modified urban development scheme (© v-cube, HH Vision)

a.b





This multi-stage cooperative workshop led to the result that the existing planning scheme consisting of five high-rise tower blocks was replaced by a more compact and lower ensemble of buildings. A particularly interesting aspect of this result was that not only vistas to the Cathedral could be preserved. The newly suggested planning scheme was also far more flexible in terms of its use than the originally planned tower blocks and therefore more efficient in economic terms. As a result, Cologne Cathedral was removed from the List of World Heritage in Danger by the UNESCO World Heritage Committee after the City of Cologne had decided to carry out this new scheme. Meanwhile, the concept has been further refined and it will probably be realized soon. Hence, the compilation of the HIA and the cooperative workshop had been important steps towards a solution aligning economic, societal, ecological and cultural aspects. In general, the intensive discussions about Cologne's cultural heritage turned out to be a valuable contribution for the city's sustainable development.

#### Conclusion: Challenges for educational activities with regard to the practical use of Heritage Impact Assessments in cultural World Heritage Properties

The above-mentioned case studies were intended to illustrate that HIAs can support the sustainable development of complex World Heritage Cultural and Urban Landscapes. Particularly if they are used as a proactive tool combined with 'tailor-made' communication and processmanagement strategies to elaborate and adjust interventions in early stages of planning processes, HIAs can be effective to assess and to mitigate potential negative impacts in such complex World Heritage Properties.

However, it is also evident that the implementation of HIAs generates a need for specific interdisciplinary know-how in several professional fields. On the theoretical level, it has to be considered that scoping processes have a large impact on the outcome and the quality of the studies. It is therefore of fundamental importance that persons or teams in charge are able to acquire the necessary capability to manage such scoping processes. It is also necessary that HIA authors or teams in charge have both a combined knowledge about cultural heritage in general and World Heritage in particular and a secure understanding of urban and regional planning processes and urban and architectural design. Since visualizations are an effective tool to support communication processes about transformations of UNESCO World Heritage Properties, it is similarly necessary to build up know-how in computer aided architectural design (CAAD). And finally, to stimulate the pro-active use of HIAs, it is of particular importance to relate HIAs to effective and thoroughly planned participation and communication strategies, which include all relevant 'players'. Therefore, also know-how in communication, mediation and conflict management strategies is required for HIAs.

In general, the above-mentioned HIA case studies illustrated clearly that due to the various procedural steps as well as the sectoral knowledge that HIA studies have to include, authors of HIAs have to cover a wide range of interdisciplinary skills. The education of heritage managers must therefore contain a comprehensive understanding of these skills not only on a theoretical but also on a practical level.

Against this background, RheinMain University of Applied Sciences in Wiesbaden / Germany launched the new interdisciplinary Bachelor Course Baukulturerbe / Architectural Heritage Conservation (B.Sc.). Students are trained here for three years to acquire interdisciplinary know-how from the fields of architecture, urban planning, heritage management and cultural sciences. As historic structures and sites, as well as cultural landscapes contribute substantially to the distinctiveness and identity of towns and regions, the practice-related study course trains students by way of different course projects also to recognise heritage values and to develop sustainable preservation, restoration and conversion strategies. To supplement this basic educational level, a new Masters Course Architectural Heritage Conservation and Adaptive Devlopment (M.Sc.) will be started in Autumn 2020.

To support this new study programme, it is also planned to establish a new UNESCO Chair which will focus on research, education and dissemination of know-how with regard to World Heritage Cultural Landscapes and Urban Landscapes at RheinMain University. This planned UNESCO Chair is meant to support and strengthen the knowhow transfer with regard to World Heritage Cultural Landscapes and Urban Landscapes on the international level, especially from North to South. Consequently, co-operations with other universities in various regions of the globe will be an essential field of activities of the planned UNESCO Chair.

At the international level, Impact Assessments were already fully recognized, at the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992, as an instrument to provide a framework for the integration of the principles of sustainable development into national policies and programmes (IAIA 2015). Now heritage specialists have to face the practical challenges resulting from UNESCO's paradigm shift. However, as has been shown, several challenges have to be tackled to guarantee the effectiveness of HIAs and their practical implementation. Against this background, it is obvious that educational activities have to be accompanied by scientific research on HIAs is of crucial importance. Besides universities, also decision-makers in charge of the implementation of the World Heritage Convention, especially the World Heritage Centre, the Committee's Advisory Bodies and political stakeholders such as national Focal Points, have to be included in such future research activities.

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## Sustainable Cultures in times of transition

I would like to start by saluting the Korean National University of Culture Heritage all those involved in the Unesco Chair in Capacity Building for the Preservation and restoration of Asia Pacific Cultural Heriatge. Thank you for this invitation, the warmth reception and let me congratulate you for the excelent session we had all day. It has been a moment of shared learning and debate around these issues so relevant to heritage, tradition and the future.

