The Role of Heritage in Building a Socially Integrative City: A Comparative Approach

Lisbet Sauarlia and Yu Wang

1. Introduction

Heritage has become an important part of urban development and has become a strength for urban renewal strategies; it has also been identified as an effective tool in building a socially inclusive city. As UNESCO asserted, “culture has the power to make cities more prosperous, safer and sustainable” (UNESCO 2016, p. 18. Historic districts, as parts of heritage, have become valuable spaces due to the sense of the place, which reflect the local identity and which has been transferred into cultural tourism. The TRANS-URBAN-EU-CHINA project agrees that “Heritage is a way to remember the past, be it tangible or intangible. Forgetting is an integral part of this remembering”\(^1\) (TRANS-URBAN-EU-CHINA 2018). This is reflected via the following: “This effect has been increased in the modern society especially after post-war period and in the age of globalisation as the globalisation of the public anxiety around memory in a media saturated world, and its flip side, a feverish obsession with not forgetting, needs to be viewed as one of the most important cultural developments of the past few decades” (Huyssen 1995, p. 57). To be able to preserve or create memories, it is necessary to also forget certain things. It is an active process, where what is seen as important or valuable should remain. To remember everything would be overwhelming, if not impossible, so what we regard as insignificant needs to be forgotten. It creates a manageable room, both for the individual and the collective memory. Heritage is also a reflection of how we view ourselves today. It is not only a question of masterplans and the tourism industry but has symbolic and political meaning. The past seems to be adapted and modified by present demands, where the creative side of culture and tradition plays a crucial role in facilitating and maintaining the process of symbolic construction (Park and Stephenson 2007). Property is fixed, possessed, controlled by its owner, and alienable. A monument can symbolize victory and a grand past, and for others a history of suppression.

---

\(^1\) The understanding of heritage has been mentioned on TRANS-URBAN-EU-CHINA project deliverable “D1.1 Report, including good practice examples in Europe and China, derived from the knowledge base” which is available on http://transurbaneuchina.eu/fileadmin/user_upload/tuec/files/Deliverables/TRANS-URBAN-EU-CHINA_D1.1_POLITO__20190129_V4.0.pdf (accessed on 26 April 2021).
Horizon 2020 TRANS-URBAN-EU-CHINA aims to answer the question of how to create socially integrative cities in an environmentally friendly and financially viable way.\textsuperscript{2} Underpinning that aim, this article is going to adapt a comparative approach using two different cases: the first is a working-class area in Norway that has been reshaped by the process of gentrification. The second is a historic district in China dominated by an ethnic minority, the Hui Chinese. These areas are experiencing different forms of transition, related to old roots and definitions of identity. Despite the obvious differences between these two cases they have also experienced some interesting similarities in the last decades.

The historic district, as a type of cultural heritage, has been labeled as the target of urban regeneration projects with the aim of upgrading the urban infrastructure and fulfilling the new demands of modern urban life. Underpinning that aim, via a series of urban regeneration projects, could change the urban structure. The area where the most urban regeneration projects take place is the old town of the city; therefore, they are likely to be listed. As a result, urban regeneration projects will have a considerable impact both on the physical environment in historic districts and on the residents who live in the district. This article has analyzed two urban regeneration cases in the historic district: Bakklandet district in Trondheim Norway and Drum Tower district in Xi’an China. The analysis of those two cases displays the impacts of urban regeneration on the historical district as a way to uncover the key role local community plays in the transformation of their district, which is triggered by urban regeneration projects.

