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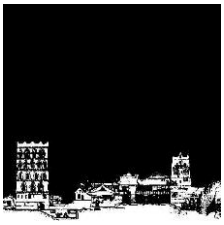

TRADITIONAL DWELLINGS AND SETTLEMENTS WORKING PAPER SERIES

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VIRTUAL RECONSTRUCTIONS AND DIGITAL TOOLS

Traditional Dwellings and Settlements
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COLLECTING THE PAST: VISUALIZING THE ROMAN BATH IN ANKARA

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COLLECTING THE PAST: VISUALIZING THE ROMAN BATH IN ANKARA

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This study examines the site of the Roman bath in Ankara as the product of multiple actors building the layers of its past. The accumulation of histories on the site framed by both rescue excavations and early Republican nationalist ideologies, with transported ruins from several locations in Ankara and continuously revealing previously disregarded layers, is examined in terms of the visual narratives in particular which have not only constructed a coherent visual history but also documented Roman baths that have since been eradicated in modern building efforts, to demonstrate the role of the image within an urban archaeological site.

1. INTRODUCTION

The site of the Roman bath, located in close vicinity to the historical urban center of Ankara in what could today be regarded as a somewhat disreputable area, states its presence with a small sign barely noticeable to the passersby. Appearing like a gated garden, the site which has been transformed into an open-air museum offers its visitors an abundance of remnants of the past. Organized in a manner that privileges no history above another, layers of the past lives of the ruins as well as the layers of their resurrection merge into one another and become frozen in time.

Several excavations, commissioned by different institutions and conducted by several archaeologists on the site, as well as rescue excavations throughout Ankara bring these ruins together on the site which has been regarded as an "Archaeological Park".
[1] Through the accumulation of the transported ruins on the site as well as the recognition of the discovered layers of the past within the site, the palimpsest that is the Roman bath open-air museum stands as the accommodating record reflecting the etchings on its surface.

This research will aim to extricate the components of this ensemble to trace the production of prominent authors in contributing to the history of the site. The visual productions of the authors that were instrumental in navigating the accumulation of histories on the site will be examined to reveal the authority of the image within an urban archeological site as well as the ideological factors shaping the construction of these visual narratives.

2. FIRST ENCOUNTERS: VISUAL HISTORIES AND RESCUE EXCAVATIONS

The visual history of the Roman bath in Ankara precedes any archeological work on the site. Tournefort's engraving of Ankara, produced through his visit in 1701 offers a glimpse into this past.[2] Although the state of the baths is not clearly understood from the image, the notion that it still stood after centuries is succinctly apparent. However, the written accounts all referring to 1926 as the year this state of the ruins changed marks its destruction by a means of explosion through dynamite to construct the building for Ministry of Defence.[3] As some of the ruins were then used to fill up the swamp land on the sides of the Hatip brook, a photograph taken by Jerphanion records the remainder of walls still standing.[4] After the decision was made not to continue with the building efforts, the site was given to the Ministry of Education and only after another building project took place it became a site of study by archeologists.

In 1931 during the construction of Çankırı Street, discoveries of archaeological findings led to the Ministry of Education's request from the German Archaeological Institute to conduct work on the site who then commissioned Kurt Bittel and Knut Olof Dalman.[5] Although water channels and parts of the *palaestra* of the bath were discovered, the excavators did not arrive at the conclusion that this was a bath complex but rather argued for having found a marketplace.[6] Dalman's argument for having found a marketplace - even after coming across components that could have been simply identified as belonging to a bath structure - was heavily influenced by a photograph sent by the Ministry of Education showing that the remains they had encountered belonged to a large courtyard.[7] In comparing the status of the found object to the photograph, Dalman's interpretation relying heavily on the photograph speaks volumes on the authority of the image. In line with Michael Shanks's argument for the prominent role of photography for archaeology stating "even when photographs are acknowledged as artifacts, they may also take on something of the status of found objects, harnessing the magic of the real,"[8] Dalman regards the image itself as a primary evidence for understanding the past, dictated by its subsequent visual representations where the image sometimes subsumes the object that is represented.

The importance denoted to the photograph was also reflected on what Dalman regarded as their contribution to the history of the Roman bath. Unlike other archaeologists working on the site in the future who often conclude their remarks with hopes for future excavations on the site, Dalman instead praised their role played in the visual history of the bath stating; "Most of the ruins will abandon their places as the necessity of modern transportation and will only continue their lives in the photographs we take."[9] At a time when ambitious building projects constructed Ankara as the new capital representing the young nation, the findings of a rescue excavation conducted to give way to building one of the main streets of the urban centre is

without hesitation regarded to only live within the image rather than actively shape the future of the site. However, what is also clear is that for Dalman photographs clearly amounted to more than mere documentations of the site or the excavation process but held a meaning of their own, one that had the potential to narrate more than what was seen. For Dalman, the photograph sent during the excavations through which the spaces are identified and the images they capture in which the ruins continue their lives both conjure reality as they constitute the beginning of a narrated visual history of the bath, surpassing the tales of the stones.

Although only a small portion of the bath was uncovered during this rescue excavation and the site today is the Çankırı Street used to approach the open-air museum, it did influence future accumulations of archeological findings. As the findings were transported to the available site nearby, where the Roman bath would later be uncovered, the area was designated as "a small architectural museum, right next to the modern road, to animate the memories of the past".[10] This defined the site through its archaeological properties and the constructed perception of it initiated the accumulation of histories on the site. The Byzantine tomb findings, product of another rescue excavation discovered during the construction of the train station building in the 1930s, were placed and displayed within its borders.[11] Hence, even though Dalman and Bittel's findings did abandon their places, they not only continued their lives but flourished in this new light.

3. UNEARTHING EFFORTS: REPRESENTING THE NATION

Following the work of Dalman and Bittel, an excavation led by Remzi Oğuz Arık in 1937 as part of a larger archaeological project to uncover the past civilizations in Ankara, was conducted on the south corner of what was regarded as a tumulus revealed Phrygian findings within the site.[12] This led to an understanding of the site as holding layers of several past civilizations and triggered further research.

In 1938, in an effort to find Hittite layers not previously encountered in Ankara, students of archaeology of the Faculty of Letters conducted excavations under the directory of the Turkish Historical Society and Monuments and Museums.[13] The archeological excavations were utilized in order to trace the origins of the secular Republic to prehistoric Anatolian civilizations and present Hittite findings as powerful symbols for early Republican nationalism.[14] However, the site revealed Phrygian, Roman, Byzantine, Seljuk and Ottoman findings. In line with the early Republican ideology which not only tried to establish its roots through a history older than the Ottoman but also promote its strong ties with Europe through Greek and Roman findings; the Phrygian layer was found 'vulgar', whereas the Roman layer was 'proper', the Hellenistic layer was noted absent whereas the Seljuk and Ottoman layers encountered were not even commented upon.[15]

Although their focus privileged certain histories among these findings, the archaeologists intended to produce a section drawing that would present every "cultural layer" which was also reflective of the early Republican archaeological efforts to include all cultural heritage. Interestingly, the sondage excavation to produce this section drawing led to the unexpected discovery of the *hypocaust*, thus identifying the space to be a bath, one of the largest in the world according to Dolunay.[16] After the excavations in 1938 and 1939 by the students of archaeology of the Faculty of Letters[17] and the following excavations in 1940 and 1941 directed by Dolunay, the majority of the bath was uncovered and dated to the time of Caracalla.[18]

In light of these discoveries, Dolunay proudly stated that "With this, Ankara has gained a monument containing a significant historical as well as touristic importance."[19] What is lost in this translation is that Dolunay regards having unearthed and defined such a monumental structure to be an asset earned as well as gained. A reflection on the selection of the word reveals a mindset that considers Ankara to always hold the right to it within its many layers but an effort had to be shown to actually claim it. There is also an emphasis on the continuity of the identity of the city, reflected through the significance of the findings having been made by a material argued to be a "completely local Ankara stone."[20] This notion of historical continuity in line with the nationalist approaches of the time with regards to Ankara is also traced within the narrative of Bosch who later notes;

> Any person who has wandered through the asphalt streets, parks, modern houses and stupendous official buildings and placed within oneself the unique sight from the top of the castle, the symbol of an old past, cannot help to wonder the age of this city and the reasons for its prominence in every era.[21]

This juxtaposition of the old and new extends even to Bosch regarding Tiberius Iulius Iustus Iunianus, who is often highlighted as the person responsible for the construction of the bath, to be a *memur* (government official) which further exemplifies the discourse of the time being reflected upon the past in a way that claims it as ones own.[22] Another point to be made when looking back to Dolunay's statement with regards to the bath is the emphasis on its touristic importance. In Ernest Mamboury's tourist guide for Ankara published in 1934, the bath is mentioned only in passing, mostly because whether it was a bath or not had still not been ascertained.[23] Hence, it may be said that with the efforts of Dolunay, Ankara had finally earned and gained the right to the Roman bath to call its own and present to others.

4. VISUALIZING THE RUINS: REPRESENTING THE PAST

After having unearthed the majority of the Roman bath complex, a new chapter of its representation began. An interest, neither on the site nor on its photographs but rather on the imagination of what it once was appeared. Archeologist Mahmut Akok, who was already acquainted with the site as he was head of the operation to transport the Byzantine tomb findings of the 1930s to the site, led several excavations on the site throughout the 1940s. Although the excavations prior to Akok had given way to visual productions which were reflective of the discourses of their time, the construction of a consistent visual narrative of the past becomes apparent for the first time in his restitution drawings.

Unlike the archaeological excavations beginning from 1937 to 1943 which were highly focused on uncovering the past of the nation, those conducted by Akok were rescue excavations where the excavators "seized the opportunities and waited for building constructions in suspicious locations" to unearth the past of a city that was in the process of being rebuilt in a large scale.[24] Working on the site with Dolunay in the early 1940s[25] Akok's excavations in the Finance Profession School courtyard in 1944, the site for the Soğukkuyu Military Prison in 1946 and the eastern part of Çankırı Street (Nurettin Ersoy building) in 1947 led him to develop a coherent narrative for the bath complex. The first excavation to the idea that the bath was intended to be symmetrical, however left unfinished, the second revealing a small bath and the third a private bath.[26]

The first excavation of 1944, was specifically conducted to reveal a symmetrical plan layout like that of the Caracalla Baths in Rome. Even though Akok argued for a symmetrical plan for the large bath complex, the excavations conducted in 1944 where this was expected to be located revealed a completely different layout. There was no reference on the site to substantiate this idea and the conclusion was made that the bath must have been intended to have been symmetrical but it was left unfinished.[27] The triumph of Akok's imagination over the reality of the space was later reflected in his visual productions. It may be argued that in both his justification for the lack of a symmetrical plan and the spaces brought to life in his drawings, Akok's acquired knowledge of Roman baths dictated the way he imagined them to be. These assumptions on what the bath must have looked like led to the production of visuals far surpassing the findings uncovered by excavations.

Although his archaeological work did not exclusively focus on the site of the Roman bath that was worked on by Dolunay extensively, his visual productions of the existing as well as newly found information surpassed any detailed text published adjacent to it. As Akok stated in relation to his drawings of the small bath:

> We have found it appropriate - with the courage of having worked on the excavation of the other, big Roman bath - to present this small bath to the scientific community by completing it with images and have prepared a plan as well as a section drawing. In this way we tried to express what would have been lengthy to do so in words.[28]

When these visual productions are compared with the textual ones, published together, what becomes apparent is that it would not only have been lengthy to do so but perhaps impossible. The written production being predominantly information based with detailed numeric identifiers, could not have been presented in a manner that evokes imagination in a way that Akok's drawings manage to.

Apart from their visual narratives, Akok's drawings also recorded a moment in time that would have been lost otherwise. The small bath Akok so cautiously presents through his drawings has since been eradicated, even though the prison meant to be built on the site has been called off.[29] This is not the only bath building surviving only in the visual productions of Akok as another bath found in the site of Ulus İş Hanı, is also recorded by his drawing from 1956 and later erased from the urban fabric.[30] Interestingly, after Akok's work, perhaps too removed from the reality of the space, in a way constructing an alternative history, the site that has been worked on extensively is deserted for nearly 50 years and remained as a disorganized open-air artefact storage.[31] This lack of attention towards the site could also be explained in terms of the power of the visual, as Dana Arnold notes; "The seductive power of a visual *ekphrasis* is the illusion of total knowledge of what is being represented or described."[32] And in these terms, the illusion of having gained all knowledge of and from the site might explain its neglect and after being brought to life from the earth, its journey of returning back to it.

5. CONCLUSION: QUESTIONING THE PAST, PRESERVING THE FUTURE

After 1995 and through the early 2000s, extensive work carried out in the site to restore the ruins and present them in a visitor-friendly manner takes center stage for the site program of the Roman bath conducted by the Anatolian Civilizations Museum's director İlhan Temizsoy.[33] As efforts to bring in more visitors whilst preserving the ruins becomes the primary focus of the site, the academic production, no longer in the domain of those conducting the excavations shifts to archaeologist revisiting the historiography of Roman Ancyra to question claims made and argue whether the tentative dating of the Roman bath to Caracalla was accurate. An important reason behind dating the construction of the bath to the time of Caracalla being the coins found on the site, the likeliness of the coins merely being in circulation during the life span of the bath is argued.[34] It is also suggested that the rule of Caracalla marked Ancyra's most prolific minting period, which may explain

the abundance of coinage in circulation.[35] Inscriptions mentioning the visit of Caracalla are also taken into critical reevaluation as such ambitious building projects for the arrival of the emperor could have been met with disappointment as he might not have shown up.[36] However, in light of contemporary research tools some aspects of the history of the Roman bath have been reevaluated. An important discovery was made by Tanrıverdi, who by utilizing arheometric methods clarified that the bath, contrary to the arguments of having been built in stages under the rules of both Hadrian and Caracalla, was actually constructed within the scope of a single project.[37]

Today, as the fragmentary ruins transported from several locations of Ankara constitute the Roman bath open-air museum, the site remains rich with layers of the past. An example of these is a tomb found in Balgat in 1998 and transported to the site for exhibition.[38] But this accumulation of ruins, together with the lack of adequate documentation and organization makes the task of future research as well as current visits difficult to curate.[39] Even the earlier archeological findings such as the Byzantine tomb which were transported to the site in the 1930 and has been a part of the history of the site before the Roman bath was uncovered, become hidden within the narrative of the site. The unearthing of previously disregarded layers within the site throughout the years have also made the task of constructing a consistent narrative difficult. With the acknowledgment of the unaccounted histories, such as the Ottoman tombs recorded in 2001, the Roman bath open-air museum becomes even more open to possibilities of reexamination.[40] Hence, problems of the organization of the site continue even after the efforts of Anatolian Civilizations Museum to give it the appearance of an open-air museum. The manner in which the site is cut from the rest of the urban fabric to an extend that even the adjacent Atatürk Girls' Technical School is not allowed any visual connection through its windows[41] or that archaeological findings are still piled up on its slopes[42] show that the construction of such a coherent narrative is far from accomplished. What is clear is that amongst all the remnants of the past it is the Roman bath which not only gives the site its name but is the protagonist within its narrative. Apart from all the layers discovered within its borders, it is the most prominent one as it also conveys the spatial organization of its findings. It is separated from the rest of the ruins to the extend where it is surrounded by barrier so as not to allow access, offering the visitors views to the spaces of the past rather than a way to experience them.

Apart from the several embedded layers within it, the archeological site of the Roman bath itself stands as a time capsule within the urban context. A glance from within the site offers a brief view to the Ankara Castle where ruins similar to those preserved within the site are embedded within its walls as *spolia*, testaments of the integration or perhaps appropriation of the past. What stands between the site and the castle is the remnants of the "modern building efforts" constituting a wall of their own and the squatter housing on the slopes as

the ruins of a far closer history of mass migration to the city. As contemporary building projects on an urban scale aim to capitalize on the historical district, remains of privileged histories such as the Hacı Bayram Mosque built in the Ottoman Period are emphasized where the Acropolis Hill which it is built upon where it coexists with the Augustus Temple is irreversibly damaged in order to construct an underground parking and extend the mosque.[43] As these building efforts in the district inevitably privilege a past in line with the contemporary ideology, sometimes at the expense of another, the open-air museum not only brings together several layers of the past but also stands as testament reflecting the ideologies unearthing them.

As efforts to make the open-air museum attract more visitors continue, the visual production of Akok still sets the bases for the 3D reconstructions of virtual reality projects.[44] The history of the resurrection of the bath finds new life in a more enhanced visual representation, further removed from the reality of the space. As Dalman hoped to have the bath continue its life in the photographs they took and Akok wanted to bring the bath back to life in restitution drawings,[45] a visual history of the site could perhaps be regarded as having a much more coherent narrative to it than a textual one or what the site itself offers. The images with a life of their own, often disregarded whilst making statements on the inadequacy of a history written of Ancyra,[46] state that perhaps the history is still to be written but the images themselves will forever be embedded within it.

NOTES AND REFERENCES

[1] M. Akok, "Ankara Şehrindeki Roma Hamamı", Türk Arkeoloji Dergisi (Ankara: Türk Tarih Kurumu Basımevi, XVII-1, 1968), pp. 5-38.

[2] Joseph Pitton de Tournefort, 1717, pp. 442-446 from M. Kadıoglu, K. Görkay, "Yeni Arkeolojik Arastırmalar Isıgında Μητροπολιε Τηε Γαλατιαε: Ankyra" (Anadolu/Anatolia 32, 2007), p.58

[3] Akok, "Ankara Şehrindeki Roma Hamamı", p.5. As this is not mentioned within the texts of Dalman or Dolunay, I have located the beginning of the mention of it to this text.

[4] De Jerphanion, S. J., *Mélanges D'Archéologie Anatolienne. Monuments Préhelléniques Gréco-Romains, Byzantins et Musulmans de Pont*, *de Cappadoce et de Galatie*, 1928, lev. 120, 3, from Kadıoğlu, Görkay, "Yeni Arkeolojik Arastırmalar Isıgında Μητροπολιε Τηε Γαλατιαε: Ankyra", p.58.