I will begin my presentation by quickly describing the context in which our chair as appeared. The School of Arts and Design of Caldas da Rainha has almost 1300 students and is part of The Polytechnic of Leiria and develops research and education in the areas of Fine Arts, Design (Graphic Design, Interior Design, Industrial Design and Product Design - Glass and Ceramics), Sound and Image and audiovisual media, theatre and our scientific domain, composed by the Masters in Cultural Management, created in 2010, and the BA in Cultural Production and Programming, created in 2016. The development of these higher education degrees and research areas follows the development of cultural infrastructures and institutions driven by the tourism boom that Portugal has witnessed in the last few decades. We were the second program designed in Portugal and the first being developed in an arts and design school.

It was and has been our understanding that this professional area of expertise should be developed not within the scientific areas of economy and management, but within those areas of arts and cultural history, has John Pick and Malcolm Anderton (Anderton, 2002) so clearly declare in London in 1980 in the publication of Arts Administration, marking a break with the essentially American tradition of situating the field of cultural and arts management as an integrated area of scientific management. The authors state that, more than management skills, the exercise of this function requires a thorough knowledge of the arts and cultural history and studies. The argument is based, they claim, on the fact that aspects of cultural history are far more relevant to the arts manager than practical knowledge of management. Thus, they propose its holistic instrumental use as an efficient approach to managing cultural organizations, emphasizing the need to involve and inform all members of that same organization. In this context, holistic management will include communication skills, the ability to recognize the organizational character of the association, company or institution, including its history and organizational memory. In addition, Pick and Anderton highlight the importance of cultural studies and cultural policies in these areas, given their strong impact on cultural management practices. According to the authors, whatever the context in which the cultural manager works, his work involves three fundamental steps:

**"1)** A thorough knowledge and personal commitment to the chosen artist (s), art form or art forms, either contemporary artistic practices, or heritage collections and sites;

**2)** An equally profound and imaginative understanding of the cultural history, consciousness, and social conditions of all possible audience segments that can be attained by the chosen art (s).

**3)** The ability, using all legitimate social, political and management skills, and bearing in mind the most complete and up-to-date political, legal and economic circumstances, to forge the best aesthetic contract available, bringing together the arts and the largest and most appropriate audiences in best possible circumstances." (Anderton, 2002, p. 3)

So our scientific area at the College of Arts and Design develops three main lines of inquiry and research: (1) the first being the area of social sciences, art and cultural history developing curatorial practice and skills; and on the other, in the area of sociology, cultural policy and urban studies, developing a critical thought on cities and urban landscapes; (2) the second being in the area of management applied to the arts and cultural sector; and at last, but not the least, (3) communication applied also to the arts and cultural goods and products.

The theoretical framework of our chair emerges then out of a multidisciplinar dialogue between different sicentific approaches and it stipulates three main premisses: 1st – we need to foster change towards sustainable cultures, and that conclusion derives from a critical reading of contemporary culture; 2nd – arts and culture, or the field of cultural production as Pierre Bourdieu it in the sixties (Bourdieu, 1993), are a fundamental cornerstone to the development and functioning of the public sphere (Calhoun & Postone, 1993), and third, that culture is the 4th pilar to sustainable development as stated in the Agenda 21st for Culture of the United Cities and Local Governments. Allow me to illustrate these premisses by proposing you on a critical reading exercise of three rather distinct events of the last few years.

So, the first event is the refugee crisis and the reffusal or prohibition of rescue in the mediterranean sea. I don't know if you are aware of that tragedy, but the numbers were, and still are, appalling, with several thousand drowned each year in the mediterranean sea. The crisis had its peak with the wars on the middle east between 2012 and 2017. So what does this event as to do with a comercial advertisement highly broadcasted in Europe from 2015 onwards? Well, nothing I should say. But if we bear in mind the readings of publicity produced by Roland Barthes in 1957 (Barthes, 1957), things might seem different. This methodology allows us to see the narrative emerging in mass culture, a powerfull message delievered in the form of a joke or a satyre, but that goes far beyond that - connecting itself to the context in which each viewer lives and acts and, obviously, votes. In this 30 second ad the elogy of inequality is explicitly celebrated, staging a war between us and them ending in a pile of corpses collapsing against an iron protected wall. Inside there's clean and fresh air, outsider a draught of dust. Why is the critique of contemporary mass culture so urgently required? The first and most obvious answer is that we need to create space for other narratives to emerge, other ways of looking into the world and into inequalities and social conflicts.

Our second premisse stipulates that culture and arts are critical cornerstones to the development of cultural spheres, as defined by Jurgen Habermas (Habermas, 1999). The world of letters, says Habermas, by developing a critique of the arts and literature, e.g., a method through which the value of each art or literary piece was discussed and assessed and not inferred by its statutory representation of power or religion, allowing therefore the development of instituting practices anchored in the rational debate of an audience. The same type of practices required in parliament and, therefore, fundamental to the development of modern states. One can only fear the effects when cultural arenas and institutions are given brand names of famous beers or sneakers... But that is another line of reflection and critique. For now, I would like to ask you to look at the next two events.