The objective of the article is to discuss the impacts of urban regeneration projects on historical districts, especially the role local inhabitants play in the process. In order to cope with that research question, the researchers selected two case studies Bakklandet district in Trondheim Norway and Drum Tower district in Xi’an China. We compared the pathway of urban transformation caused by urban regeneration projects. The cases were selected for two reasons: one, this research is under the framework of Horizon 2020 TRANS-URBAN-EU-CHINA, which identifies the research scope as between Europe and China, and two, the selected cases are easy to access, which allowed the research team to collect data and conduct fieldwork within a limited time and on a budget. The research team is from the Norwegian University of Science and Technology (NTNU) and its campus is located in Trondheim Norway, where Bakklandet District is located. The NTNU research team had several research projects in Drum Tower historical district in Xi’an, which built a solid foundation to conduct a comparison study with the case in Norway. During the study, data

\textsuperscript{2} The research objective of TRANS-URBAN-EU-CHINA is reflected in the project description on http://transurbaneuchina.eu/project/about-project/ (accessed on 26 April 2021).
collection was divided into two parts: part one was gathering the historical materials from existing research and literature, and part two was the fieldwork during which participatory observation was the main method to collect data.

2. Urban Regeneration in Historic Districts: Theoretical Argument and Research Method

Historical districts are the manifesto of the past with the rich historical information. However, with outdated infrastructure and living spaces of pre-modern society, historical districts cannot meet the standards of daily life nowadays. Furthermore, they do not support the functioning of a modern city. Hence historical districts are the inevitable targets of urban regeneration.

Sometimes the regeneration activities in the historical districts are initiated by the local community, is a self-organized activity that can bring small modifications to the neighborhood. Due to the lack of control, self-organized urban regeneration can sometimes cause damage to historical values. Sometimes the municipality makes plans for urban regeneration in historical districts, which will usually be large upgrades to the neighborhoods in order to let the old areas of the city connect to modern urban infrastructure and services. Government-dominated upgrades in historical districts can increase the livability, which enables the local neighborhoods in those areas to share the results of the urban development and narrow the gap of living standards between old and new neighborhoods. In the meantime, this type of urban regeneration can balance the protection of historical values and the modernization of the neighborhoods, which also bring new activities, improve the built environment quality in historic districts and keep the district competitive in the urban fabric. However, sometimes top-down urban regeneration in historical districts only pays attention to upgrading the physical built environment, with less attention to the local community who are the carriers of social memory of this place and the intangible heritage in the neighborhood. In some cases, after the government-oriented urban regeneration plan, the original residents of the neighborhoods in this area are replaced by new higher-income residents, or, in extreme case, habitation is eliminated after the urban regeneration and replaced by profitable commercial activities, which will eventually decrease the heritage values of the historical districts.

The people-centered conservation and regeneration approach aims to avoid the shortcomings of the above two methods for urban regeneration in historical neighborhoods. The key of this approach is the involvement and designated roles of the original community, local authority, real estate developers and conservationists in the process of urban regeneration.

In the operation phase, the policy should ensure that multiple stakeholders can be involved and play an important role in the entire process of conservation and regeneration projects in the historical districts. Additionally, the methods for effective
teamwork of multiple stakeholders in this process should be in position and a team of specialists, to act as icebreakers and teamwork facilitators, should be assembled. Furthermore, monitoring the project performance and post-project evaluation also requires the feedback of all stakeholders.

The two selected cases in this research are historic towns with local inhabitants and the impacts of tourism on local development are considerable. However, the method of intervention of historic districts and the process of the decision making were different, which caused different chain reactions and pathways of evolution in the two cases. That can be identified as two typical development methods in the historical district. Therefore, this research explores those two cases and initiates a comparative study via a review of its process of development in relation to tourism business and the role of the local community. Through the comparison, the paper aims to uncover how important local inhabitants can be in the process of regeneration.

3. Bakklandet: A Norwegian Example

Bakklandet is a historic district in the city of Trondheim Norway. It is located on the east side of the Nidelva River and the Old Town Bridge. Bakklandet is a neighborhood with a built environment of traditional wood buildings in a narrow street. By the early 1600s, the center of Trondheim had grown, and the city needed to expand. As a result of this, Bakklandet, laying on the other side of the river encircling the city center, became Trondheim’s first suburb. Bakklandet soon developed into a bustling trading place, with small factories and workshops. The venues and residential buildings followed and, unregulated as the area was, streets and houses were built where there was natural space. It was mostly fishermen, craftsmen and workers who settled in the district. The houses were small and simple. In the 1960s the district was threatened with remediation. A new route through Trondheim was planned and it was decided that the Bakklandet settlement had to be removed. There was however great commitment to preserve the old settlement, and enthusiasts were at the forefront of the struggle against the municipality. Their involvement did not lead to immediate victory, but the municipality has never completed its plans. From the 1970s, the settlement was restored and Bakklandet is today an idyllic district. It is a popular place for tourists, as well as locals to visit, with its many restaurants and coffee shops. The struggle for conservation proved to be vital and today the municipality’s plans seem unreal. Regardless of political color, all Trondheimers are