[5] K. O. Dalman, "1931'de Ankara'da Meydana Çıkarılan Asarı Atika", (Türk Tarih Arkeologya ve Etnografya Dergisi 1, 1933), pp. 121-133.

[6] Dalman, "1931'de Ankara'da Meydana Çıkarılan Asarı Atika", p. 125.

[7] Dalman, "1931'de Ankara'da Meydana Çıkarılan Asarı Atika", p.130. The photograph mentioned by Dalman is not published nor further described in detail but it would not be impossible to suggest they were the photographs taken by Jerphanion.

[8] M. Shanks,"Photography and Archaeology" in *The Cultural Life of Images: Visual Representation in Archaeology*, ed. B. Molyneaux (London: Routledge, 1997), p.80 from Frederick N. Bohrer, "Photography and Archaeology: The Image as an Object", S. Smiles, S. Moser eds., *Envisioning the Past: Archaeology and the Image*, (Blackwell, 2005), p.183.

[9] Dalman, "1931'de Ankara'da Meydana Çıkarılan Asarı Atika", p. 132. Original text in Turkish: "Harabelerin büyük bir kısmı modern münakalatın icabatı olarak yerlerini terkedecekler ve ancak çektiğimiz fotoğraflarda yaşıyacaklardır." Translated by the author.

[10] Dalman, "1931'de Ankara'da Meydana Çıkarılan Asarı Atika", p. 132.

[11] M. Akok, N. Pençe, "Ankara Istasyonunda Bulunan Bizans Devri Mezarlarının Nakli" (*Belleten* 5 20, 1941), pp. 617-622.

[12] N. Dolunay, "Türk Tarih Kurumu Adına Yapılan Çankırıkapı Hafriyatı" (Belleten, 19:5, 1941) p. 261 and Akok, 1941, p.5.

[13] Dolunay, "Türk Tarih Kurumu Adına Yapılan Çankırıkapı Hafriyatı", p. 261.

[14] For the Hittite motifs' symbolization of Republican nationalism, S. Bozdoğan, "Art and architecture in modern Turkey: the Republican period," R. Kasaba, eds., *The Cambridge History of Turkey: Turkey in the Modern World*, Vol. 4 (Cambridge University Press, 2008), p. 439; for the utilization of archaeological excavations for state ideology, S. Güven, "Constructing the Past in Ankara: From Augustus to Atatürk", S. Redford, N. Ergin eds., *Perceptions of the Past in the Turkish Republic: Classical and Byzantine Periods*, (Peeters, Leuven, Paris, Walpole, MA, 2010), p. 38.

[15] Dolunay, "Türk Tarih Kurumu Adına Yapılan Çankırıkapı Hafriyatı", p.262.

[16] Ibid.

[17] This excavation was directed by H. H. Von der Osten. N. Dolunay, "Haberler, Çankırı Kapı Hafriyatı", (Belleten, Sayı 2, 1938), p. 495 from Z. Tanrıverdi, "Archaeometric Investigation of the Construction Materials of Roman (Caracalla) *Bath in Ankara"* (PhD Thesis in Archeometry, METU, 2018), p.64.

[18] Dolunay, "Türk Tarih Kurumu Adına Yapılan Çankırıkapı Hafriyatı", p.266.

[19] Dolunay, "Türk Tarih Kurumu Adına Yapılan Çankırıkapı Hafriyatı", p.266. Original text in Turkish; "Ankara bunula tarihi ve aynı zamanda turistik ehemmiyeti haiz büyük ve mühim bir eser kazanmış bulunmaktadır." Translated by the author.

[20] Dolunay, "Türk Tarih Kurumu Adına Yapılan Çankırıkapı Hafriyatı", p.266.

[21] E. Bosch, "Ankara'daki Antic Devir Hamamı Müzesi", (III Türk Tarih Kongresi 1943) p. 576. Original text in Turkish; "Ankara'nın asfalt caddelerinde, parklar, modern ikametgahlar ve heybetli resmi daireler arasında dolaşarak, eski bir geçmişin sembolü olan kaletepesinin eşsiz manzarasını içine hak etmiş olan her şahıs, bu şehrin yaşını ve her devirde haiz olduğu ehemmiyetin sebeplerini kendi kendine sormaktan kendini alamaz." Translated by the author.

[22] Bosch, "Ankara'daki Antic Devir Hamamı Müzesi", p.578. Original text in Turkish; "[Iunianus] adet olduğu gibi fahri olarak üzerine aldığı bütün memurluklarda yüksek başarı göstermiş, memurluğu müddetince vatanı olan şehri zenginleştirmiş, en güzel binalarla süslemiş." Translated by the author.

[23] Mamboury, in his work of 1934, mentions that the "leveling" of 1926 revealed circular pools (that seemed to have been used as graves by the Seljuks) that appeared to resemble an old bath, probably dating to the Roman or Byzantine times. E. Mamboury, *Ankara Gezi Rehberi*, trans. Ankara University Faculty of Languages History and Geography, Department of French Language and Literature research assistants, (Ankara University Press, 2014) p. 78, 145.

[24] M. Akok, "Ankara Sehri Içinde Rastlanan Ilk Çag Yerlesmelerinden Bazı Izler ve Üç Arastırma Merkezi", Türk Tarih Kurumu (Turkish Historical Association) (Belleten, 75:19, 1955), p. 310. Original text in Turkish: "Geniş ölçüde yeniden kurulmak mecburiyetinde olan Ankara'da modern iskanın kabuğunu istenildiği gibi kaldırıp, altında esaslı bir arkeolojik arama yapmak imkanı yoktur. Ancak, bizim örneklerini sunduğumuz gibi fırsatları gözlemleyip, şüpheli noktalarda yeni binaların kurulacağı zamanı beklemek mecburiyeti vardır." Translated by the author.

[25] Akok, "Ankara Şehrindeki Roma Hamamı", p.6.

[26] Akok, "Ankara Sehri Içinde Rastlanan Ilk Çag Yerleşmelerinden Bazı Izler ve Üç Arastırma Merkezi".

[27] Ibid, p. 311.

[28] Akok, "Ankara Sehri Içinde Rastlanan Ilk Çag Yerleşmelerinden Bazı Izler ve Üç Arastırma Merkezi", p. 325. Original text in Turkish: "Bu küçük hamam binasını- diğer büyük Roma hamamı hafriyatında çalışmış olmanın verdiği cesaretle- resim yolile tamamlıyarak bilim alemine sunmayı yerinde bir iş bulduk ve bu

maksatla da biri binanın plan durumu, diğeri genel heyetini gösterir iki resim hazırladık. Bu suretle yazılarımızla anlatılması uzun olacak husuları kısaca ifadeye çalıştık." Translated by the author.

[29] Kadıoglu, Görkay, "Yeni Arkeolojik Araştırmalar Isıgında Μητροπολιε Τηε Γαλατιαε: Ankyra", p. 63.

[30] Ibid, p. 66

[31] I. Esen, "Ankara Roma Hamamı 2000 Yılı Çalısmaları", 12. Müze Çalısmaları ve Kurtarma Kazıları Sempozyumu, (Ankara, Kültür Bakanlıgı Anıtlar ve Müzeler Genel Müdürlügü Yayınları, 2001), p. 286.

[32] D. Arnold, "Imag(in)ing Architecture", Z.Böröcz and L.Verpoest eds., *Imag(in)ing Architecture: I*conography in Nineteenth-Century Architectural Publications, (Leuven: Acco., 2008), p.19.

[33] Esen, "Ankara Roma Hamamı 2000 Yılı Çalısmaları" p. 286. And Ö. Mutlu, "Integration of the Roman Remains in Ulus Ankara within in the Current Urban Contex" (MA Thesis, Restoration in Architecture Department of METU, 2012), p.102. Mutlu in her thesis states; "While the number of visitors of Ankara Museum of Anatolian Civilizations is around 300.000-400.000 per year, only 3000-4000 people visit the Roman Baths Open Air Museum per year which means one hundred times less than the visitor number of Museum of Anatolian Civilizations."

[34] S.D. Cooke, "The Monuments of Roman Ancyra Reviewed" (MA Thesis, Archaeology and History of Art Department, Bilkent University, 1998), p.52.

[35] J. Bennett, "The Political and Physical Topography of Early Imperial Graeco- Roman Ancyra" (Anatolica 32, 2006) p.210.

[36] Cooke, "The Monuments of Roman Ancyra Reviewed", p.50.

[37] Tanrıverdi, "Archaeometric Investigation of the Construction Materials of Roman (Caracalla) Bath in Ankara", p.155.

[38] H. Demirdelen, "Balgat Roma Mezarı," 10. Müze Çalışmaları ve Kurtarma Kazıları Semineri (Kültür Bakanlıgı Anıtlar ve Müzeler Genel Müdürlügü Yayınları, Ankara, 1999), pp. 35-48.

[39] Kadıoğlu, Görkay, "Yeni Arkeolojik Araştırmalar Isıgında Μητροπολιε Τηε Γαλατιαε: Ankyra", p. 54 Mentioning that the transportation of all architectural fragments found in central Ankara being carried to the area of the bath making the task of identifying architrave blocks without inscriptions a difficult task.

[40] İ. Temizsoy, İ, Esen, S. Atesogulları, "Ankara Roma Hamamı 2001 Yılı Kurtarma Kazısı" 13. Müze Çalısmaları ve Kurtarma Kazıları Sempozyumu, (Kültür Bakanlıgı Anıtlar ve Müzeler Genel Müdürlügü, 2002), p. 146.

[41] Mutlu, "Integration of the Roman Remains in Ulus Ankara within in the Current Urban Contex", p.142.

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[43] Ö. Özçakır, A. G. B. Altınöz, A. Mignosa, "The Impact of Politics and Ideology on the Transformation of Heritage Values: Hacı Bayram Districts in Ankara, Turkey", M. Menezes, D. R. Costa, J.D. Rodrigues, eds.

Intangibility Matters: International Conference on the Values of Tangible Heritage Proceedings (IMaTTe, Lisbon, 2017). pp. 241-252.

[44] E. Sertalp, "Ören Yerlerinde Artırılmıs Gerçeklik Standlarının Kullanımı: Ankara Roma Hamamı ARtur Örnegi" (Sanat ve Tasarım Dergisi: 22 2018), pp. 273-289.

[45] Akok, "Ankara Şehrindeki Roma Hamamı", p.11. Original text in Turkish: "Roma hamamının kazılarla verilerini esas alarak çizdiğimiz Restütüsyon resimleriyle, tarihi Ankaranın hamam binasını tekrar hayata kavuşturmak istedik." Translated by the author.

[46] From Bosch in the early 1940s stating that the history of Ankara is yet to be written, to Bennet in the late 2000s that what has been written has been relying on supposition, the discourse on the inadequacy of Ancyra's history has been a recurring critique.

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THE ROLE PLAYED BY HERITAGE BUILDING INFORMATION MODELING AS A VIRTUAL TOOL IN THE APPLICATION OF SUSTAINABLE RETROFITTING OF HERITAGE BUILDINGS IN EGYPT

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Heritage buildings play an important role in shaping societies as they reflect the cities' identities. Consequently, their preservation through sustainable retrofits is an opportunity to re-use them while preserving them. Therefore, the application of Heritage Building Information Modeling as a new paradigm is used as a virtual tool to provide a comprehensive set of data and information particularly focusing on the heritage buildings restoration. The paper aims to integrate HBIM tools in the application of sustainable retrofits through a proposed conservation theoretical framework. The paper presents a literature review and analysis for the application of sustainable retrofits in heritage buildings applied on worldwide examples. The outcomes of this research provide an initial theoretical framework for the implementation of sustainable retrofits of heritage buildings in the Egyptian context.

1. INTRODUCTION

Heritage buildings are the landmarks of Egyptian cities; heritage quarters and streets in the downtown are centers give uniqueness to the cities. They are a living symbol of Egypt's rich cultural heritage as they reflect society's identity. Therefore, keeping those heritage buildings attractive and alive is a major challenge especially with all developments taking place in Egypt. These valuable resources according to the Egyptian law no.119 of 2008 require protection and restoration. Some of these buildings are still used nowadays. However, some heritage buildings suffer from degradation problems despite that they can be re-used to preserve them for future generations.

Heritage buildings are important assets for current and future generations. For several reasons, first these buildings reflect and record stories of historical evolution, social, economic progress and cultural development for the past. Even though there are increasing interests and arguments for protecting heritage buildings, many heritage buildings remain under the threat of degradation and demolishment because of the limited resources that are devoted to their long term protection in Egypt. Therefore, new and innovative strategies and tools are required for the protection of these valuable assets through suitable retrofitting of heritage buildings.

On one hand, the concept of sustainable retrofitting of heritage buildings is a good opportunity for the conservation of these heritage buildings while considering all aspects of sustainability. Sustainable retrofits aim to improve energy efficiency, building performance optimization, increasing tenants' satisfaction and the economic return while preserving the heritage values of heritage buildings. On the other hand, HBIM tools can be used as a set of comprehensive data that provides information about all disciplines focusing on the

conservation of heritage buildings. In addition, the geometric accuracy of the models produced by HBIM will provide reliable visualization data that enhances sustainable retrofits.

The paper aims to integrate HBIM tools in the application of sustainable retrofitting of heritage buildings through a proposed conservation theoretical framework in Egypt. The research presents a literature review and a qualitative analysis for the application of sustainable retrofits in heritage buildings applied on worldwide heritage buildings examples. The worldwide examples were chosen and analyzed according to the literature review that discussed the heritage values and elements of sustainable retrofits in addition to how the goals of reuse address these values.The outcomes of this research provide an initial theoretical framework for the implementation of sustainable retrofitting of heritage buildings in the Egyptian context to be used as a guide towards understanding the different aspects of heritage preservation. The framework will integrate sustainable retrofit as a design tool and HBIM as a computational tool.

2. THE UNIQUE NATURE OF THE HERITAGE BUILDINGS

Throughout multiple historical era's, humans presented a miscellany of cultural heritage that retained their historical inheritance through different times. The definition of cultural heritage is expounded by the Council of Europe's Framework Convention as "a group of resources inherited from the past which people identify, independently of ownership, as a reflection and expression of their constantly evolving values, beliefs, knowledge and traditions. It includes all aspects of the environment resulting from the interaction between people and places through time [1]". Built heritage is a significant category of cultural heritage. It could favorably represent different characteristics of a society and its evolution through time. [1] From the cultural recognition, heritage buildings give nearby character and an entirely substantial association with the past, with aesthetic and network benefits. They venture further go into the past and have more noteworthy connects to area and history; something which can't be effortlessly supplanted, and accordingly they require and approach which is explicit to their unique situation. They are developed from various materials and in various auxiliary structures contrasted and current buildings and subsequently, they perform in a different way.[2]

2.1 THE IMPORTANCE OF THE HERITAGE BUILDINGS

Heritage buildings are an everlasting valuable presence in the lives of people. The concept of "value" has been approached in numerous ways. One of the most prominent attempts was carried out by the Welsh government's historic service, Cadw, which clarified five types of values of built heritage. These values are indicative, historical, decorative, comparative and communal values. Indicative value of buildings relates to proof about a specific important activity held in buildings in a specific time period.[3] It indicates the larger

historical aspects, rather than the individuality of certain buildings that the indicative value would explain.[3] Furthermore, the visual attributes of a heritage building hold the aesthetic values. A built heritage may define certain era's architectural style, construction methods and progresses in architecture and construction. Comparative value revolves around how exceptional and distinctive the building is, compared to other equivalent buildings. Lastly, communal values represent the benefits the built heritage provides for people. That includes economic, social and cultural values.[3]

Economic values include improving tourism and job facilities. In contrast, social and cultural values include identity expression, increasing sense of belonging and community attachment in addition to social cohesion.[1]

Another noteworthy proposition to define the value of heritage buildings is that of Alois Rieg (1858-1905), who first published his work in German in 1903. The article was given the title of "The Modern Cult of the Monument: its character and its origin". In this work, he highlighted the engaging values that should be taken into consideration when conservation of historic structures is applied. [4] Additionally, he categorized the value of a heritage essence into primary categories: Age value, historical value, deliberate commemorative value and use value.

In that categorization, Riegl surmised that age value is seen through the monuments outworn appearance and is shown in "imperfection, a lack of completeness, a tendency to dissolve shape and color, characteristics that are in complete contrast with those of modern". His interpretation was based on the belief that man of the 20th century enjoys the *"purely natural cycle of growth and decay"*. Through this belief of the age value which gives the importance of Heritage Buildings through restoring or renovating them to sustain a distinct trace of the original form of the building.[4]

On the other hand, historical value is based on analyzing the causes of contentment from a monument or heritage building. However, this contentment is not solely based on age value, but also exists as a result of allocating said monument to one of the stylistic categories present in the minds of viewers. Furthermore, historical value is primarily concerned with the notion that most people discern monuments according to general periods, such as medieval, early modern, and modern. The deliberate commemorative value exemplifies its disparity to age value. It strives to prevent a moment or heritage entity from becoming history, and in turn, maintain its presence in the consciousness of generations yet to come. Lastly, Riegly introduced the use value, which is premised on recognizing the physical value of heritage entities. Based on this concept, he deemed the maintenance of old buildings that are still capable of accommodating occupants as an indispensible process. Although use value appears to contradict age value, they both subsist differently in

heritage buildings. Differentiating between the degrees of applying both values is correlated with the nature of heritage buildings and its usage suitability.[4]

Within the Egyptian context, the National Organization of Urban Harmony in Egypt discussed values addressed values of heritage buildings in their guide regarding principles of urban harmony for heritage, valuable buildings, and regions. Historical, architectural, symbolic, urban, and social functions are discussed. The historical value of a building revolves around its association with significant historical events that build a city's memory. When a building exhibits distinctive architectural style, or depicts a local architectural style, it attains an architectural value. The value of a building stems from what it symbolizes. It can be related to a famous influential character, or designed by an important architect. Urban value is concerned with the importance of an entire urban context that the building belongs to. Social and functional values are added by the functions performed by the building, and the services it offers to society. [5]

2.2 CATEGORIZATION OF THE VALUES OF HERITAGE BUILDINGS

Through the previous literature review, three models of classification were studied. Each model is distinguished by one or more items of classification. The classification by Cadw showed the distinction between evidential and historical values, in which the building in itself could represent a certain part of history or be a more general part of a historical period. Cultural values were ranked under what was named communal value. As defined by Edward Taylor, culture is "that complex whole which includes knowledge, belief, art, morals, law, custom and any other capabilities and habits acquired by man as a member of society.[6] Consequently, history is a component of culture. Regarding the intended classification in this paper, cultural value is determined to generate a broader category that encompasses both evidential and historical values. According to the Egyptian National Organization of Urban Harmony's classification, architectural and urban values are also included under the culture category. Architectural and urban values entail the aesthetic values as defined by Cadw. It is a broader category which involves architectural style, planning approaches, construction methods and materials used.