So the second event is the fire in the National Museum of Rio de Janeiro that occurred in 2018, destroying all the artifacts and collections, but one: a metheoryte, an object not made by human hand. And the third event are the fires of the Amazonia Forest in 2019. As you should problably know, the collection of the National Museum of Rio de Janeiro gathered all the antropological research and ethnographic objects of the primitive and ancient tribes of Amazonas. It was the most important museum in South America to study, know and identify the diversity of cultures and tribes, of modes of living and beliefs. The destruction of these materials, objects and knowledge surely feels that a second extinction was imposed on to these long gone tribes and their living descendents, who, in their turn, feel the deadly rage of fire too. Without cultural resources to connect to and with no knowledge of the past, indigenous peoples and tribes are being sent to oblivion.

Of course the causes that lead to such events are distinct in nature, even in locations and plausible explanations. But if we look closer to each one of them and to set of events, one can start to distinguish a pattern that emerges in each one of these singular events. What pattern is there to find? One that as no respect for human beings, for their artifacts and their natural and wild environment: in the denial of rescue at sea to migrants in violation of international conventions; by not protecting and preserving the collections of the National Museum, a disrespect for what men and women before us cherished, collected and thought of as important to safeguard, study and give to future generations; in the destruction of the Amazoniaa disrespect for our natural heritage. Although the causes behind such events are different and causeeffect correlations are nowhere to be found in this assortment of rather distinct events, the pattern, however, in the modes of being and acting, e.g., our culture are, in my humble opinion, cristal clear and give proof to the statement of the Agenda 21st for Culture as 4th pilar for sustaibable development.

Having in mind this theoretical framework, the purpose, programme and aims of our Unesco Chair in Arts and Cultural Management, Cities and Creativity, created in the past 5th December 2018, were developed in the Masters of Cultural Management at the College of Arts and Design of Caldas da Rainha, Portugal to foster three main projects, which I will describe later.

The main objective of the Management of Arts and Culture, Cities and Creativity Chair is to promote an integrated system of research, training, information and documentation on the visual arts, arts management and creativity. It thus establishes a platform for collaboration between researchers of international excellence and recognition, faculty and students of the Institute and other institutions in Portugal, as well as from other regions such as Latin America and the Caribbean, Africa and other regions of the world.

#### The goals are the following:

**Ol** · Contribute to the strengthening of the cultural and creative sector by strengthening skills and policies in these areas, notably through the development of innovative higher education programs and the implementation of research projects aimed at identifying the knowledge and skill set considered critical in the field. context of the creative economy;

**O2** · Design and implement jointly with partners activities to promote mutual understanding of identities, promoting positive recognition of the creative force resulting from differences, and the development of sustainable cities and communities;

**O3** · Conduct training and learning activities to contribute to the professional development of students of arts and cultural management in the European Union, Ecuador, Brazil and Cape Verde, promoting gender equality;

**O4** · Promote networking, dialogue and the sharing of knowledge and best practices among relevant stakeholders, including local authorities, including through the establishment of a local cultural policy web platform, organization of conferences and seminars, publications and exhibitions;

**O5** · Collaborate with UNESCO and current UNESCO Chairs on relevant programs and activities.

These five main goals are materialised in three main projets: (1) the Arts & Sustainability Forum, dedicated to the artistic practice and to the promotion of the mobility of artists and partnerships with the Global South; (2) an on-line editorial project – Hermes, that is going to be launched in 19th of May 2020 to publish fundamental research in the areas of curatorial studies, cultural management and mediation; and finally, (3) the Living Cities Observatory, where the application of Caldas da Rainha (where our school is located) to the Unesco Creative Cities Network in the field of Craft and Folk Art was developed.

I will finish precisely by looking closer to this proposal developed under our chair. I think it summarises and brings together the several steps of our thought, elucidating the role of the Unesco Chair to the Sustainable Development Goals and the 2005 Convention for the Promotion and Preservation of the diversity of cultural expressions. In this application, the chair designed a new set of cultural policies aimed at the city's cultural and creative sector of Ceramics. The need to develop a comprehensive policy strategy came from the colapse of the many factories that gave economic dynamism to the city and the region. In the wake of 2008 global economic crisis action was needed to preserve a five hundred year tradition in the city. The Ceramic industry of Caldas dates back to the end of the 15th century, developing uninterrupted activity ever since. During this period the city's ceramic centre has expanded throughout the west Portuguese region. The distinctive and commercially successful mark of the ceramics of Caldas da Rainha - a type of earthenware fundamentally decorative inspired by naturalistic motifs allowed the development of the main industries and factories of the city. In the 19th century, the factory of Maria dos Cacos (1820-1853), followed by the the work of Manuel Mafra (1853), as well as the small workshops of António de Sousa Liso, José Francisco de Sousa, José Alves Cunha, Francisco Gomes de Avelar (Junior) and João Coelho César, transformed the city into an active and dynamic productive centre, in which the factory of Rafael Bordalo Pinheiro (1846/1905) ) has the main stage. The tension between craftsman workshops and mass industry endured throughout the twentieh century pouring into our times. The industrial sector no longer has the expression once had in the structure of employment generated in the city, representing around 13% of the jobs effectively located in the city. Once compared with the national employment structure, it emerges a specialization pattern in the sector of ceramics, glass, building materials and other non-metallic mineral products. Due to its historical importance and for its role in building the modern identity matrix of the city, ceramics presents itself as an important factor of distinction associated with the municipality: 2 large

and medium size industrial units (more than 50 workers), an estimate of 17 small workshops and ateliers, 7 shops dedicated exclusively to the commerce of ceramic goods located in the city's historical centre. Of the 6807 enterprises found at Caldas da Rainha, almost 3% are dedicated to the arts, entertainment, sports and recreation activities, where almost 76% are individual enterprises.

In the creative field of arts and crafts one can first define three different sets of groups distinguished by their role within this cluster of activities: the first group is, then, associated with works within the industrial dimension of this sector; the second group being those who are engaged in learning and training activities for the ceramic sector, including those developing R&D activities and projects; and finally, those engaged in the artisanship of handcrafted ceramic goods, objects and products. In this particular field one can broadly define three different communities emerging from different sets of products created: the first associated more with traditional arts and crafts products; the second broadly defined by creative ceramics, that innovates and challenges the city's ceramic tradition, by incorporating design and contemporary flare to handcrafted ceramic goods; and finally those where ceramics becomes the medium of artistic expression.

From the outset the main challenge identified was the invisibility of the craftsmen and women – the human gesture behind all handicrafted objects – in the face of the massive scale of industrialised production, we need strategies that render this gesture visible and valued in the context of our global economy. So, in the context of a fast-driven globalization and automatization processes, manual labour is condemned to invisibility. Promoting and creating added value to the Cultural and Creative Sector is then seen as one cornerstone of the development strategy.

The second challenge addressed the frailty of the structure of employment within this sector. To improve the livelihoods of artisans and to promote sustainable jobs is seen as an important driver for sustainable urban development. The third challenge aimed at promoting knowledge and best practice sharing by developing evidence-based cultural and sustainability policies involving many global and local players within the Cultural and Creative Sector, creating a research centre focused in (a) knowledge and best practice sharing in cultural and sustainability policies in ceramic cities; (b) research and public display of the many collections owned by the city council; (c) monitoring and evaluating impacts in pollution of water-related ecosystems as a result of small and medium ceramic workshops activities. Having in mind these challenges, the proposal in the domain of Craft and Folk Art identified three main cornerstone projects:

1) develop and support in-depth research within the OBSERVATORY LIVING CITIES in two main policy areas – culture and sustainability – in ceramic cities in partnership with the UNESCO CHAIR in ARTS and CULTURAL MANAGEMENT, CITIES AND CREATIVITY of the Polytechnic Institute of Leiria and other European and Brazilian Cities. The main aim is study, compile and compare in selected ceramic cities: (1) sustainable-led practices in product design and management in workshops and industries; (2) cultural policies aiming at the strengthening of the cultural and creative industries. The outputs of this R&D project are: written reports, books, field missions and the development of a website for dissemination of results;

2) create, develop and support a CERAMIC HUB as a focal dynamic tool to strengthen the cultural sector with workshops suitable for ceramic activities, equipped with large communitarian ceramic ovens, a concept store, for the creation of peer-to-peer sales strategy, and, finally a smart management model of the city's resources dedicated to ceramics. It will also implement a programme for the mobility of artists, both incoming and outgoing, based in good governance and transparency policy practices; and it will create and support the development of an ECO-POINT for the collection of ceramic waste, that will be responsible above all, to study, evaluate and monitor possible pollution effects of water-related eco-systems resulting from ceramic and artistic workshops in its washing, cleaning and maintenance activities. Although in an early stage of development, this R&D project will be developed in three main stages: (1) evaluate the polluting effects of water disposals at small ceramic workshops; (2) monitor its impact in public sewage; (3) if needed, find easy-toimplement solutions;

Of cross-cutting nature, the biennale MOLDA promotes a multidisciplinary dialogue between the areas of Design, Music and Media Arts and the craftwork in ceramics, supporting the dissemination of knowledge and best practices sharing;

The expected long-term impacts of the strategy are: (1) a stronger cultural and creative sector by the implementation of evidence-based policies; (2) a significant improvement of labour conditions of craftsman; and finally, (3) a reduction of the polluting effects of the ceramic activity