Another major category under the classification is tied to tangible benefits from built heritage, which is the use value as defined by Alois Riegl .[4] Use values entail social and economic values outlined by Cadw under the communal values category. The value of a building is partially formed by the services that it offers for the society and the revenue it could create. Lastly, age value as defined by Riegl is significant, though not as significant as other values when it comes to used buildings. It is of great importance for a heritage building not to lose its age value entirely. However, maintaining age values reaches a certain limit; a building is no longer of use if the effect of age on it is drastic. In conclusion, the classification of built heritage includes

three main characters, two of which are more relevant to used heritage buildings values, namely cultural and use values. Age values, on the other hand, are less concerned with used heritage buildings. Social and economic values encompass four main categories: historical, evidential, identity and architectural and urban values. The categories of use values include social and economic values as shown in Fig. 1.

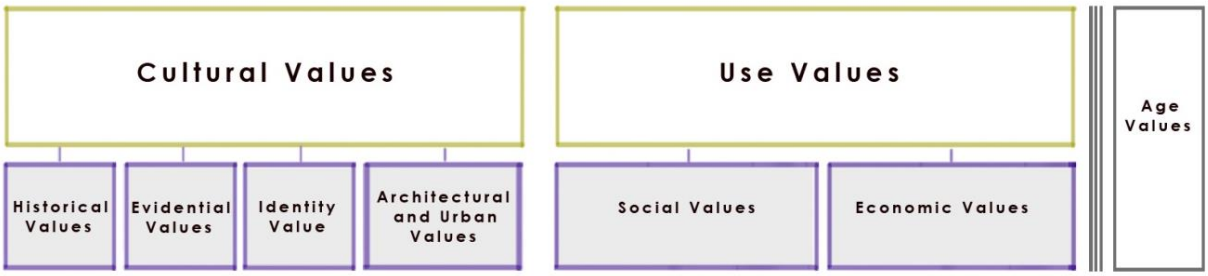

Fig.1: Classification of Built Heritage Values. (Source: Data by Cadw, 2011; Riegl, 2010; National Organization of Urban Harmony, 2010. Image graphically worked by the author).

2.3 CLASSIFICATION OF THE HERITAGE BUILDINGS IN EGYPT

Egypt is extremely rich with its built heritage. The wide range of timeframes can be seen in the design of every period. The National Organization of Urban Harmony classifies the built heritage into three levels as the following :

- Heritage buildings level A: The adjustments permitted inside and remotely are extremely restricted.
- Heritage buildings level B: The internal adjustments are permitted with greater adaptability
- Heritage buildings level C: Greatest adaptability is permitted, the building can be demolished and rebuilt, however the external elevations must be kept with the same design. [5]

Heritage buildings are resolved by the Egyptian Law of built heritage preservation, no.144, 2006. Buildings controlled by this law are buildings that have a particular architectural style (architectural value), related to a particular historical period (historical value), or considered as a touristic goal (social and functional value). These buildings are ensured by this law.[7]

2.4 THE THREATS FACING THE HERITAGE BUILDINGS IN EGYPT

In spite of the extraordinary value of the rich and various Egyptian built heritages, it experiences numerous dangers and threats. Numerous buildings are exposed to fractional or full obliteration. For instance, the city of Alexandria in Egypt experiences fast pulverization of significant old villas. Since the 1990s villas and mansions that were built at the end of the nineteenth century until the mid-twentieth century have been destroyed and demolished. Since 2011 the rate of destruction has accelerated and listed villas were targeted and even removed from the heritage list by direct order of the prime minister. For example, in Alexandria, Villa Aghion designed by French architect Auguste Perret and Villa Cicurell which presents another example of the absence of clear law to protect important buildings from destruction as shown in Fig.2. Many more were damaged or destroyed without ever being studied or documented, unfortunately taking with them a significant slice of modern Egyptian history.

Fig.2: Photos showing the destruction and demolishment in the heritage buildings in Alexandria Villa Aghion. (Source: Author)

Close to expected destruction of buildings, some other buildings experience the ill effects of halfway breakdown because of their decayed condition [8]. The weakening of built heritage in the Egyptian setting is a consequence of numerous reasons. Low upkeep, powerless administration, and shortcoming in authorizing laws and approaches are a portion of the disintegration reasons. The impacts of time and weather conditions with the low support can make their conditions worse.[8]

During the early 1960's, the Egyptian government stopped a system called 'Waqf', which is an Arabic word that signifies 'endowment'. With this system, a few people used to give a building where its income is utilized for altruistic purposes and the building cannot be sold, leased, or inherited [9]. Some portion of the building's income is devoted to the upkeep and preservation of the building to guarantee the progression of the building's arrangement. With the scratch-off of this system, a wellspring of support finance was lost and the administration was not ready to give adequate assets to the upkeep of such buildings.[9] Another significant explanation behind the quick crumbling of the built heritage in Egypt is the lack of public awareness with the value of these buildings and the wide potential advantages they could give.[5]

3. THE APPROACH OF SUSTINABLE RETROFITTING FOR HERITAGE BUILDINGS

A differentiation between terms is vital to be identified in order to have a clear understanding of the term “Sustainable Retrofit”. Especially that the approach to the update and reuse of buildings is demonstrated by the usage of numerous titles such as: “Retrofit, Refurbishment, Restoration, and Conservation”. To begin with, the more extensive term "Conservation" is characterized by Cen [10] as “measures and actions aimed at safeguarding cultural heritage while respecting its significance, including its accessibility to present and future generations”.[11] It merits referencing that another equivalent term of the word "Conservation" is "Preservation". The second related term "Restoration", which varies from "Conservation" in that it incorporates the expulsion of historic materials to make an exact portrayal of a specific timespan, not really the first or last timeframes. "Restoration" is characterized by Cen[10]as “actions applied to a stable or stabilized object aimed at facilitating its appreciation, understanding and/or use, while respecting its significance and the materials and techniques used”.[11]

The term "Refurbishment" includes the repair, renewal and modification of a building to meet economic and/or functional criteria.[12] It is unique in relation to the term "renovation" in that it is not specifically applied to buildings renovations which are often focused on feel and tenant facilities, however may also include upgrades to the building's services systems and has an impact on energy and water productivity.[13] Finally, Rehabilitation according to BPIE [12] and GDNR [13], is defined as "a procedure of making conceivable use of a property through repair, alterations, and additions, while preserving its historical, cultural or architectural values "[11]. In any case, the term retrofitting is often associated with building services, owing to the fact that the life of the building structure and fabric is considerably longer than that of the installed services. According to Douglas' [14] and Sara [15], retrofit is "any intervention to adjust, reuse, reuse or upgrade a building to suit new conditions or requirements". While, Riley [16] and Haeyoon [17] defined it as “fitting new and more modern systems into an existing building".

Applying Sustainable Retrofits on heritage buildings, sustainable retrofit has various positive impacts on the environmental performance, their social sustainability and their economic sustainability. Firstly, environmental performance is enhanced by extending administration life and reducing energy consumption and carbon dioxide emissions. Secondly, social sustainability is achieved by increasing user's wellbeing, top notch indoor air and comfortable space, more natural light and cleaner air and using healthy materials. Finally, achieving economic sustainability is enabled by lowering operating costs because of efficient management of energy use, in addition to attracting economic return on investment.[16]

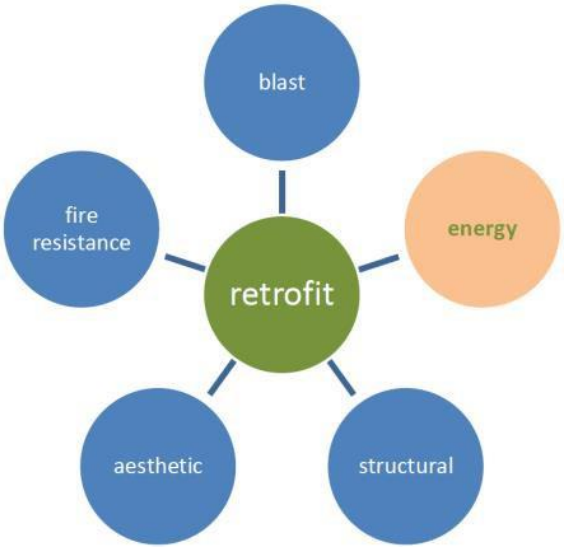

Fig.3: Depicts different kinds of retrofits that could be applied in the heritage buildings.
(Source: Andrea, A., 2013)

It is another level of intervention has started to emerge and is widely used in different countries. It is the Sustainable Retrofit for heritage buildings. It has different branches like energy, structure; aesthetic as shown in Fig.3. It requires a good design for the building in addition to careful planning that considers its surrounding environment. Sustainable design principles that encourage maximum reuse of existing building components, restoration of passive aspects of the original design and preservation of microclimate created by heritage plantings and site usage should also be included in the sustainable retrofit of heritage buildings.It was proved that sustainable retrofit and sustainable design has a significant role in the future of heritage buildings. The sustainable retrofit extends the lifespan of the building and adds value to the building and reduces its carbon footprint while preserving its cultural heritage values as shown in Fig.4.

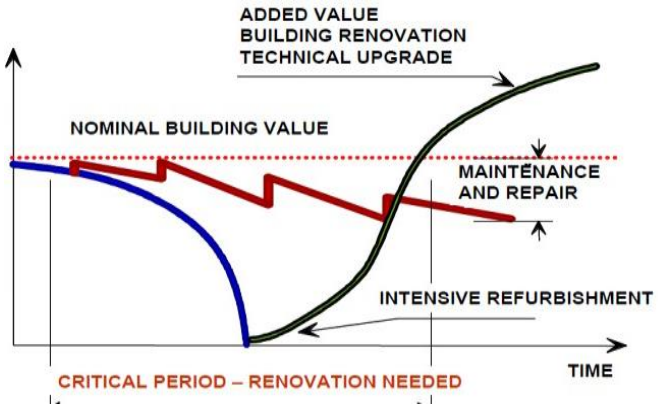

Fig.4: Regular Maintenance and Repair as well as Investments in Technical Upgrade of the Building Elements Results in Higher Value of the Buildings. (Source: adapted by the author from http://ei- education.aarch.dk)

3.1 THE STAGES OF SUSTINABLE RETROFITTING FOR HERITAGE BUILDINGS

Sustainable retrofit includes a number of stages. These stages start with setting a retrofit scope at that point setting up a vision for the structure. Consequently, choices on the system of retrofit are settled. Finally, various options are suggested where the best alternative is chosen [18]. These stages are clarified in more details below:

- First Stage: is the project setup and pre retrofit survey, in this phase the retrofit team need first to determine the scope of work and set project targets. In addition, the available resources to determining the budget and program of the work can be determined. A pre-retrofit is also required in this phase in order to better understand building operational problems. Moreover, condition audit is applied to determine the current condition and expected remaining life of building's components. The areas have to be examined, including the structure, external walls and roof, thermal performance, water usage, day lighting, occupant satisfaction, mechanical, electrical, materials, security and review of safety issues[19].This stage is also called "Problem Formulation".
- Second Stage: Setting and preparing the goals and objectives; this is based on results from the analysis by the design team. The team has to set a methodology after prioritizing the aim of retrofitting to decide on items to be substituted, provide an initial budget the scope and identify of the items that should be targeted for sustainability.[20] Further on, the early goal setting is aligned with the chosen rating system that supports the objectives of retrofitting. [21]
- Third Stage: is the identification of the available retrofit options through the usage of appropriate energy models, economic analysis tools and risk assessment methods. The performance of a range of sustainable retrofit alternatives can be assessed quantitatively. The different retrofit alternatives and options are given priority based on relevant energy-related and non-energy-related factors. It is worthwhile to mention that there is a range of no cost and low cost ECMs that could be identified during energy auditing. (e.g solar retrofit, lighting retrofit, passive design), indoor quality retrofit (e.g internal shading, top level sky lights under floor supply) and water efficiency retrofit (e.g. low flow water fittings and shower heads, low flow plumbing equipment, water efficient irrigation).
- Fourth Stage: is site implementation and commissioning. The previously selected retrofit measures will be implemented on site. Test and Commissioning (T&C) is then dedicated to tune the retrofit measures to ensure that the existing building and its service systems are operating in an optimal manner. Sometimes the implementation of some retrofit measures may lead to significant interruption to the building and users operations.
- Fifth Stage: is the validation and verification of energy savings using computer devices. Once the retrofit measures are implemented and start operating, standard M&V methods can be used to verify

energy savings. A post occupancy survey is needed to ensure if the building's occupants and owners are satisfied with the all retrofit process and results.

- Sixth Stage: Performance assessment stage that involves risk and performances assessments to reinforce financial analysis and valuation of sustainable property investments. Several evaluated performances involve: Process performance, feature performance, building performance, market performance and financial performance.[20]

4. HERITAGE BUILDING INFORMATION MODELLING (HBIM)

As a result of the extensive usage of laser scanning and photogrammetry, recording cultural heritage sites have recently become state of the art. HBIM (Historic Building Information Modeling) became a notable tool that aids in conversation of historic buildings. As plug-in for BIM, Historic Building Information Modeling is defined as a system for modeling historic structures from laser scanning and photogrammetric data. The process of implementing HBIM generally involves a reverse engineering solution, whereby parametric objects depicting architectural elements are mapped onto laser scan or photogrammetric survey data. This process entails a number of stages, needed in order to achieve the final product, beginning with the collecting and processing of laser/image survey data, the identification of historic details from architectural pattern books, the building of parametric historic components/objects, and lastly, the correlation and mapping of parametric objects onto scan data and final production of engineering survey drawings and documentation.[21] The end product is the creation of full 3D models, including details behind the object's surface regarding its methods of construction and material makeup. The HBIM automatically produces full engineering drawings for the conservation of historic structure and environments; this encompasses 3D documentation, orthographic projections, sections, details, and schedules.[22]

4.1 IMPLEMENTATION OF HERITAGE BUILDING INFORMATION MODELLING (HBIM) IN THE SUSTINABLE RETROFITTING OF HERITAGE BUILDINGS

Not only is HBIM specially tailored to the application of heritage buildings, but it also achieves prototyping, visualization, collaboration, energy simulation, comparing different design options, solar study and energy demand prediction. The rationales behind the adoption of HBIM in the conservation of heritage buildings in general, and in sustainable retrofitting of such buildings particularly, are apparent in the advantages of HBIM, which outweigh other modeling approaches, seeing as it provides automated documentation in the form of engineering drawings for accurate conservation of architectural heritage. It aids in the development of the details behind the object's surface, regarding its methods of construction through utilizing images to

comprehend texture, massing and form. It can also be considered a dataset of information about the disciplines.[23, 24] Additionally; HBIM provides a review of the building's exterior and interior. It also facilitates the availability to survey renovations and changes that took place throughout different time periods, prior to committing to a strategy and producing full-construction documents.[25, 26]

The plug-in HBIM is a library of parametric objects that created from historic data. Furthermore, it is a system for mapping the parametric objects onto a point cloud and the survey image data. The HBIM process is started with distant collection of survey data using terrestrial laser scanning or digital photogrammetric modeling. In building parametric objects, the problem of file format and exchange of data has been overcome by using Geometric Description Language (GDL). The scripting in GDL allows for sharing and editing of the parametric objects at different levels.[27]

The use of historic data introduces the opportunity to develop detail behind the object's surface concerning its methods of construction and material composition. In the last stage of the HBIM process, the libraries of parametric objects are mapped onto the point cloud and image survey data using a platform of cross software management. Full engineering orthographic drawings and 3D models can be automatically produced from the HBIM.[28] In addition, benefits of generating heritage buildings in a 3D BIM environment are:

- Remote reviewing of the building exterior and interior.
- Allows study with new structures in the environment context.
- Possibility to survey of different periods of time.
- Better estimation of the structure using images to understand texture, massing and form.
- Allows appreciation of renovations and adaptations prior to committing to a strategy and full construction documents.
- Most people can understand a 3D building more than a 2D flat drawing. [29]

4.2 HERITAGE BUILDING INFORMATION MODELLING (HBIM) APPROACHES

The HBIM concept was first used in the work of Murphy et al. [30], from the Dublin Institute of Technology. According to Murphy et al. [28] and Dore et al. [31], H-BIM pursues the modeling and documentation of architectural elements, according to artistic, historical, and constructive typologies. In addition, HBIM is considered to be a special library of BIM parametric objects that was specifically designed to preserve and manage cultural heritage within the general framework of "smart heritage". Generally, the HBIM library is built using the manuscripts and historical architectural documentation, laser scanning, photogrammetric techniques, and other data obtained from the physical analysis of the building in question.[32]

The first step, "Knowledge and Information Collection", covers the collection of information related to graphic, semantic, and typological data. Graphic data is obtained from the 3D laser scanning and photogrammetry methods. These methods can provide a set of raw point clouds that spatially demonstrates the visible parts of the surfaces of a building or object. Concerning the semantic and typological data, it is obtained from the technical analysis of the building and also from the manuscripts and historical documentation.