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developed in small workshops. The expected long-term impacts of the strategy to be implemented following the designation are:

 the development of a set of evidence-based policies aiming at two important cornerstones for sustainable urban development:
 (a) policies aiming and promoting sustainable urban cultures and
 (b) policies aiming at the strengthening of the cultural and creative sector, headed by the Living Cities Observatory of the UNESCO Chair in Arts and Cultural Management, Cities and Creativity in partnership with European and Brazilian Cities;

**2)** foster the mobility of artists by implementation of a programme that will support creative and artistic interactions, promoting gender equality, South/North relationships and transparency in the decision-making process;

**3)** enhance visibility by the creation of a Ceramic Hub with workshops suitable for ceramic activities, community ceramic ovens, Concept store and a cultural management steering committee to foster assertive marketing;

**4**) study, monitor and reduce possible pollution effects of waterrelated eco-systems resulting from small ceramic and artistic workshops, adopting a problem-solving research;

The challenge to strengthen and improve this creative sector was identified in the actions and meetings held to develop the strategic plan of the city of Caldas da Rainha 2030. In that analysis one could identify the growth potential of this creative cluster, but above all its potential to bring to life, connect and be a driver for the improvement of living standards, quality of life and social inclusion. Following this process, the application was built by the UNESCO Chair in Arts and Cultural Management, Cities and Creativity on behalf of the city council. In order to identify the main threats and opportunities identified by the several stakeholders and groups, six meetings were held to analyse and discuss the main challenges in the four areas of sustainable development strategies: environment, economy, social inclusion and culture. The compilation of remarks and conclusions of this bottom-up consultation process are then translated in the aims, goals and actions of this project.

The outreach, partners and initiatives of the proposed plan of action are as follows:

**1)** the OBSERVATORY LIVING CITIES (OLC) is based in three field missions in selected ceramic cities to develop in a study-case methodology the research design and goals. The dissemination strategy is based on the development of a website that compiles results. The beneficiaries are, not only the city councils, but also all the ceramic craftsmen that may find in-depth research and solutions for sustainable management practices of their workshops.

2) the CERAMIC HUB will develop: (a) in the mobility of artists' line of action, three major exhibitions will be curated having in mind South/ North relationships to foster knowledge and best-practices sharing; (b) in the strengthening of cultural sector, it will assess, evaluate and acquire community ceramic ovens to improve and enlarge revenues of the creative investment made by artists; (c) in the smart marketing strategy, will develop not only the peer-to-peer Concept Store, but it will also develop commercial services and strategy consultancy to craftsmen; (d) in the smart management of the city's ceramic resources, it will develop a platform for local institutions and entities (private, public and third sector) to align and coordinate services. The main beneficiaries of these activities will be all those involved in the process of creation – craftsmen, artists and designers working on ceramic. Integrated in the Hub, the ECO-POINT for the collection of ceramic waste will provide services to craftsmen, artists and designers to dispose any waste that may be the outcome of the production. It will also lead the process to develop an R&D project evaluating possible polluting effects of ceramic workshops: define project milestones, project partners, main goals and outputs. The main beneficiaries of this line of action are not only craftsmen, but the municipality and the region in general.

The main initiative being prepared for 2020 and 2022 is MOLDA – The Ceramic Biennale, that will, has it did in the past, mobilise the city's cultural and educational institutions, the private and public sector as well as civil society's associations in the development of an ambitious program, linking heritage, tradition, know-how and contemporary ceramic practice in a festival dedicated to, but not limited to, ceramics. Proposing exhibitions, conferences, seminars and creative workshops, MOLDA's programme is designed to foster internationalisation and evolves in multitude of media, from film, to literature and music.

Designing tradition into the 21st century is or will not be an easy or fast process. It is a slow process of creating the space for this cultural and artistic expression to change, evolve and find its contemporaneity within the tradition it brings forth. It is a process of allowing new ways of shaping, seeing and experience the cultural and artistic objects emerging from our culturally diverse times. Made by craftsmen and women that can learn from the past and shape it for the future, it will only endure if it is able to maximize the opportunities given by digital networks. And it will only endure if it reduces its ecological footprint. These are the hallmarks of our times. And finally, it is also a process of preserving the know-how and the knowledge of its history and importance to be passed on to future generations. But our aim is not to freeze it in time or in ways of doing. Our aim is to create the sustainable space that allows it to happen and that values and preserves the human gesture and creative freedom of which they are proof throughout the chain of history. So that from the passage of our times and actions can survive something more than a meteorite.

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Role of Digital Cultural Heritage for the Sustainability in Cultural Heritage Philosophical Study of the Restoration of Gongju-mok Site for the Sustainable Conservation of the Ancient City, Gongju The Analysis of Foreign UNESCO Chair Programmes The Sustainable Conservation of UNESCO World Heritage Mireuksaji Hwaryeongjeon Shrine Story to Become a Heritage Treasure The Sustainable Conservation of Cultural Heritage

# **Role of Digital Cultural Heritage for the** Sustainability in Cultural Heritage

Korea Advanced Institute of Science and Technology

Sustainability to ensure the sustainable future for all human beings with scarce resources in limited spaces is now an important issue for social development. The concept of sustainable development mainly focused on economic development in the early days. And social and environmental sustainability was generally regarded as the subordinate. However the concept and policy of sustainability have changed gradually. As its scope has expanded, cultural sustainability took the position as a major sector of sustainability in the 1990s. This change in perception led to the new perspective on the role of culture and heritage in social development and the discussion of sustainability in the field of cultural heritage.

Digital cultural heritage is attracting attention as the convergence with digital technology becomes indispensable in the heritage fields recently. Digital technologies are applied to all stages which include digitalizing cultural heritage, construction heritage database and enjoying cultural heritage. Digital technologies have a great impact on the conservation and utilization of cultural heritage. Therefore, the impact and role of digital cultural heritage needs to be addressed as the main issue when discussing sustainability in the heritage fields.

Sustainability in the heritage fields can be discussed in two ways, which are the sustainability of cultural heritage and the role of cultural heritage for the sustainable development of society. In the digital age, the use and importance of digital technologies has increased in conserving, managing, archiving and accessing to cultural heritage. Digital technologies enable the methods of analysis and conservation which had not been possible before. And they broaden the range of interpretation and understanding to extend the experience of enjoying cultural heritage. Enjoying cultural heritage and understanding its values raises the desire for conservation and contributes to heritage conservation in a circular way. The awareness about the important role of culture and cultural heritage needs to be raised as the concept of sustainability expands, Nevertheless, cultural heritage is still perceived as a negative factor to hinder development, rather than as a positive one to support sustainable development. For the sustainable conservation of cultural heritage, conservation policies and implementation plans need to be established to overcome the negative perception. The methods appropriate to the contemporary digital era must be applied to raise the awareness about the necessity of heritage conservation, to enhance the values of cultural heritage and to develop advanced conservation methods. In this context, the positive role and value of digital cultural heritage needs to be discussed more actively for the sustainable conservation in the field of cultural heritage.

# Philosophical Study of the Restoration of Gongju-mok Site for the Sustainable Conservation of the Ancient City, Gongju

Gongju-mok Site, where Gongju-mok was located in the Joseon Dynasty, is the significant place of the ancient historic city Gongju. From the ancient times to the modern times, there was the ruling facilities to govern the area. In the Japanese colonial period, modern medical facilities replaced the site, which changed the spatial function. Displaying the historical timeline of the change the site has played an important role in forming the identity of the ancient city Gongju.

This article aims at examining the framework for philosophical consideration on the value-based assessment. It analyze the values of Gongju-mok Site in the context of the historic ancient city, Gungju. Based on this analysis, the ways how restoration will be reviewed for the sustainable conservation of Gongju-mok Site.

The article highlights the importance of both tangible and intangile elements of expressing values in deciding the way of restoration. is to be discussed. Remaining elements that make up the values of Gongju-mok are mostly intangible. So the focus must be on restoring such intangible elements. It is necessary to consider how the restoration will show the meaning of Gongju-mok, its role and function as governing facilities, associated historical context and events and raise the awareness of its significance.

The medical facilities built in the Site during the modern period is also part of the historic layers, which must be included in the process of restoration. Gongju-mok Site is the place where experienced constant change by accumulating different historical layers. Therefore, Gongjumok Site should be restored to reflect such experience rather than simply to freeze into a certain historical time. In addition, the direction of restoration should be determined in consideration of local identity and socioeconomic value formed around the Gongju-mok site. The role of the site in consisting historic and cultural context of ancient city as well as its urban planning should be examined in decision-making. It should be discussed how the restoration of Gongju-mok site can contribute to educational and socioeconomic values.

National Research Institute of Cultural Heritage

The UNESCO Chair Programme was launched in 1992, which more than 700 institutions in 116 countries participate in. The aim of the program is to realize UNESCO's philosophy through collaboration and to act as the intermediary for research and policy making in academia, civil society and communities. In Korea, Seoul National University, Ewha Womans University, Sookmyung Women's University, Kyung Hee University, and Korea National University of Cultural Heritage are the participants of the UNESCO Chair programme. The only program for conservation and restoration of cultural heritage has been run by Korea National University of Culture Heritage (KNUCH).