This information will allow for materials and traditional constructive rules to be discovered, as well as the past transformations that could have affected the building. In particular, according to Quattrini & Baleani, [33] and Quattrini et al. [34], the use of historical data to model the components of the HBIM library introduces the opportunity to develop details that are stored behind the surface of the parametric objects regarding their materials and construction components, their cultural and historical memories, as well as their conservation status and maintenance program. It is also possible to enter temporal parametric data to represent the events that occurred throughout the building lifecycle. [35]

Therefore, the components of this new library provide a better reading of the analyzed heritage monuments, and could also be used to produce technical conservation documentation (floor plans, views, elevations, sections, cuts, details, perspectives, etc.) and 3D virtual models (display models) in a semi-automatic way. In addition, it is considered that the parametric objects belonging to the -BIM library allow for transformations and quick changes in shape, in this way achieving the generation of 3D virtual models of any project with similar character and architectural style, thus approaching a solution to reverse engineering modeling. In the second step, "Filtering", which is an ontological process, is created to be used as a knowledge base of all the semantic information collected. The ontology can be integrated into three-dimensional object representation through IFC templates, or directly with the BIM platform.

On the other hand, the obtained point clouds are aligned, cleaned, and filtered to facilitate their management. Subsequently, two methods (automatic or manual) can be used to parametrically model the point clouds (Scan-to-BIM).The automatic method consists of the automatic segmentation and generation of parametric objects from the point clouds, using specific algorithms and software plug-ins, which is currently feasible only for plane surfaces or primitive geometries. In the manual method, the filtered point clouds must be directly integrated into the BIM environment.

The third step, "3D parametric modeling", starts upon the point clouds and the semantic data

integrated into the BIM platform. For this step, the integrated point cloud is manually segmented and delimited in order to recognize the objects to be modeled. Subsequently, the existing BIM library and the externally constructed objects are used to parametrically model the studied object or building. The resulting models are grouped in an H-BIM library that could support the parametric modeling of architectural buildings belonging to the same historical period. The H-BIM libraries will serve as the basis for the management and interconnection of information with other data sources thanks to the Interoperability capacity between BIM platforms. The H-BIM library interoperability facilitates the historical analysis of the structure, energy simulations, time, and cost calculations, and other functions that will improve the way to manage the maintenance and restoration processes of the analyzed Multimodal Technologies and Interact. In addition, thanks to H-BIM it is possible to understand the materials and construction techniques, as well as help conservation efforts, management, restoration, or reconstruction of heritage buildings that no longer exist or that are not documented.

4.2 APPLICATION OF HERITAGE BUILDING INFORMATION MODELLING (HBIM) IN EXAMPLES WORLDWIDE

The usage of computation methods in works related to heritage buildings is not widely popular in Egypt. Instead, very limited applications using laser scanning, for the purpose of documentation, was applied in Egypt. Examples include a pilot project for laser scanning of Old Cairo [36], laser scanning of Red Monastery church in Upper Egypt to document the final state of the church after its restoration project [37], laser scanning for a virtual reality documentation of the monuments of Tutankhamen [38], and laser scanning of the Northern wall of Old Cairo as part of a restoration project. The following part of this paper will assess the example of Jeddah Historical Building Information modeling (JHBIM), seeing as limited data is available on examples that used HBIM in the Egyptian context. (Available data about most Egyptian projects encompasses the application of laser scanners and making as-built models only).

There are different HBIM applications in the cultural heritage context and this section of the paper describes characteristic cases. One of them is the Basilica of St. Maria of Collemaggio in L"Aquila of Italy that was damaged by the earthquake in 2009. In this survey created a 3D detailed model "(Fig.5)" to support the on-going design project of conservation and intervention of the damaged temple parts. The HBIM model manages the stages of simulation of structural behavior, analysis economic evaluation of the project, and restoration of the Basilica [39].

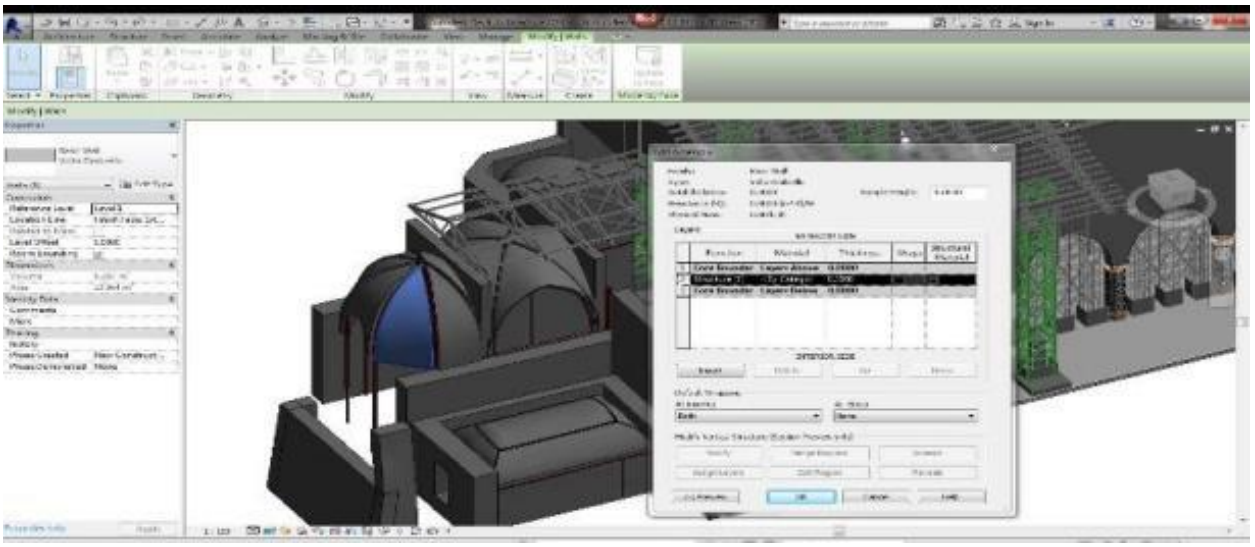

Fig.5: ©Revit model of the Basilica St. Maria and WBS to manage the restoration. (Source: Oreni D., Brumana R., Della Torre S., Banfi F., Barazzetti L., Previtali M., 2014).

Another BIM application is the modeling of the Henrietta Street, in Dublin, Ireland. The process started with laser scanning and the final orthographic images was imported into the BIM platform Archi-CAD. The use of laser scanning and photogrammetry can record very high and accurate levels of detail in the field for cultural heritage. Next, the modeling was completed by combining all the required library parts included in the HBIM plug-in. The final stage is converting the HBIM model "(Fig.6)" for Henrietta Street into CityGML for further GIS analysis. For this purpose Google Sketch-Up with the CityGML plug-in was used. Finally, the integration to CityGML can provide further capabilities for linking the information systems with 3D heritage model. [27]

Fig.6: Final HBIM Model of the Henrietta Street. (Source: Murphy, M., Dore, C., 2012).

Another example is Jeddah Historical Building Information Modeling (JHBIM) which is an initiative aiming to introduce BIM tools for the documentation of existing historical buildings. Traditional surveying methods are currently being used to create report data about existing buildings. These tools have high costs, consume a lot of time and are sometimes not very accurate. JHBIM initiated a test project to create a model for one of the historical buildings in Jeddah, Farsi House. It recommends to be expanded later to form a complete database about the current conditions of historical buildings in the region of Old Jeddah. The importance of having such a database will help in the determination of their conditions and decision making related to management, reuse and maintenance of these buildings. The project used image survey, laser scanning, creation of 3D points clouds models and creating of the 3D model using Autodesk Revit, "(Fig.7)" JHBIM Approach from Baik et al. [40] When expanding the project JHBIM will be a set of data about the buildings, for example, new parametric models of architectural features can be added as prototype libraries, different architectural drawings and construction and materials information. [40].

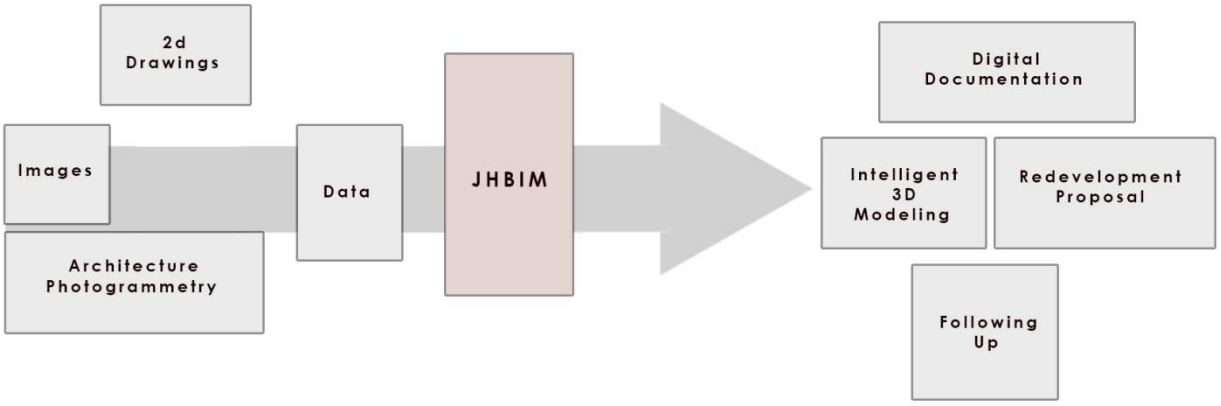

Fig.7 | JHBIM Approach. Source | [40] A. Baik, J. Boehm and S. Robson, "Jeddah Historical Building Information Modelling 'JHBIM' Old Jeddah-Saudi Arabia," 2013.

The last examples is the Batawa project-model that is a redevelopment proposal for approximately 600 hectares of land that includes a former factory in Toronto (a cluster of three 19th century heritage buildings) with its rich history of modern architecture and town planning. The purpose is to document the heritage assets of Batawa and to develop a BIM model using available software packages that are appropriate for specific applications (AutoCAD, Civil 3D, Sketch-Up & Revit,) as shown in Fig.8. That will serve as a digital archive to help in conserving the extant heritage buildings and planning and to test future development proposals within the context of these historic buildings and plans.[41]

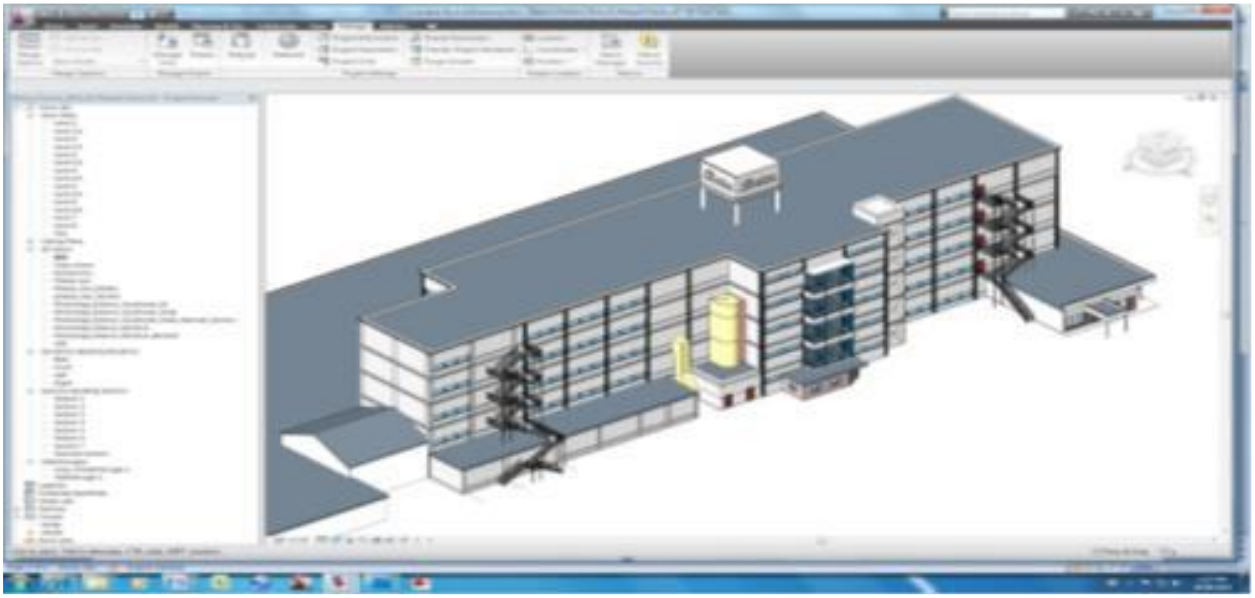

Fig.8: Final HBIM Model of factory. (Source: Fai S., Graham K., Duckworth T., Wood N., Attar R., 2011).

5. ANALYSIS OF EXAMPLES FOR THE APPLICATION OF SUSTINABLE RETROFIT IN HERITAGE BUILDINGS

The following section of this paper provides examples for retrofit of two heritage buildings. Those two selected heritage buildings are one from the Egyptian context and the other one from the European context. The Egyptian example was chosen from one of the most significant cites that are culturally rich in Egypt, which is the city of Alexandria. Unfortunately, Alexandria has suffered a rapid loss of its built heritage since 2011 revolution through a sort of systematic destruction that was significant to the activists of cultural heritage protection. [42] The selected example from Alexandria is Bassili Pasha Villa which has an encountered a retrofit and a reuse to be the National Museum of Alexandria. It is a successful example that shows the wide potentials of retrofit which can provide for the conservation of the built heritage. The example might not accurately following the concept and principles of sustainable retrofit, but still it is a successful example of well-adapted buildings for new projects that was admirable by both professionals and laypersons with different degrees. [43]

The other selected example is from European context, in order to provide a different perspective of retrofit. It is Villa Heike in Berlin, Germany, which dates back to the same period of Bassili Pasha Villa. Nevertheless, it presents a different usage, which offers more alternatives about re-use strategies. The selected examples include various features that considered all aspects of sustainability the retrofit process.

The selected examples were analyzed relatively to the discussed literature review about heritage values and principles of retrofit. The various values these buildings provide for the society are determined, as well as how the goals of re-use address these values. The analysis includes comparison between re-use goals, as well as the elements that were added to meet these goals. The analysis provides an illustrative example of how the addition of new elements can add to the conservation values.

5.1 ALEXANDRIA NATIONAL MUSEUM, ALEXANDRIA, EGYPT

Alexandria city is one of the most significant cites that are culturally rich in Egypt. It witnessed the development of different cultures that affected its heritage. Its built heritage shows the multi-cultural value influenced by the different foreign cultures which is a distinguished feature of Alexandria. The foreigners who lived in Alexandria for many years brought a variety of architectural styles.[44] On the other hand Alexandria has recently suffered for a continuous loss of its built heritage due to the unsettled period following 2011 revolution which resulted in the destruction of many heritage buildings. In addition, too many other heritage buildings those are under the threat destruction and suffer from deteriorated conditions.[42]

Therefore, protection of the built heritage requires more attention, the re-use of the old villas in Alexandria as the National Museum is a means of the built heritage protection. The villa was previously owned by Al-Saad Bassili Pasha, and then owned by the United States government to be used as their consulate. The Egyptian Ministry of Culture bought the building in order to reuse it as a National Museum. The reuse plan ensures the importance of keeping architectural features of the villa regarding both the external elevations and the interior spaces. In addition to new features that were required were added. [43]

Background	**Date**	**1931**
Cultural Values	Original owner	Al-Saad Bassili Pasha
	Original use	Residential
	Social Appearance	It represents a place for the upper class families who lived in Alexandria.
	Architectural	Neo-Renaissance Style with classical decorative elements
Use Goals of Reuse	Alexandria National Museum	
	Preservation the heritage building with its surrounding garden	
	Modifying and enhancing the circulation system inside the villa to accommodate the re-use as a museum	
Examples of the added elements for the Re-use	New glass display units designed in diagonal orientation for the display of the artifacts	
	Fire safety measurements are added	
	New acoustic installation added as well as electrical and mechanical	
	Revival of history and memory to the residents of the neighborhood	

5.2 VILLA HEIKE, BERLIN, GERMANY

Berlin is located in northeastern part of Germany on the banks of the Rivers Spree and Havel. It is the capital of the Federal Republic of Germany. With such long, rich and varied history to its name, Berlin is quite literally brimming with its incredible heritage sites and buildings. Villa Heike is a listed building built in 1910 as a multifunctional building with a reinforced concrete skeleton; Unfortunately, Villa Heike was abandoned for over 20 years.[45] Then it was re-used, the concept for the project had been laid out in advance by the architects to serve as an affordable space in a builder-owner set up for artists and creative businesses. This concept was tailor-made for the building. That made it possible to keep the historic fabric mostly unchanged. The post-war additions were removed, lost elements were carefully added. As a witness to history, the Villa Heike is meant not to hide its scars. Intentionally, traces of all periods are kept visible, contemporary additions and reconstructed elements are carried out in a perceivable manner.[45]

Background	**Date**	**1910**
Cultural Values	Original owner	Richard Heike
	Original use	Residential & Administrative
	Social Appearance	It represents a place for the wealthy family living in it
	Architectural	Reinforced concrete skeleton with classical Doric decorative elements
Use	New artist studios, office spaces and a show room	
Goals of Reuse	Preservation of the heritage building after being abandoned for 20 years	
	Modifying and enhancing the interior spaces inside the villa to accommodate the re-use of the different functions	
Examples of the added elements for the Re-use	The completely converted entrance hall was reconstructed according to its initial state.	
	Significant elements that were lost, the entrance door, for example, the balustrade in the entrance hall or the third-floor balcony, are all designed in a contemporary manner, but strongly inspired by the historical predecessor.	
	New acoustic installation added as well as electrical and mechanical	
	Fire safety measurements are added	
	Revival of history and memory to the residents of the neighborhood through a modern way of usage	

5.3 FINDINGS

Findings of this paper depended on both contemporary literature review and the analysis of examples, offering suitable framework for the conservation of heritage buildings in general, but particularly in Egypt. This framework mingles together the sustainable retrofit as a conservation approach, HBIM a computation tool, and heritage values guiding principles. Fig.9 depicts the suggested framework, divided into five main stages: initiation, planning, implementation, monitoring, and assessment.