The program of Korean Traditional Culture University has been operated since 2017 under the theme of "Capacity Building for the Conservation and Restoration of Asia-Pacific Culture Heritage". The program is to conduct field surveys on traditional materials and technique, to provide professional training course, to build expert networks and to construct the database for the conservation of Asian-Pacific traditional materials and technique. In the KNUCH UNESCO Chair Programme, international conferences and heritage experts training courses were held. And field surveys and heritage workshops were carried out in Cambodia. Despite these achievements, theoretical study, case analysis, collaboration with external institutions for the sustainable development of UNESCO Chair Programme, and promotion of operational performances are still insufficient. The purpose of this study is to analyze foreign UNESCO programmes related to building heritage and to propose new programs and plans for development of KNUCH UNESCO Chair Programme.

The UNESCO Chair Programmes for architectural heritage are carried out in 8 countries except Korea where design-oriented researches are the main for the conservation and effective management of historic cities. The representative programmes are of Politecnico di Milano in Italy and Université de Montréal in Canada. Politecnico di Milano launched a master's course in architectural design and history as part of the UNESCO Chair programme in 2012 to train experts for conservation and restoration of building heritage. The curriculum consists of studiooriented design projects. The goal is to cultivate architects who understand the historical context. The UNESCO Chair Programme at the University of Montreal's Environmental Institute focuses on international cooperation through education and networks for sustainable development in urban landscape design.

What the two universities have in common is international workshops. The workshops aim at the cooperative relationship where the various stakeholders work together to share common goals and find solutions. Workshops are carried out through domestic and international cooperation as well as local communities, and are operated based on the collaboration of experts and students in related fields. This shows that the goal of the UNESCO Chair Programme has been realized by contribution of the programmes to international society as well as communities. The websites for the UNESCO Chair Programmes were built and information about the programmes is available online. This public relations activity is the important factor that leads to public interest and raises social awareness.

The international conference of KNUCH UNESCO Cahir Programme is growing in size, but the scope of participation is still limited to professionals. In contrast, the international design workshop at the Université de Montréal in Canada fulfills the goals of the UNESCO Chair Programme, in that architects, students, politicians and community members on local and international level involve to discuss common themes. It also actively communicates with the public through website and social networking services. The construction and promotion of website is also essential to contribute to the society for local residents.

# The Sustainable Conservation of UNESCO World Heritage Mireuksaji

National Research Institute of Cultural Heritage

The Restoration and maintenance researches for the conservation of Iksan Mireuksaji Temple Site have been conducted in earnest since 2013 after research planning phase, and now the main research is underway. The whole research process is divided into basic research, main research, and advanced research with progressively deeper levels. Based on the research road map established on the basic research phase (2008~2010), the fifth stage of main research is in progress. After the completion of the main research in 2021, the advanced research will be conducted by 2030.

The most difficult and ongoing controversial issue in conducting the research is how to establish the identity in restoration and maintenance of the Mireuksa Temple Site. This is because the contents of restoration at the present time vary depending on the identity setting. And it leads to the change in the historic perceptions of restored Mireuksa Temple Site in the future.

The Mireuksa Temple Site was listed as a UNESCO World Heritage Site in 2015 for its outstanding universal value. This means that the Mireuksa Temple Site was recognized for its values globally as well as domestically. The selection criteria of Baekje Historic Areas, including Mireuksaji Temple Site, as World Heritage sites, are criteria ii) and (iii). In other words, its outstanding universal value (OUV) was recognized as a proof of important exchange in East Asian culture and as an unique or exceptional evidence of cultural tradition or civilization, not as a buddhist masterpiece of human creative genius. In this point of view, Mireuksaji Temple Site should be restored and maintained to represent historic layers more comprehensively than simply highlight the history of Buddhism. What should be absolutely avoided is the haste to finish the restoration in a short period of time. Reconstructing the 1400-year-old architectural heritage in 20-30 years may not properly represent its essential values and may even damage it. Even if it takes 100, 200 or more years, the indepth and continuous research on values and significance must be preceded and followed by restoration and maintenance in the optimal way for the sustainable conservation of the Mireuksa Temple Site.

## Hwaryeongjeon Shrine Story to Become a Heritage Treasure

After the construction of the shrine for King Jeongjo was discussed, Hwaryeongjeon Shrine was built on April 29, 1801 to the north of Hwaseong Temporary Palace and the portrait of King Jeongjo was enshrined. The main hall where the portrait was placed was called Unhangak Hall where King Sunjo honored the filial devotion of his father and wrote down Unhangak on the hanging board.

Unhangak Hall of Hwaryeongjeon Shrine is famous for its elegant and dignified traditional wooden building. Hwaryeongjeon Shrine, built in graceful and majestic taste under the king's motto of solidity and simplicity, is a representative building of the Joseon Dynasty. Among the other halls of Hwaseong Temporary Palace, including Bongsudang, it is difficult to find a building that surpasses the magnificent and dignified style of Unhangak Hall.

Unhangak Hall of Hwaryeongjeon Shrine, where the portrait of King Jeongjo was enshrined with the hanging board written by King Sunjo's was the sacred place.

All the kings since King Sunjo had visited the place which became the symbol of Suwon. Managing Hwaryeongjeon Shrine with Yungneung and Geolleung Royal Tombs was one of the main tasks of Hwaseong-yusu, the provincial governor of Suwon-bu Prefecture, and Suwon-pangwan, the deputy governor. In particular, Hwaseong-yusu had visited Hwaryeongjeon Shrine every five days, and incensed every first and 15th day of a month by the lunar calendar. Regular ceremonies for the repose of King Jeongjo had been held on his birthday and the ritual day on December.

Hwaryeongjeon Shrine was designated as Historic Site 115 on January 21, 1963. Last year, three buildings of Hwaryeongjeon Shrine, Unhangak Hall, lancheong and Bokdogak, were listed as Treasures 2035. This shows the significance of Hwaryeongjeon Shrine as the archetype of palace architecture, which has been conserved in its original form of 1801. In order to restore the originality of Hwaryeongjeon Shrine, Suwon has made great efforts like representing the interior design of Unhangak Hall and replacing the portrait of King Jeongjo with the original one.

Nevertheless, there are some issues that need to be improved. First of all, the hanging board 'Pungwhadang' must be replaced with 'Hwahwajeon Jaesil' This is to restore the authenticity of Hwaryeongjeon Shrine. Secondly, the Unhangak board written by King Sunjo must be hung on the hall. At the time of the replacement of the Unhangak board in 2005, it was not able to use the glass plate photo at the National Museum of Korea. Now the glass plate photo made it possible to visually check the original hanging board written by King Sunjo, to engrave it and to hang the represented board on the hall. This is the way to restore the true meaning of hanging the Unhangak board written by King Sunjo on Hwaryeongjeon Shrine in 1801. Third, the moving line in Hwaryeongjeon Shrine must return to the original. Now visitors are embarrassed that the front door of Hwaryeongjeon Shrine is closed. This is because visitors can buy tickets and enter Hwaryeongjeon Shrine only through Hwaseong Temporary Palace. The only way to Hwaryeongjeon Shrine is to pass through Nakmanheon and Hyeopmun which is the side gate of the shrine. It is uncourteous to enter the sacred space with looking at the oblique angle. It is right to enter the main hall through the main gate, Hwaryeongjeon Sammun. Lastly, in front of Hwaryeongjeon Shrine were Hongsalmun and Hamabi, which symbolize the sacred place. Visitors had to go through Hongsalmun and Sammun to enter Hwaryeongjeon Shrine. They had to step into a sacred atmosphere while looking at the dignified building, Unhangak Hall. Hamabi still stands in the original location but Hongsalmun was moved to Hwaseong Temporary Palace. Hongsalmun of Hwaryeongjeon Shrine needs to be relocated to its original position. Proper representation of Hwaryeongjeon Shrine, the most sacred place in Suwon, is the way for our future generations to inherit the significance of the heritage treasure.

# The Sustainable Conservation of Cultural Heritage

Korea Research Institute for Human Settlements

There are no specific standards in the system for the management and registration of modern cultural heritage. This leads to the demolition of modern cultural assets or the removal of existing modern assets to restore the cultural heritage that once existed.

Two years ago, a project was launched to conserve the cultural heritage of Gwandeokjeong Hall and restore the surrounding area. This is the urban regeneration project that brings about changes in the urban system for the purpose of conserving the precious cultural heritage of Gwandeokjeong Hall. Cultural heritage conservation with restrictions on the property rights of residents requires various management measures to improve the quality of life of residents.

It is necessary to interpret cultural heritage from the perspective of sustainable urban development, not as a static resource, and implement various conservation and management measures through consultation with the residents. Cultural heritage is the common asset and social insocial infrastructure which is shared with future generations. So various management measures and sustainable management tools are needed.

The cultural heritage in this article is limited to the concept of "Cultural Heritage", not "Cultural Property" under the Article 2 of the Cultural Property Protection Act. Among cultural heritage, the focus will be on modern cultural heritage, especially the modern cultural heritage linked with cultural property. In the conservation of modern cultural heritage, there are many cases in which demolition policy was chosen due to the high cost of repair and maintenance. In oder to prevent further damage, various sustainable maintenance measures must be prepared for the restoration and utilization of historic sites. In-depth discussion on the ways to conserve and restore modern cultural heritage are needed.

The development of the city comes from the past. It is no exaggeration to say that the conservation and sustainable use of cultural heritage and resources determines the rise and fall of city. When we forget the past and think only about the advanced future, the city is easy to become dry and stereotyped. So the conservation and management of cultural heritage is an important issue from the perspective of comprehensive urban management. We must recognize the value of cultural heritage in our livelihood and make it a vehicle for urban development.

In the future, there will be various projects in the city. In particular, it is expected that urban regeneration projects will be carried based on communication with the residents through recognizing the significance of cultural heritage and utilizing regeneration values.

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Cultural Heritage Administration





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