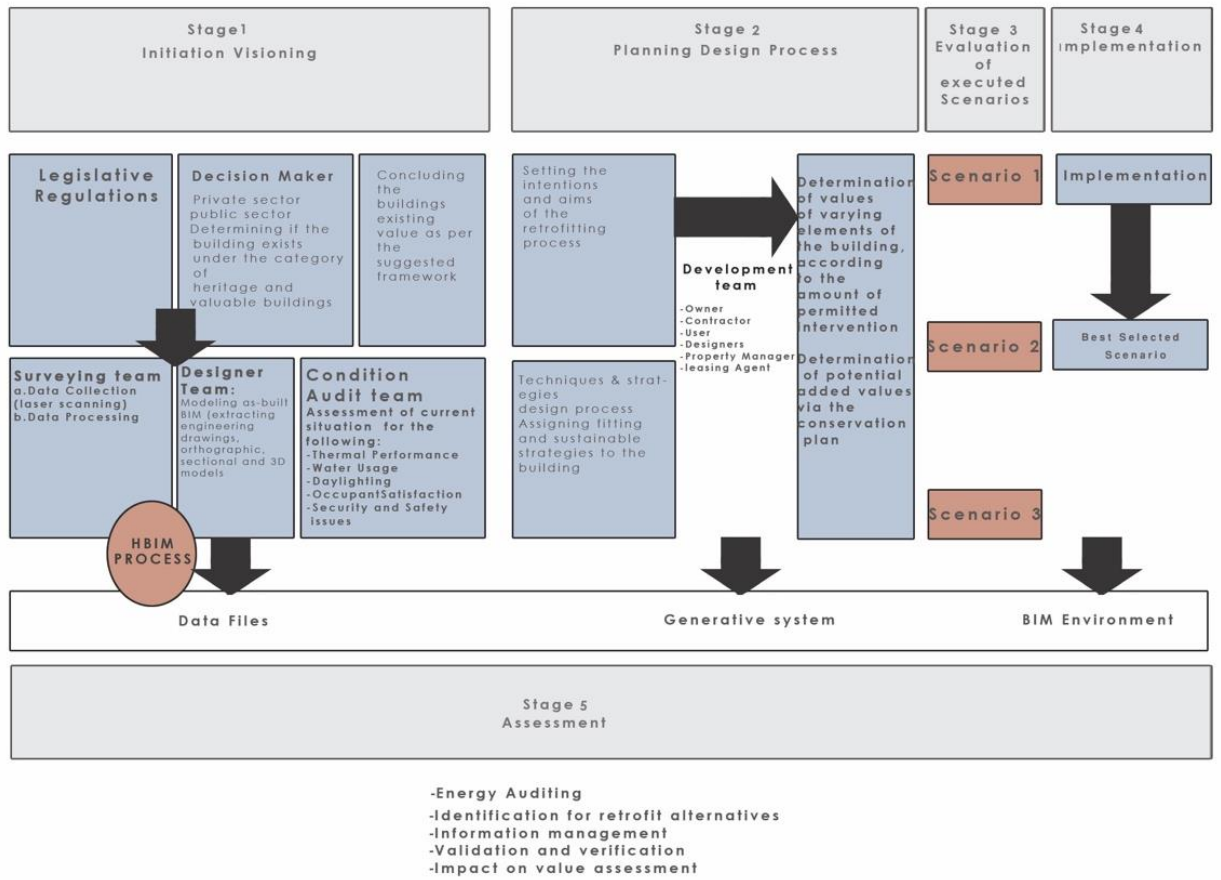

Fig.9: Proposed Framework to be implemented in Egypt. (Source: Image graphically worked by the author) .

Stage 1: Initiation: entails setting the vision for the conservation project. It encompasses two sub-stages: value determination and problem formulation. In the value determination entails determining the decision about the building value, in accordance with the defined law. Upon the building's classification as a heritage building (or a building of value), it becomes protected under the law. Additionally, the law manages the regulation process of the entire conservation procedure of the building. In the event that the building is decided to serve reuse purposes, then numerous requirements need to be considered from both perspectives of retrofit and heritage values.

Conversely, the problem formulation phase commences by studying the present situation, with the goal of detecting problems and analyzing needs. This is achieved through gathering data using laser/image survey data, along with identifying historic details from architectural pattern books. The latter process is executed with the purpose of presenting a 3D model, exhibiting detailed information and data, such as drawings, structural elements, mechanical systems, material measurements, data suppliers, scheduling, and financial data identifying the current state of the building.

Value-related data is also collected alongside technical data. Determination of values is critical; it could be taken into consideration and potentially enhanced throughout the conservation process. Retrofitting with the goal of enhanced energy performance should not dismiss other important values. Aims and strategies of conservation are expected to balance between the requirements of retrofit and the confirmation of the building heritage value, with the end goal of providing more benefits for the community. Built modeling necessitates information regarding all features of the building and the degree of permitted interventions.

Stage 2: Planning: It involves the design process. This phase can be set in motion by setting goals and strategies that are capable of identifying the building elements that require retrofitting, and applying the suitable strategy on the building on the detailed 3D model and the automated documentation by means of engineering drawings that aid in the application of the main aim of retrofit. Planning and design offer distinct alternatives for the conservation of the building. The input of heritage value will be a significant element of evaluation of this alternative, which leads to stage 3 which is the Evaluation.

Stage 3: Evaluation of executed scenarios: It includes choosing the best scenario that has both minimum effects on heritage values and is most efficient in sustainable retrofit. This can be executed by using simulation tools embedded in HBIM as a testing tool that can aid in comparing different design scenarios and making decisions about the best scenarios that are expected to be applied further on the project. Several factors are crucial in this phase: achieving public co-operation and participation, along with good communication among the professionals in the field. Finally, the finest scenario should be selected and implemented in Stage 4, according to the following factors:

- Optimizing the benefits of the building;
- Improving the building performance;
- Emphasizing the heritage values of the building;
- Fulfilling sustainable design goals, including reduced energy usage and costs
- Implementing green improvements and maximizing financial performance.

Stage 4: The Implementation phase portrays the actual application of the selected best sustainable retrofitting design scenario. It tracks the evaluation of the executed alternatives phase, and is then followed by the final Assessment phase.

Stage 5: Performance Assessment: it strives to ensure the achievement of high building performance. Varying methods of assessment can be applied here, including:

- Mock-ups assessment to offer a visual feel of what the final version might appear like.

- Sustainable performance assessment of the building, including process performance feature or system performance, building performance, market performance, and financial performance.

6. CONCLUSIONS

Upon analyzing the examples provided in this paper, it becomes evident that applying both HBIM and sustainable retrofit on heritage buildings in Egypt continues to be a limited practice that faces numerous challenges. A number of the many challenges include the unavailability of equipment, restricted availability of professionals, and funding and financial-related challenges. This, however, requires the invitation of various international entities that are concerned about the conservation of worldwide heritage to help share in training of expertise and providing funds for those projects.

The suggested framework discussed in this paper is still a theoretical one. In other words, it is not applied yet. The aim was to incorporate various sides of conservation in one framework that relies on a scientific background. This framework requires further evaluation and feedback from the operational perspective authorities in Egypt.

The conservation of heritage buildings in Egypt requires stronger support from the legislation. Unfortunately, the Egyptian law, in its current form, permits manipulation. This is commonly perceived as inconvenient seeing as it is the first key entry for the suggested framework. Furthermore, this ability to manipulate facilitates building owners' capability of skipping the listing process of their buildings amongst valuable/heritage buildings. Henceforth, it requires stronger clarification to avoid any leap holes to be more obligatory.

Another important issue revolves around spreading public awareness of the value of built heritage. Contrary to common belief, built heritage conservation does not contradict the providing of owners with economic benefits. The building can, from then on, be reused for various purposes without demolition or the need for rebuilding. In fact, the National Organization for Urban Harmony in Egypt should provide aid in spreading awareness, guidelines, rules that assist the application process of sustainable retrofit, and in setting rules for the collaboration and involvement of community members in this process.

Ultimately, the primary determining factor in selecting acceptable risk for evaluation standards and for selecting the minimum performance objective for retrofit public policy is the cost of applying both HBIM tools and sustainable retrofit processes on heritage buildings. When applied in European countries, energy efficiency retrofits have shown promising returns on investments. This is attributed to the fact that such measures do not only generate direct cost savings, but they also have been shown to exert positive impacts on

the overall value of buildings. Within the Egyptian context, however, this issue is highly debatable. This is because demolishing an old building and building a new multi-store-type one can be more lucrative for the owner of the building. To conclude, this paper advocates the creation of a more detailed study regarding the short-term benefits contrasted with the long-term benefits, and the return on investment from applying both HBIM and sustainable retrofit on heritage buildings in Egypt.

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Traditional Dwellings and Settlements

Working Paper Series

VISUALIZING THE UNSEEN RICE STREET IN COLONIAL TAIWAN: AN APPLICATION OF GEOGRAPHIC INFORMATION SYSTEM AND INTERPRETATION OF EVERYDAYNESS

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VISUALIZING THE UNSEEN RICE STREET IN COLONIAL TAIWAN: AN APPLICATION OF GEOGRAPHIC INFORMATION SYSTEM AND INTERPRETATION OF EVERYDAYNESS

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Since the last decade in Taiwan, amounts of high-resolution digitalized maps and aerial photos of Japanese colonial period (1895-1945) are progressively applied in historical research. It sharpens our understanding of the images of a colonial government and the people ruled. However, there are contrasts enhanced in the meanwhile. Some images are blurred if we only were able to view the history from the materials the colonizers documented and recorded.

Therefore, first, this research relocates the spatial-socioeconomic information of historical material on a digital cadastral map with a data base by applying geographic information system (GIS) to visualize a vivid scene of the Rice street in Tainan City unseen by the Japanese colonizer in 1930s. Second, a conceptual tool, 'the perspective of the vulnerables', is derived from the history just mentioned in the theoretical context of everyday life study. This paper not only proposes an interpretation that the everyday life reveals the vulnerability, potentiality, and the resistance of the colonized but also points out that in Taiwan, an island repeatedly governed by oversea regimes, the ruptures between histories and substantial contemporary society should and could be articulated by recognizing the essence of everyday life.

The application of GIS and the perspective of the vulnerable enable us to empirically see a scene of the subsistence productivities in a traditional Han people's street and intellectually bridge the ruptures among the macro nation-state history, some mezzo histories, and commoners' micro contemporary everyday life. Moreover, these histories contribute to contemporary movements and projects.

Keywords**:** *Tainan City, Taiwan, modernity, postcolonial study, Japanese colonial period, Harry Harootunian.*

1. INTRODCTION AND CONTEXTS: AN EMPERICAL TURN AFTER THE END OF MARTIAL LAW PERIOD

'The land colonialisms made', Arif Dirlik (2018) once described Taiwan in his lecture. Ch'ing Dynasty (1683-1895), Empire of Japan (1895-1945), Republic of China (ROC, 1945-), these three political regimes govern Taiwan in a raw. Even today, Taiwan is under sort of 'multiple colonized' circumstance if the essence of nation-building of post-colonialism is viewed. In this paper, a historical research and a survey on

contemporary subsistence production are viewed as two parts of an action to overcome the 'colonized' circumstance. Geographic information system (GIS) is applied in different way in both parts. Further, we propose an initial conceptual perspective from everydayness to bridge these two parts with the inherent connection in everyday and daily life.[1]

AFTER 1987: THE END OF MARTIAL LAW PERIOD

There are three contexts when the applications of GIS are concerned. First is a long-term political context that under the governance of Republic of China, the 39-year-long Martial Law period was put into an end in 1987. That lead to an empirical turn on the historical discourse of Japanese colonial period.

In 1895, China, so called Ch'ing Dynasty, ceded to Japan the sovereignty of Taiwan after Sino-Japanese War. This is the start of Japanese colonial period in Taiwan. In 1945, Empire of Japan was defeated in World War II and returned the sovereignty to Republic of China, which inherited the international political position of Ch'ing Dynasty in 1911. At that time, Republic of China was one-party-dominant lead by Kuomingtang (KMT). In 1949, in the Civil War Kuomintang was defeated by Chinese Communist Party (CCP) and retreated to Taiwan in the aftermath. In the period of Civil War, the Martial Law was declared and implemented until 1987.

An empirical turn of the historical discourses of Japanese colonial period in Taiwan happened since the Martial Law period ended. During Martial Law period, the historical discourses of Japanese Colonial period are mostly under the 'allies-against-axis' structure to emphasize the exploitation and depression caused by Japanese colonial government and the 'Chinese' orthodox established by ROC's governance. In Japanese colonial period, some scholars, Tadao Yanaihara (矢内原忠雄), a left-wing economist for example, did point the disadvantage of local Taiwanese farmers when they faced the modern sugar industry and the institutions and mechanisms behind it. [2] Nevertheless, it is not false that some of the negative discourses on the minority of these postwar historiography are directed by ideology. [3]

IN 1990s: THE EMPIRICAL TURN

The second context is the empirical turn of historical researches. In 1990s, in the aftermath of Martial Law period, the empirical turn unveiled the scientific, reasonable, bureaucratic, technical dimensions of Japanese colonial period by the open and release of historical material and facts. For example, KA Chi-Ming (柯志明) who responds to Tadao Yanaihara with his research on the connections between rice cultivating and sugar industry. [4] The emphasis on materials and facts is put in Ko's socioeconomic researches to reliably judge and discourse the colonial circumstance.

Similar story was told in the discipline of architectural historians' settlement study. In 1990s they turn to study the transformations of sociocultural and built environment attributed by not only the colonizers and technical bureaucracy but also of the colonized and ordinary people. Based on the outcomes of these settlement studies, Taiwanese architectural historians proposed some analytic tools to point out that how the built environment was impacted by the modernized, urbanized, industrialized sociocultural environment and lead to the rupture between traditional Taiwan and Japanese Taiwan, a colonially modernized island.

There are two things worth paying attention in these settlement studies. The concern on settlement and the method that treat building as substantial historical material. The former means that the focus of architectural historian was significantly shifted from memorial architecture to ordinary building, or saying vernacular architecture. This turn emphasizes more on the histories of the colonized and subalterns than the colonizer and headman. In 2000s WU Ping-Sheng proposed his discourse that the subjectivity of the colonized could and should be established by their way reading the city-as-text. [5] Further, in 2010s CHENG An-Yu (2018) and WU Ping-Sheng (2020) implemented a series of researches on the daily practices. The emphasis on daily life lead us to the NGO's survey which would be shown in the fourth part. [6]

IN 2000S: DIGITALIZED IMAGE AND GIS

As for the researching method about building as substantial historical material, it leads architectural historians to make use of the maps, aerial photographs which were rapidly released by government since the spatial information within them are collaborated by GIS. That is the last context, the opensource of image material. In 2003, Academia Sinica officially provided the service of 'Taiwan History and Culture in Time and Space' system (臺灣歷史文化地圖系統). In the next year, the *Statute for Examination of Hydrographic and Land Maps* (水陸地圖審查條例) was ceased. The following year, Google Map provided online service. It was the

conjuncture that image material became an accessible resource to everyone. In 2010s, maps, aerial photographs, and satellite images were abundantly integrated on GIS as a new researching tool of architectural history and settlement study.

FIRST ISUUE: AN VISIBLE BUT COLONIALY UNSEEN SPATIAL LAYER OF TAINAN

'Tainan' is settled by migrant Han people no later than early 17th century. Therefore, before there was a boundary of administrative division set by any regime or political entity, there was already a real 'Tainan' settlement where people lived their life.

In 1683, Ch'ing Dynasty took over Taiwan. Tainan gradually became an important urban settlement. Before the day of Japanese colonial period began in 1895, Tainan was set as Tainan *fu-cheng* (臺南府城) with hundreds of tortuous roads, commercial streets, and city wall and gates. [7]

In Japanese colonial period (1895-1945), the western urban plan was put into practice for the purposes of public health and economy. In 1920, an administrative division 'Tainan City' was set up. The original tortuous streets were cut off by the new haussmannized avenues (Figure 1, Figure 2). Meanwhile, the new urban space was filled with modern architectures and new economic activities.

The sub-division of downtown Tainan City , machi/cho (町, Figure 2), is the essential spatial structure about whether the people and urban space are visible or not.[8] In the administrative division system of Japanese period, each machi/cho was mainly comprised one main street and several blocks along it. Each machi/cho was divided by crosses. This spatial structure was cooperated with modern urban plan and statistic investigation policies. When blocks were formed by newly-opened streets, some traditional streets and alleys were cut. In Figure 3, the traditional main street in Hon Machi (No. 13 in Figure 1.) was widened in 1910s. In Figure 4, a new main street in Suehiro Cho (No. 18) was opened in 1930s.

No.	Cho/Machi	町別
1	Irifune Cho	入船町
2	Ta Machi	田町
3	Shin Machi	新町
4	Fukusuni Cho	福住町
5	Eiraku Cho	永樂町
6	Minato Machi	港町
7	Hama Cho	濱町
8	Takara Cho	寶町
9	Seimon Cho	西門町
10	Oimatsu Cho	老松町
11	Meiji Cho	明治町
12	Dai Machi	臺町
13	Hon Machi	本町
14	Nishiki Cho	錦町
15	Omiya Cho	大宮町
16	Izumi Cho	泉町
17	Shirogane Cho	白金町
18	Suehiro Cho	末廣町
19	Nammon Cho	南門町
20	Hanazono Cho	花園町
21	Saiwai Cho	幸町
22	Midori Cho	綠町
23	Hokumon Cho	北門町
24	Taisho Cho	大正町
25	Kotobuki Cho	壽町
26	Kiyomizu Cho	清水町
27	Takasago Cho	高砂町
28	Kaizan Cho	開山町
29	Asahi Cho	旭町
30	Takezono Cho	竹園町
31	Tomon Cho	東門町

Fig. 1: Administrative division: the machi/cho of Tainan City downtown. (Source: authors).

Fig. 2: Substantive environment: the machi/cho-street spatial structure. (Source: authors).

Fig. 3: Hon-machi Street: The traditional main street was cleaned and opened by 1910s urban plan. (Source: 1913「台湾全島写真帖」(大正 2 年 2 月 15 日　平賀商店）より「台南竹仔街通リ」).

Fig. 4: Suehiro-cho Street: A whole new haussmannized street was opened in the 1930s, there were a department in the middle and a bank in the right. (Source: https://www.kunputw.com/archives-/%E4%B8%89%E4%BA%95%E7%89%A9%E7%94%A2%E5%8F%B0%E5%8D%97%E6%94%AF%E5%BA%97).

Fig 5: Ch'ou-ch'ien Lane in 1931. (Source: Skillman Library at Lafayette College, [wa0017] [Tainan Yongle market], http://digital.lafayette.edu/collections/eastasia/warner-postcards/wa0017).

However, inside the blocks there were vivid street life neglected under this administrative structure. Taking the Mi Street and Ch'ou-ch'ien Lane (Figure 5) for instance, instead of being viewed asan integrated urban space, this street became the boundary among Seimon Cho (No. 9), Meiji Cho (No. 11), Tai Machi (No. 12), and Hon Machi (No. 13). Therefore, the vivid subsistence productions on this street were invisible when most historical materials were separately recorded in the order of administrative divisions. Following, the methods about how to visualize the socioeconomic data and activities by applying GIS is illuminated.

The high-resolution digital images just mention physically allow researchers 'seeing' the historical facts more clearly, just like the empirical turn in 1990s. In this paper, we propose two applications of GIS as a tool to re-present historical facts which attribute to bridge two corruptions. One is between the colonial history and the present, the other is between historical research and everyday life. As the former, we introduce how to see the visible but unseen histories and bridge the rupture between traditional, Japanese colonial modernized, and contemporary Tainan. As the later, by historically and theoretically establishing the continuity of Taiwan society, we devoted into a NGO's survey on subsistence production in Tainan City to overcome the circumstance that Harootunian says, 'being forced to live comparatively-life in double time-as a condition of their modern transformation. [9]

2. EMPERICALY VISUALIZING THE COLONIALY UNSEEN STREET

THE NATION NARRATIVE: A MODERN-ECONOMY-ORIENTED URBANIZATION UNDER JAPANESE COLONY

From Tainan *fu-cheng* to Tainan City, it is no surprise that urban plans which were put into practice by colonial government profoundly transformed the spatial structure of Tainan (Figure 6).[10] As far as the scopes of three spatial plans are concerned, the 1911 Plan was basically set to improve the area covered by Tainan *fu-cheng*. In 1929, the planned area was extended and formed a new and modernized spatial textile and structure of Tainan City. Finally, the 1941 Plan aims to strengthen the connection between downtown and suburb. In a broad sense, the spatial plans mentioned above, including demolishment of city wall and gates, eviction of cemetery, open of roads, setup of public facilities, and establishment of new political-economic axis (Figure 7) illuminates the modern-economy-oriented logic of government's policies.

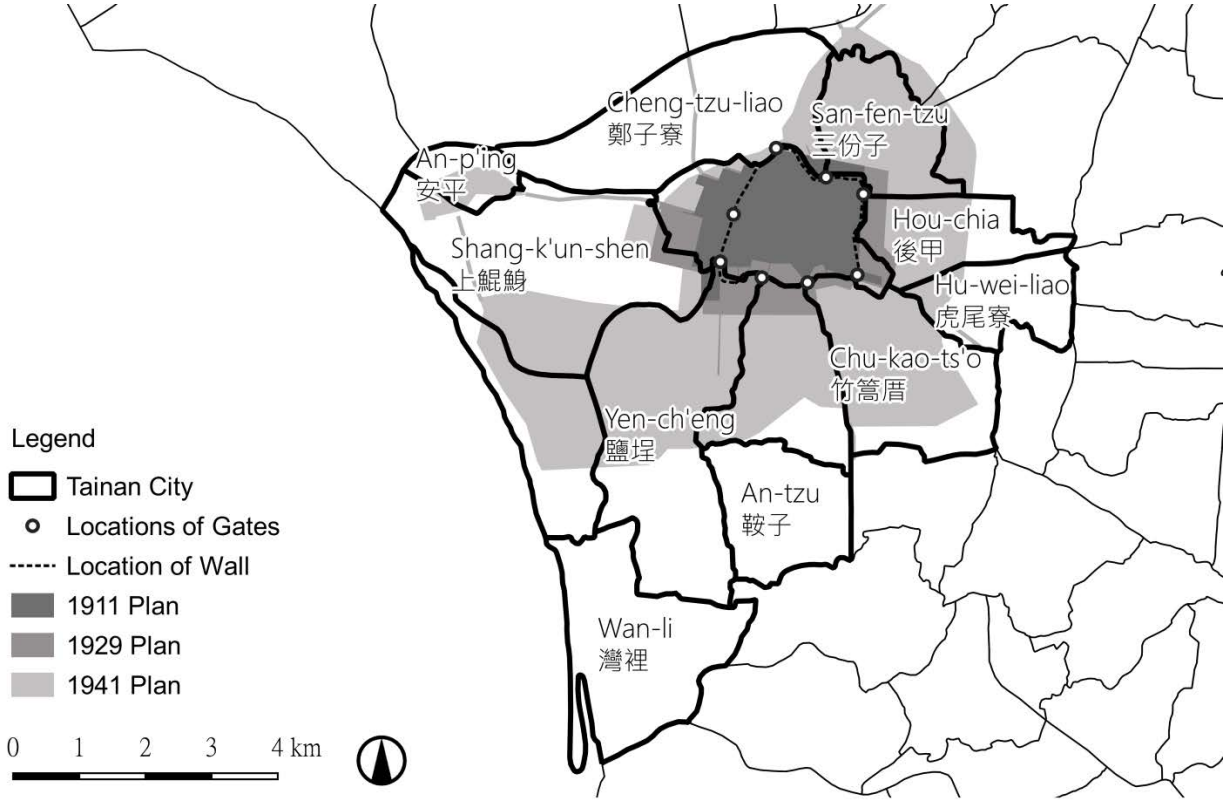

Figure 6. Tainan City and the scopes of three spatial plans. (Source: authors).

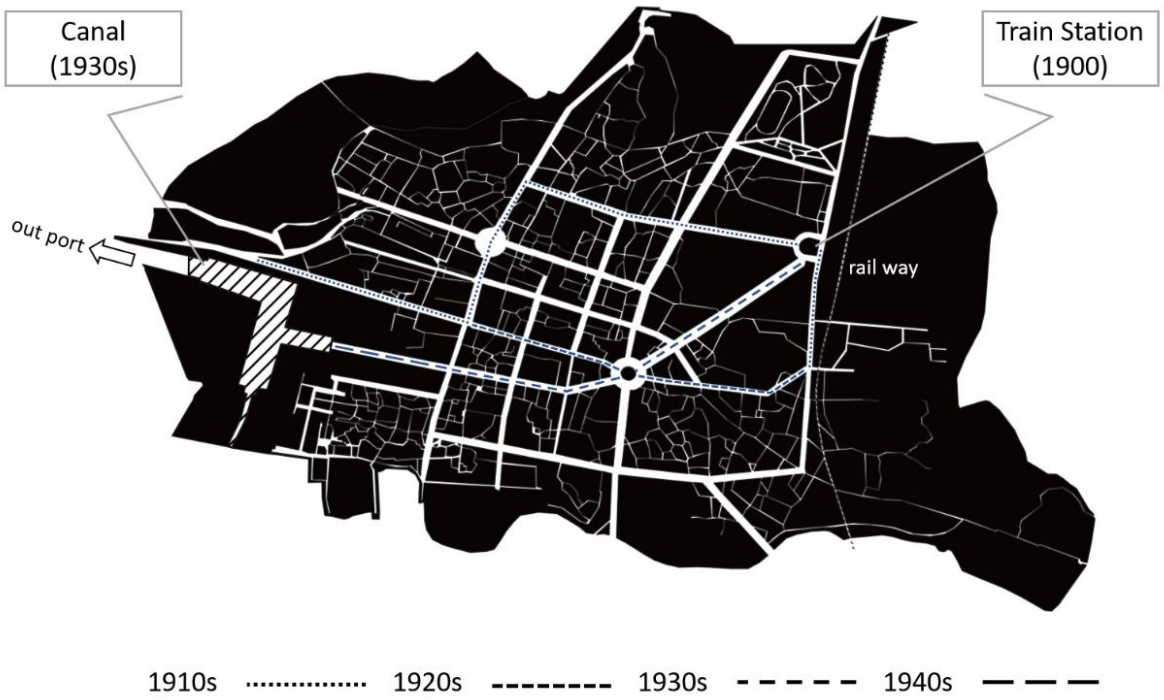

Figure 7. The changes of political-economic axis: This figure ground map shows the two spatial layers. (Source: authors).

THE MAUP AND APPLICATIONS OF GIS

The discourse just mentioned describe the national narrative of the spatial transformation of Tainan City. However, the citizens are invisible in it. A step further we visualize the economic activities of the commoners by GIS. In the beginning when choropleth map is applied to figure out the commoner's economic performance (**Error! Reference source not found.** for instance), the modifiable areal unit problem (MAUP) follows up immediately. Like just mentioned in introduction, the real, vivid life is neglected to some extend when data was visualized under the colonial administrative structure. To approach the historical facts of distributions of economic activities, we take digital cadastral map as basic map and the *Guide of Commerce and Industry of Tainan City* as the main material. It is a material containing information such as address, owner, telephone number, economic activities of 1,918 shops and factories. 1,579 records are located on the map as result of GIS visualization (Figure 9). The visualization of actual distribution of economic activities overcomes the MAUP.

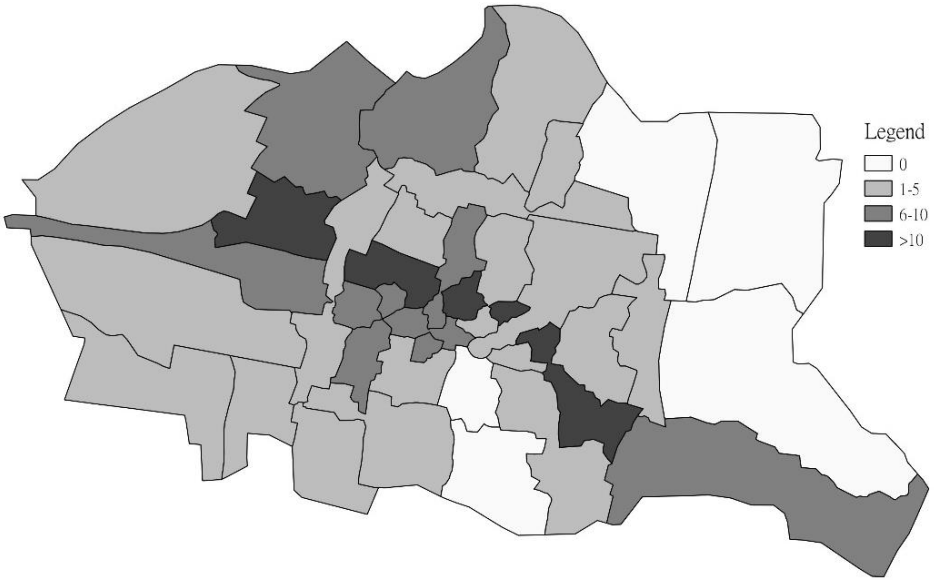

Fig. 8 | An instance of Choropleth map: This map illuminates the amount of factory locating in every division in 1926. (Source: authors).

Fig 9 | Distribution of economic activities of downtown Tainan City, 1934: The base map was made in 1935. (Source: authors).

HON-MACHI STREET: STILL-THE-MAIN STREET

In **Error! Reference source not found.**, the data of economic activities in Tainan City is visualized as heatmap. It is significant to see that nearly 40 years after Empire of Japan took over Taiwan, 25 years after the first spatial plan of Tainan was proposed, and ten years after the new axis, Suehiro-cho Street (Figure 4), was opened, the original structure still generally unchanged. Main Street was still the central business districts (CBD) of this settlement. The colonial governance and modern plan shaped new built environment but the transformations of socioeconomic environment 'colonially belated'.

Fig.10: Heatmap of downtown Tainan City in 1934 (The base map was made in 1935). (Source: authors).

MI-STREET: VIVIDLY LIVED STREET

Further, the distribution map reveals a lived street (Figure 11). Mi Street was where the shop-cum-factories of rice producing and selling gathered. This street was first recorded in 1807 however the records of crops trading of this location could be traced back to 1696. This important street, nonetheless, became 'anonymous' under Japanese colony and its spatial plans. When Tainan City was setup, Mi Street became the boundary of four divisions like mentioned before and the subsequence was that when all kind of documents recorded under the framework of machi-cho, such as the material *Guide of Commerce and Industry of Tainan City*, the vivid street life was separately classified into these four divisions. The format colonizer used to record, to see the colonized, attributed the result that some phenomenon of historical facts invisible.

In fact, the vivid life never vanished (also see Figure 5). In Mi Street in 1934, there were all sorts of economic activities for daily life. There was only one rice factory-cum-shop but several shops of ritual money and incense still supplied the temples nearby. There were lots of simple food processing factories (including noodle, soy-bean sauce, and grain flour), Chinese pharmacies, wooden furniture stores, cotton cloth stores, and pottery stores. Besides, there were some modern industries like metalwork and delicate productions with noble metal. Some modern service industry like clinic, restaurant, pawnshop, and poolroom as well.

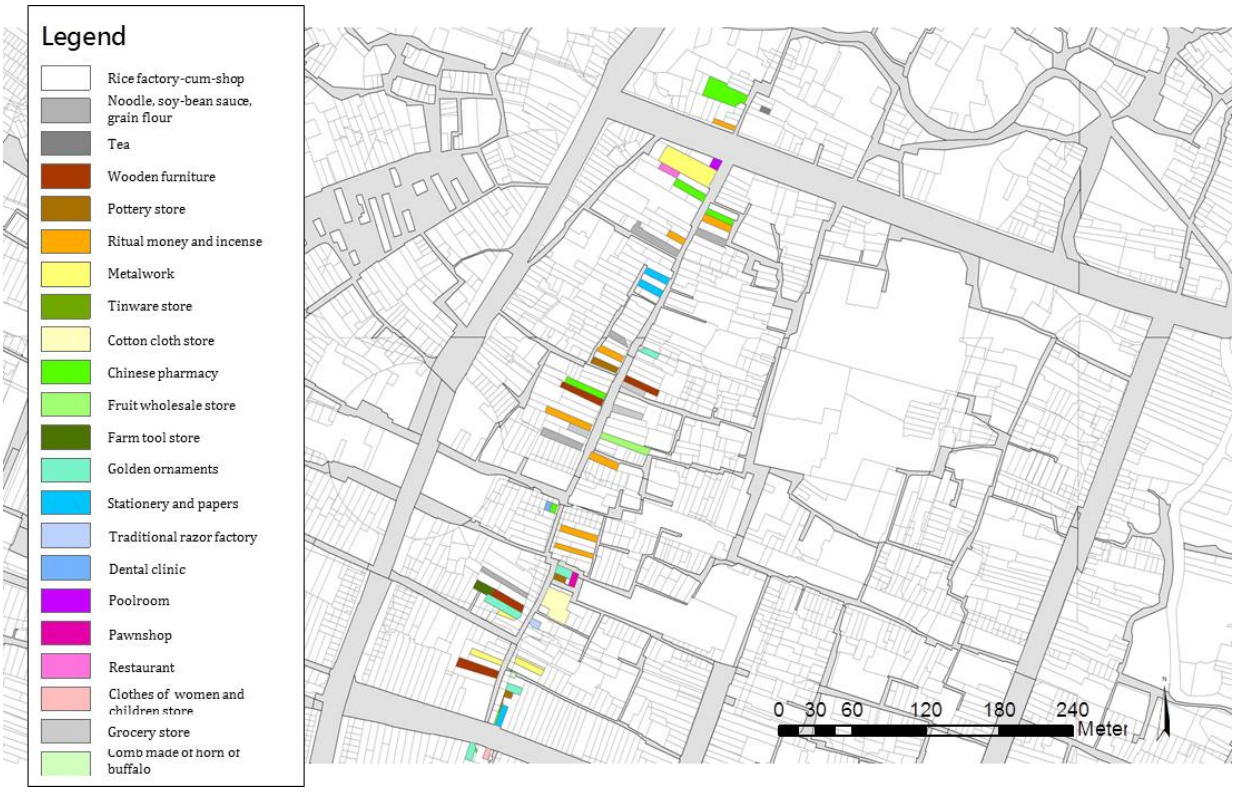

Fig.11: The economic activities in Mi Street in 1934. (Source: authors).

3. THEORETICALLY BRIDGING HISTORIES AND EVERYDAY LIFE

This research starts with quite a naïve motivation, to know the history of the city We study and live in. In 2011 when one of authors stood on the Mi Street, it is not such an unrecognisable condition that history is ruptured from present to certain extent. The absence of marginal histories of ordinary people leads to the rupture between history and present, between academic research and our own daily life experience as well. When we recognise the rupture between history and present as researchers, another kind of rupture between history and everyday life is simultaneously recognised by us as habitants. If all the history is about master narrative, there will be no place left for ordinary people like ourselves who striving in the city. A theoretical perspective to face the historical facts and present scene of a settlement shall be proposed to bridge the ruptures.

Fig. 12: The Ch'ou-ch'ien Lane in 2015, same position and orientation where Figure 5 was taken

POTENTIALITY AND STRATEGY OF EVERYDAYNESS

"A society driven by the ever new in the ever same", says Harootunian (2009) to propose how could we imagine a temporal form to bridge the nation-state historical narrative and everyday life. In Mi Street, by acknowledging the various economic activities, including traditional and modern, industry and service, we turn to focus on the 'subsistence productions' of ordinary people in daily life, instead of paying attention on the 'modernization' narrative. When subsistence production is concerned, it turns out that even though the ordinary people devoted themselves to some modern business, they just made themselves adaptive to the urban spatial-socioeconomic transformations. It is not that proper to discourse the histories 'modernization'. That is the way the colonized strived to live and represent their agency to the colonizer and headmen with resources. [11]

'What distinguished the discourse on everydayness was how often it concentrated on the details of multiple practices, starting with unimportant, shallow, and trivial occurrences. [12] The everydayness is a key concept to question the essence of a modernized society and culture. Further, in the case of Japan under the context of multiple modernities, Harootunian's discourses on potentiality provide another key argument between practice of everyday life and modernization. [13]

Previously everydayness was referred to the routinized, dull everyday life of industrial society especially in the cities. However, Harry Harootunian proposed a positive dimension by studying Japanese philosophers in 1920s and 1930s. [14] By comparing the difference of meanings of 'everydayness' between western and Japanese society, Harootunian proposed that westernization leads to a discontinued experience between traditional lived historical time and the everydayness as a specific cultural form of modernity in Japan society. The modern everyday life (modan raifu) is different with traditional life (日常生活, にちじょうせいかつ, nicjijio-seikatsu) [15] The repeated 'everyday', as the smallest unit of time, cancels the temporal structure of the present and past, then the history. [16] Further, modern everyday life not only actualized the past but promised the possibility of future.

Harootunian further elaborated the concept possibility that experience of modernization of Japan perhaps much similar with Soviet case that everyday become a symbolic concept of utopian aspiration [17], Japanese thinkers recognized there was a newness of modern everyday life different withthe very immediate past. When 'seeing daily life and its transactions in home and on the streets as the source of subjectivity, we are confronted with not the simple expression of enthusiasm for the newness of "modern life" but with the conviction what is new life had come to mean for Japanese living in a present they saw constantly opening up to a completed future. To thinkers at that time, they thought modernization and modern everyday life, though colonized by the commodity form, was a program to be completed.

The study of modern everyday life of Japanese thinkers mentioned above was closely to the urban space. A disciplinary called modernology (考現學, kogengaku) was proposed by Kon Wajiro (今和次郎) in 1920s.[18] He stood on Ginza Street corners 'to put into practice a new discipline devoted to the modern, this secondary revision upheld the claims of modernity as the product of determinate history directly only by the present and a different temporality that would, according to stages of development, ultimately yield hitherto unimagined new forms of human existence and experience for Japan's masses (ibid: 101).' Harootunian illuminated that city, the expanding site of industrialization and the establishment of mass society, is where everyday life could be observed, not the rural area. Here the discussion back to the epistemological temporal assumption of modernity that '[i]t is thus the cities, not anymore the countryside in general, that make up the contemporary scene, the now of the present' Harootunian said,

> [T]he modernity of everydayness is the street, the buildings, the new institutions and constant movement, the ceaseless interrelationship between public and private that register large and small events alike. …Everydayness is precisely the space of immanence that dissolves the received binary between inside and outside and within which we must locate historical practice. And it is in the cities that the everyday writes its own history. [19]

IN-BETWEEN SPACE AND STRATEGY OF THE COLONIZED

When colonial modernity is concerned, however, Brenda S. A. Yeoh focused on how colony shaped the urban built environment of colonial cities. From Yeoh's viewpoint, the production and representation of urban space of colonial city is a process of contestation between the colonizer and the colonized. [20] Echoing subaltern studies, this research aims to view the invisible, to re-present, recognise, and observe the visible but unseen. Following, the concept 'in-between space' proposed by Homi K. Bhabha is reviewed to elaborate the strategic essence of the everydayness within colonized society. [21]

Though Homi K. Bhabha did not quite explicitly elaborated the concept 'third space' and 'in-between space', we view it as a conceptual tool he made to cancel the dualism in every level of discourses and cognitive framework by a metaphor of space and location but signifying the temporality. [22] 'It is a place and a time that exists in-between the violent and the violated, the accused and the accuser, allegation and admission. [23] Bhabha released these compact binary structural cognitive frameworks by applying in-between space. The emphasis we draw attention to on this concept is the 'strategy' within it. [24]

We view 'in-between space' as a very abstract concept the location with potential energy and the momentum with kinetic energy is combined to interpret the historical facts and societal realities of subsistence production. The strategy of in-between space and the potentiality of everydayness are the two sides of a coin called agency. By viewing the visible but once colonially unseen subsistence productions, we recognize the essence, the societal continuity of the citizen's lived life in the city.

SECOND ISSUE: APPROACHING THE SUBJECTIVITY BY TURNING HISTORIES INTO ACTIONS

After World War II, Tainan, this city once was capital of Taiwan, was gradually 'surpassed' by other city, especially when economic growth is concerned. KMT government shifted resources relatively mainly into the other cities, especially Taipei, the capital city now. The 'lack' of economic construction, the 'stagnation' of urban environment, and the 'lag' of economic growth, the life lived inevitable attributed to an inferior sense of self identity.

However, in recently years, cultural heritages of Tainan City became a kind of niche of conservation and economically reuse. The once public administrative offices are transformed into museums, art gallery, etc. standing by the haussmanned avenues and rounds. The private shop-cum-factories by the traditional lanes were reused as coffee shops, restaurants, bookstores, personal individual working spaces, B&B, and other business with relatively low entry threshold. The conservation and reuse do change the socioeconomic-built environment and locations of this city.

Further, there are a deeper impact on the dimension of self-identity. The national policies focus on cultural heritages contribute to the recognisation of the complex of Taiwanese histories. Like mentioned in the introduction, historical researches after 1990s reviewed Japanese colonial period and were adopted as the discourse when the value of cultural heritages is estimated. The more the old buildings are reused, the stronger that citizen identifies themselves living in a historical capital of Taiwan. Histories, old buildings, and historical areas are physically and mentally transformed as the resources supporting the life lived in this city. Nonetheless, to some extend it could be a kind of consumption when histories are just used to add the exotic stories to the old house for some business interests or hipster sense. Histories are ruptured with contemporary life when they are just repeatedly told to the travelers but not connected with the everyday life of the habitants. Based on the attention paid to the subsistence production of ordinary people and the societal continuity within it, we operate a survey project in a non-government organization, the Foundation Historic City Conservation and Regeneration (FHCCR, 財團法人古都保存再生文教基金會) to view our own visible but unseen everyday life.

4. CONCLUSION: A GRASSROOT APPROACH

The survey project we devote to is called 'Culture and Practice of the Ordinary's Everyday Life (常民生活文化研究與實踐計畫)'. Based on advanced historical researches and literatures, we recruit volunteers to join this project to survey how ordinary people earned their livelihood today in this historical city. Each year one industry is selected and the volunteers are trained to document the related information, stories, people, etc. Our first target, in 2015, is the economic activities related to paddy and rice, like rice shops, snacks shops, etc. One direct reason we choose this industry is that in the previous researches we find out that the rice shop-cum-factories no longer gathered in Mi Street in 1930s (Fig. 13). We would like to know where they are in 2010s.

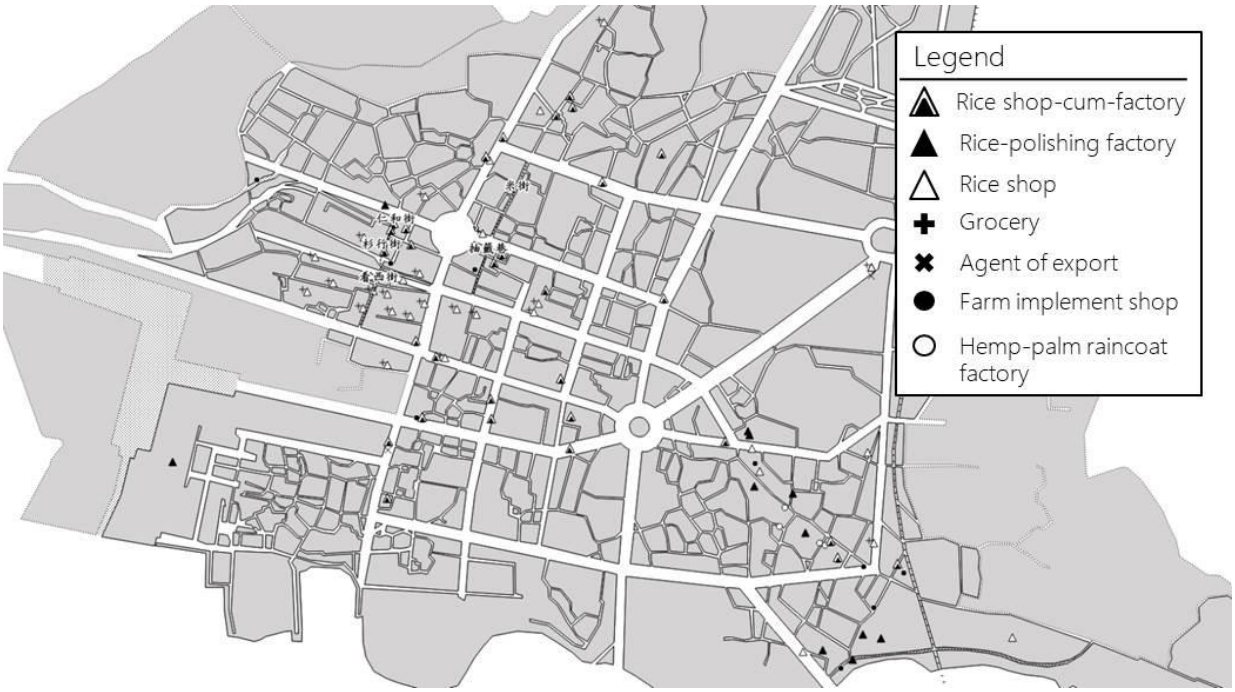

Fig. 13: Distribution of rice-sale-and cleaning activities in 1934. (Source: An-Yu Cheng, 2018)

4.1 GIS AS AN EMPOWERED TOOL FOR VOLUNTEERS AND NGO

In this project, GIS is applied as an efficient, accessible, and most important, easy tool for volunteers to empower themselves. In the survey, they take pictures, fill investigation notes, and establish the GIS file. Based on GIS, a basic general and comprehensive figure of the paddy-and-rice-related economic activities is presented (Figure 14). The features on this map are not filtered by their opening year or advertised appeal but just presented as where and what they are. Instead of stories without historical and contemporary context, we could see a general picture of the city we live by the visualization of GIS. The entire practice just began when the survey is done. GIS present the social facts. Nonetheless further promotion like tour guide, public education, publishing is needed to represent the reality of everyday life of this city, to bridge histories and contemporary situation by linking within subsistence production (Figure 15).

Moreover, the effort volunteers pay to the survey return to themselves since this project is very close to their own life. In the following topic we choose, the medicine pharmacy in 2018, the clothing in 2019, some volunteers joined in the project because of the industries we choose are highly related to their own profession or family background. To some extend we could claim that this whole project is quite self-reflective for everyone involved.

Fig. 14: Distribution of rice-related shops in 2015 (The scope surveyed is based on the administrative division of Japanese downtown Tainan City)

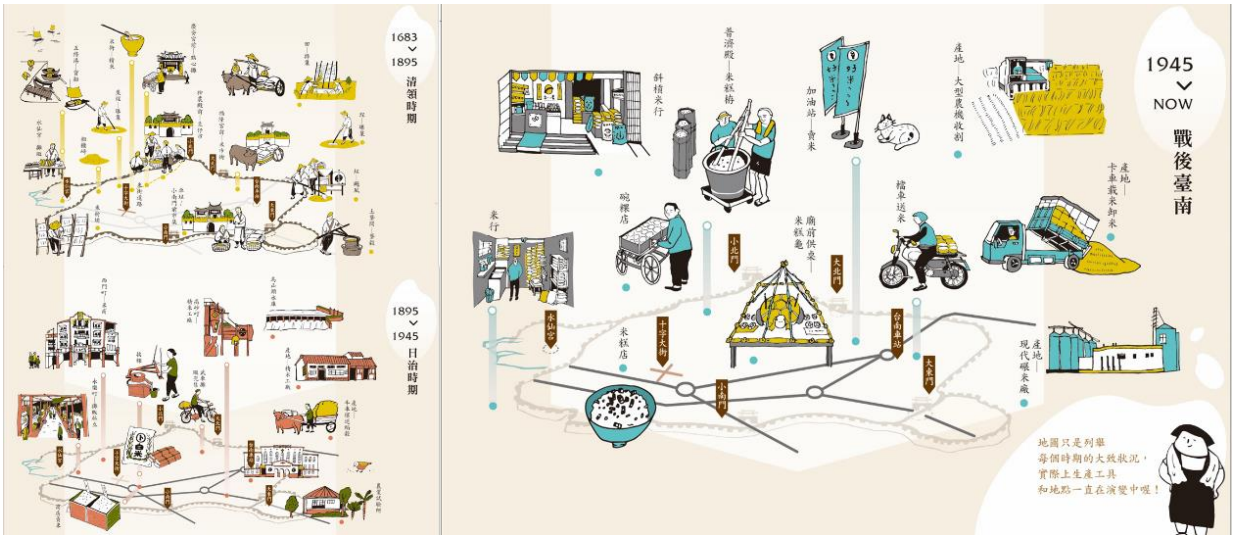

Fig. 15: No caption (Source: N/A).

PHYSICALLY AND INTELLECTUALLY VIEWING THE HISTORIES WITHIN THE CITY WE LIVED

In sum, to re-present histories and present contemporary life of the ordinary, GIS is applied in several ways in academic researches and NGO project. In historical researches, it is very efficient to collect and manage socioeconomic and spatial information of historical materials and literatures by designing and establishing proper attribute table. The visualization such as label, symbology, distribution map, choropleth map, heat map empirically re-present historical facts especially veiled by colonially institutionalized data and recognizing frame. GIS provides a relatively general and comprehensive view of facts that allow researchers paying more attention to the marginal histories of the commoner's everyday life.

In the survey project, GIS is an easy tool for the volunteers. In a large degree GIS reduces the threshold of the operation of NGO to train volunteers and makes the further visualizations for public promotions possible. We also share the method to the other NGO since GIS is a very accessible tool. Further, the data collected in GIS is accumulated so that the survey would not be isolated and easily to continue or reboot in any time for any other purpose, even interfacing with the official data or the other GIS-format projects.

Last but not the least important, we find that GIS is an efficient tool indeed, however, it is useful when the proper applications are recognized. The empirical historical or contemporary social facts are just the basic understanding for further narratives and actions. To make better use of GIS, maybe a deeper reflection on the initial reason we choose this tool and the visionary applications GIS could help is desirable.

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EXERCISING THE VIRTUAL COLLECTIVE STRATEGY IN THE CONTEXT OF 21ST CENTURY ALOR TRADITIONAL SOCIETY

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EXERCISING THE VIRTUAL COLLECTIVE STRATEGY IN THE CONTEXT OF 21ST CENTURY ALOR TRADITIONAL SOCIETY

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To run our lives daily without the existence of the internet and the online environment seems like an impossibility nowadays. In the case that the physical operation has been interrupted by some issues like a geographic barrier, we still need to communicate with each other. Nowadays, we rely on virtual networking in the virtual space to accomplish almost every bit of our work and need. This kind of space becomes the backbone of everyday social practice. Transformation in the way people communicate has performed an alternative idea of occupying space. People start living in the in-betweenness of two intertwined realms: the physical and the virtual. This paper will discuss the operation model of the virtual space that relates to the physical space while try to elaborate on the features that enable the operation. The change of user's experience in the physical space due to intervention of the existence of virtual space will be analyzed to understand the alternative value or meaning, function, and "form". By studying the birth of social media-based collective space in Alor traditional society, the discourse in this paper aims to define the modification of virtual collective operation that has resulted in socio-economic improvement for the local people. All data has been gathered through in-depth interviews with the actor of the collective movement and observation on social media. A literature review has been used to study the relationship between the virtual and physical environment in producing the transformation of social and spatial practice.

1. INTRODUCTION: THE ADVANCEMENT OF ICT AND THE TRADITIONAL SOCIETY OF ALOR

In a revolutionary way, the invention of the internet in the 1990s has transformed human interaction due to its ubiquity characteristic [1]. Through the internet, anyone can access information anywhere and anytime, thus brings an expanded reality for everyone. In just two decades, the number of internet users has grown from millions to billions [2], showing public acknowledgment of the power of the internet. The advancement of information and communication technology (ICT) has revolutionized the way we exchange information and open new opportunities, especially by resolving the problem of dispersed geographic location. People are more connected and get closer, hence ideas or knowledge can be easily spread, reproduced, and implemented. Social media is one popular example of ICT application on a daily basis. Accompanied by the development of high-tech yet affordable mobile phones, social media plays a major role in facilitating many activities in a more efficient and even affordable way. It mediates people to do business, share knowledge, or even initiate and mobilize social movements. Social media provides a user-centered connection that allows people to actively create or manipulate information rather than just consume it. This reality of social media causes a higher degree of willingness to participate [3]. Social media users might feel more liberated to express themselves or introduce personal identity to the other users that watch their activities.

This novel way of connecting to each other also means a new way of socio-cultural practice that resulted in a particular spatial concept and representation of space. Such kind of space operates and is maintained in-

between the realm of physical and virtual. Since we can send and leave a message or text to everyone anytime from anywhere, time and space seem shrunk [4]. Here, the way we think about our territory is also changed, driven, modified, and directed by the reality of virtual space. Rather than a physical dimension, it works in a symbolic level. As Alessandro Caliandro [5] argues, the activities between the virtual and physical space has merged. Moreover, the activities happening in both spaces have influenced the model of each space.
For instance, a community that is previously established offline can have more chances to improve the intensity of interaction and expand the range of the connection by creating and maintaining the account on social media. This strategy will also save large costs to manage a community since the allowance to transport people or to arrange a physical space can be diminished. In other words, social media can make a more efficient community and more people can get involved in the collective activities because of the affordability and easy access [6]. The improved efficiency will increase the capacity of the community's members to do more activities and achieve more goals [7]. The members of a community can focus to tackle the main issue and are not distracted by the difficulties to meet in the exact time and space. What will arrive next is a form of a more inclusive, active, creative, and sustainable community.

The transformation of human communication also inevitably affected the lives of traditional communities, with no exception for those who live in a rural setting of a certain country. These days, many traditional societies in Indonesia still inhabit rural areas with a minimum level of physical development, such as road infrastructure. However, infrastructure to enable internet access has arrived. The advanced application of smartphones and social media has also been introduced. Facebook's users in the year of 2012 from Indonesia hold the third rank of top 3 most users after the United States and India [8]. This data seemed relevant to my observation about the popularity of Facebook in the Alor Regency.

The traditional society of Alor consists of smaller communities that speak in different local languages. They live in the Province of East Nusa Tenggara, Indonesia and get accustomed to a slow phase infrastructure development. Socio-economic improvement in this regency can be considered low, but they keep connecting on Facebook as the main social media and almost the center of daily entertainment in the sleepy living environment. The excitement about this social networking application does not stop there. It has provided local people with a platform to urge social change. One of the biggest achievements goes to a collective movement called GESER (One Thousand Rupiah Movement) that has been awarded as a local heroic initiative by a renowned national talk show. The story of this movement was broadcasted across the country. This movement is initiated by a 47-year-old member of the local community. Zakaria Atapada, who was experiencing poverty in his childhood, contemplates about the longing for better well-being of his community and eventually finds an outlet in the power of Facebook. His initiative turns into a very productive social movement across Alor Regency and now across Indonesia. He realized that many old day's limitations of

connecting people will no longer be a problem for the 21st-century social media. He believes this is the key to create a social infrastructure. In the context of developing countries, this approach sounds plausible when remembering the importance of equality to access information and knowledge as a remarkable catalyst for socio-economic development [9].

2. THE VIRTUAL COLLECTIVE SPACE: AN ALTERNATIVE OF SPATIAL PRACTICE

Many social media users spend a significant amount of time per day to access their social media account. They linger and mark a sense of the environment in the virtual realm [10]. In 2015, when Zakaria started GESER, the sense to occupy a virtual environment has been formed in his local community. On the other hand, the geographic situation of the Alor Regency has commonly been blamed as the reason for the slow infrastructure and economic development. This regency consists of a 2800 km2 rugged mountainous area. The main port is located in the chief town, Kalabahi, the only flat area of the whole island. The low-quality road and the unavailability of a bridge to connect one rural settlement area to the adjacent settlement areas have motivated Zakaria to do something. At that time, he already settled with his family in the capital city of the province, located across the ocean.

Johnson [11] explained that social media and its capacity will encourage a potential actor to be an agent of change. This thesis has shown that social media is a powerful tool to bring rural or marginalized communities' well-being into reality. Although many privacy problems have been discussed around the operation of social media, the study in this paper is designed to analyze the positive role of social media in building community engagement. Virtual space in the form of social media platforms has been used as a public space or at least communal or collective space by its users. Furthermore, virtual space often works as the extension of physical public space, for instance, by posting a photo of a place that will be discussed through the comment section on the social media platform.

The discussion in the comment section happens organically. It also represents the action of exchanging opinions, ideas, and knowledge in a more public environment that even hard to find in the physical public space. More interactive tools such as photo and video sharing also add up interest to share or receive information. Zakaria [12] explains in our 2019 interview that he identified the geographical issue as his main obstacle to actualize the GESER movement since he lives in a different city on another island. On this matter, Lev-on [13] argues that geographical proximity, as the fundamental dimension of communities, is no longer a requirement for a successful place-independent virtual community. This kind of alternative community will generate full-of-opportunities collaboration and civic renewal. Once it is activated, it will be

known and thus will attract more potential collaborators. Lev-on's thesis finds evidence in the success of Zakaria's GESER initiative using Facebook as the main platform.

Bruno Latour [14], who develop the Actor-Network Theory (ANT) believes that to find out how can a living environment and each human or non-human agencies within it sustainably operate and achieve collective well-being, the observer has to follow the natives meaning following the socio-cultural and spatial practice of the local actors. Interaction happens between human and non-human actors and can be shown in a patterned network. We can look at social media as the non-human actor or agency in the case of GESER. When Zakaria realized that he needs people, networks, and not really a place or headquarter to start GESER, he decided to start exploring the potential of his Facebook account.

3. GESER AS VIRTUAL COLLECTIVES, FACEBOOK AS VIRTUAL SPACE

Often taken for granted, there are many powerful tools we can find in social media to literally run a community. Facebook allows us to start community ideation, raise collective awareness of an issue, make collective memory or record, orchestrate collective decision, and also raise funds [15]. The initiators of movement need to learn how to effectively use the basic tools in order to coordinate action and they may not lose the moment to share or react to a piece of information. Social media enhances collective capacity through technological capability and mobility and offers several functions to process online content, such as producing, sharing, reproducing, and commenting [16]. High-speed information sharing is one of the useful characteristics to gain momentum of action and define the time for circulation of ideas or knowledge [17]. When a momentum has been gained through location marking as well as image and video sharing, virtual space will be a very productive environment to amplify ideas and encourage actions. Alsayyad & Guvenc define this momentum as virtual dissemination for the in-person or physical event [18]. They further argue that virtual space cannot function alone. It should operate side by side with physical space because physical space, such as public space is the actual arena to make a real change happen. In this connected operation, physical space might not be as active as and not as liberated as virtual space, but it will encode and articulate the virtual collective actions together with the attached stories or meanings. I argue at this point, due to the intense real-time engagement in the virtual space, the physical space itself might become the simulacrum of virtual space, not the other way around. The sense of solidarity to solve a collective problem can be evoked spontaneously among the users that show the capability of social media in generating civic engagement [19].

The operation of GESER as a social movement on Facebook has shown similar traits. Zakaria left Alor Regency to have a better livelihood when he was in his 20s, however he still maintains a close relationship with his relatives in several rural settlement areas in Alor Regency. On weekdays, he worked as a staff for the

non-governmental organization World Wide Fund for Nature (WWF) in the city of Kupang. Meanwhile, on weekends, he visited several rural settlement areas where he grew up to identify what kind of urgent assistance needed. He started from an in-person dialogue with the local community and its leader. This dialogue is rare since most local people rely on the government plan to solve any problems in their living environment. Zakaria always has a different mindset about local contribution and participation to improve the local socio-economic situation and achieve better health quality. In the first place, his concern was about road infrastructure and bridge construction. There were six settlement areas or villages around the place he grew up located side by side but not connected. It was 2011 and those infrastructures have been broken and futile for three years. After a series of intensive dialogues with local communities, he insisted to repair the road and bridge construction together with local communities. He convinced them to not wait for the government plan, but to individually contribute in any possible way.

Eventually, a modest commitment was made. Individuals who live in each village donated money as much as 1,000 Rupiah (around 70 cents USD using the latest conversion rate), at least one time. They set a deadline for the crowdfunding and agreed to start the construction process right after the deadline. Zakaria's optimism assumed that the biggest cost must be for the workforce's allowance, thus he and the local community also agreed to collectively work without payment. He kept continuing to renovate broken infrastructures in dispersed rural settlements across the Alor regency until he got inspired by social networking tools offered by Facebook. After the accomplishment of these projects, Zakaria has gained more popularity in the local context.

The next challenge was a greater number of projects that needs to handle at the same time, the need to improve the efficiency of the movement's operation, as well as the importance of transparent fundraising. The type of projects to assist also gets more variety. Zakaria handles the school's building and house renovation as well as takes care of ill people. The demand to have a different kind of operation led him to establish GESER as a Facebook-based social movement in July 2015. Zakaria perceives Facebook as a platform at which we can learn something new and good. He wanted to focus on the available virtual network rather than rely on dysfunctional physical infrastructure. For him, the main infrastructure is the community themselves. They are the key to achieve a resilient community. The virtual space is used by Zakaria to encourage a new independent mentality of the local people.

Zakaria notices that the most powerful Facebook tool to enhance the good impact of GESER is actually the "add friend" button. Just like letting people get into his house, he actively adds more and more friends. Mainly, he targets Alor people who no longer live in Alor to maintain a job or study. However, the good reputation of the movement itself has preceded the plan to make it go national or even international.

Nowadays, GESER's friends reside all over the place, whether in the national or international boundary. All of them occupy the same virtual space and share solidarity to help those who do not have.

In GESER operation, physical space still plays an important role such as collecting donations in cash. This movement has covered at least 5 working areas in Indonesia: Makassar (southern part), Kupang and Alor (eastern part), Surabaya (western part), and Kalimantan (middle and northern part). Physical space also becomes the locus of the project's realization where real transformation takes place. The utilization of virtual space is caused by awareness to improve the dwelling's environment together with the effort to celebrate inhabitants' dignity who live and be in the same network with the dwelling units. This holistic effort aims for a deeper process of socio-cultural reformation, both physical and mental. The local community themselves are encouraged to be agents of change for their own settlement area.

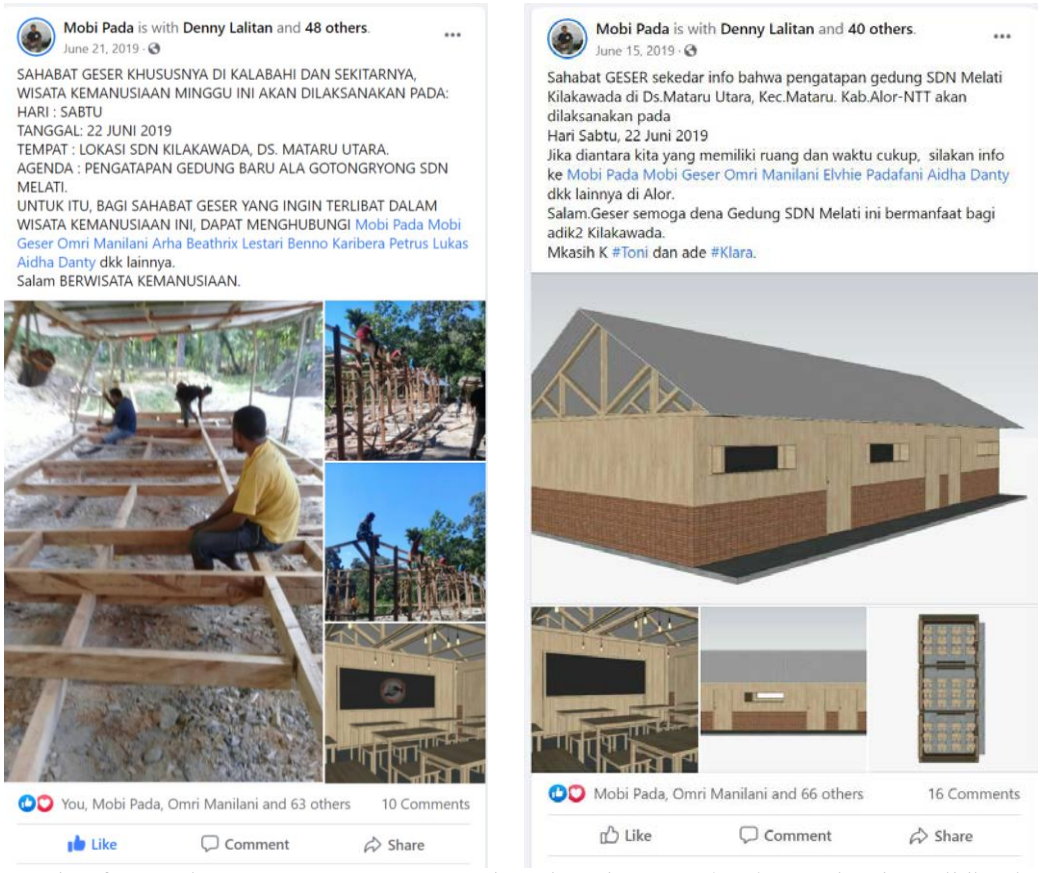

Fig. 1: Example of On-going GESER Project Posted & Shared on Facebook: A School's Building in Alor Regency (Source: https://www.facebook.com/klarapuspaindrawati/)

GESER has no rigid structure like an organization. Zakaria, as the initiator, prefers to adopt rhizomatic formation to operate the movement. There is no fixed member. He considers somebody has made a contribution to GESER once he/ she likes or shares the post so that not contribution does not necessarily

mean donation. His experience of working for decades in a well-established NGO has taught him about the downside of bureaucracy that somehow has brought less solution for the communities in need. Rhizome model graces GESER with flexibility and efficiency as well as repels the burden of hierarchy. In three years (2015-2018) GESER has resolved 30 cases. Five of them were the renovation of the school's building. One building complex that consists of 6 classrooms costs 7.5 million Rupiah (512 USD using the latest conversion rate). The renovation project typically will be completed in two weeks by utilizing the local community as the workforce.

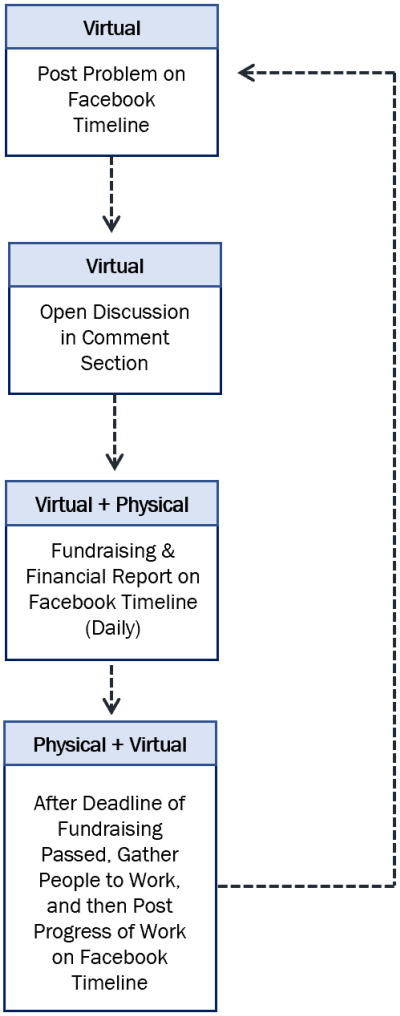

Fig. 2: Work Flow of GESER Movement and The Occupancy of Virtual and Physical Space
(Source: Klara Puspa Indrawati, 2020)

Figure 2 shows the dynamic relations between the occupancy of virtual and physical space to solve each case in the GESER movement. The posting on the Facebook timeline is the main element to create momentum so that new people get informed and are attracted to be involved. Zakaria sees the discussion process in this virtual platform as the key to evoke and reinforce a sense of belonging among actors in this movement. This

discussion also means an exercise for open exchange of knowledge and production of solutions for assisted problems. Each actor will be the spearhead to share the mission of the movement into their circle, thus every actor is an agency of proliferation in this open network. Instead of plays a role as a leader who controls every activity in the movement, Zakaria seems to be apprehended as an inspirational figure, who dedicated his life to connect the virtual and physical space as a strategy to solve social problems in his community. Although, he is still the one that posts every donation's record every night to maintain the culture of transparent crowdfunding.

To promote a greater social change at the national level, GESER has expanded its virtual existence. A YouTube channel named GESER ALOR was launched in May 2018 to cover the social projects within Alor Regency. Early this year, a national website was also launched to provide the history of the movement and the story for new cases. This movement and its actors have successfully unleashed themselves from the limitations found in the physical space and keep experimenting with the power of virtual space to support their social mission.

4. CONCLUDING REMARKS ON AN OPERATIONAL MODEL OF THE VIRTUAL SPACE

By studying the GESER movement that brings progress to the slow socio-economic development in the rural area of Alor Regency, it is clear that social media can mobilize a larger number of people that share the same belief that their participation in the virtual collective space will bring a positive impact [20]. A virtual platform such as social media has enabled the geographically dispersed individuals to be bonded by common purpose [21]. Changes in social practice will always directly relate to the transformation of spatial practice [22]. The social media user has occupied the virtual space and appropriated the physical experience into the virtual. The experience of exploring virtual space, in terms of building a social network with other users, will also modify the value or meaning of physical space or even can change spatial behavior in the context of physical space. James Clifford [23] once explains the concept of traveler that dwells in no-place. He further suggests no-place can be defined as every place. Thus, traveler theoretically dwells in every place. This concept can also be seen in the connection with the concept of the Deleuzian nomad whose arena of dwelling is constantly in the state of becoming rather than a final form. The analysis in this paper indicates that inhabitants of virtual space show quite similar characteristics with the traveler and the nomad in the spatial formation of the network. Within the network, they actively create a strategy to survive and react to pressures or problems.
The operation of the virtual space studied in this paper reveals an inclusive, participatory, dynamic, open-access, and rhizomatic model. The virtual spatial practice can productively operate with support from heterogeneous actors or agencies who virtually produce, disseminate, and reproduce ideas. They also hone the common mission or purpose using social networking or social media platforms. However, the operation of

virtual space will culminate in the actual action that takes place in the physical realm. Thus, both virtual and physical space should be seen as an intertwined landscape to accelerate holistic well-being in one living environment.

The spatial practice between the physical and the virtual realm has weakened the feeling of strangeness among human agents in a virtual community while strengthening a sense of solidarity and motivation to be self-sufficient as a group of mutual empowered people. This positive value might change the way we see our living environment that is not only a dwelling unit or social institution initiated by the state or central government, but also as an organic socio-cultural, economic, and ecological network that can be modified by each agent within the network. The result of mutual appropriation between the virtual and physical spatial practice might come in the form of relational space that allows different skills, power, and potentials come together as combined forces to move towards a more sustainable and resilient society.

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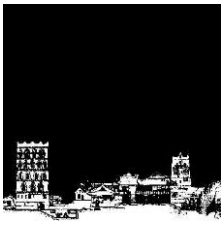

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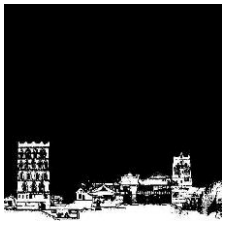

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