______________

3 The result of this case study was submitted as TRANS-URBAN-EU-CHINA project deliverable D1.1 Report, including good practice examples in Europe and China, derived from the knowledge base, available on http://transurbaneuchina.eu/fileadmin/user_upload/tuec/files/Deliverables/TRANS-URBAN-EU-CHINA_D1.1_POLITO_20190129_V4.0.pdf (accessed on 26 April 2021).
proud of this district and it is something they gladly show visitors (Bakklandet.info 2011).

In the 1960s, there was widespread consensus that the old wooden quarters of the city needed to be renewed—and that the old wooden houses should be replaced by modern buildings that were, both economically and functionally, better suited to the demands made by modern society. This modernization project reflected a hegemonic understanding of the city as an economic arena adapted to a modern, capitalist economy. As an important measure, Trondheim drew up a masterplan for the city’s development and management of land use, presented as a first draft in 1965, which prepared the ground for the demolition of the historical city center of Trondheim. Trondheim municipality had, since the early 1950s, plans to turn Bakklandet into an efficient road system for the city. The municipality was largely ruled by Labour and Conservatives in this period. The Labour party’s post-war reconstruction efforts were carried out in the sixties, with modernization and facilitation for increased prosperity as a leading principle. With these good intentions, it was also understood that something had to be sacrificed on the altar of progress. The conservation, however, was quite remote, and those who claimed otherwise were seen as sand in the machinery. The Labour party received support from the Conservatives and the city council coordinated well. There was no room for preservation; Trondheim should modernize and adapt to the rapid development of the world. A common opinion among politicians and the people of Trondheim was that the area should be demolished.

In the 1970s people started to react and mobilize against the municipality’s plans. The conservationists were often residents, associates, and enthusiasts. They received support from the SUFs (Sosialistisk Ungdomsforbund), a youth party on the outer left, known for being political activists. The first organized initiative to take care of the district came from the “Environmental Group on Bakklandet” in 1971. The environmental group was the precursor of Bakklandet and Lillegårdsbakkens Velforening, a residents’ association for the area. Their goal was to preserve Bakklandet as a residential area. Many in the area lived in quite dilapidated houses but the cost of living was affordable. Students also took part in the conservation idea, although they lived there only for limited periods. An important step towards demolition was to convince local owners to sell their houses to the municipality. Many were convinced and since these houses were left empty with no maintenance, the area got rapidly worse. Occupation of these houses was used as a counteraction. The residents’ association took the initiative to move people into the empty houses to prevent further decay. Architects from the university made an alternative masterplan proposing a zoning plan that would preserve Bakklandet as a residential area. In addition, relentless action of squatting, petitioning, theme concerts, and “walk-slowly” civil disobedience actions were arranged. In the end, protesters won and the plans
were not enforced. Property that had been expropriated or bought from locals was sold to private people (Figure 1).

Figure 1. Illustration by Arvid Sveen. Source: Kontrast 40/1973, used with permission.

Today, Bakklandet appears as an idyllic district and with favorable living conditions. It has become one of the city’s most important tourist attractions and is known far beyond the country’s borders. Trondheim tree houses are now considered some of the most important in Europe. The goal of the activists was reached, but with one drawback; today, Bakklandet is so attractive that housing prices have shot up, thus excluding many from living there. A large part of the original population moved to new suburbs, and people with higher levels of education and income moved in. Bakklandet has experienced a gentrification process—saving the built environment but changing the everyday life and culture.
4. Xi’an Bei Yuan Men Historic District: The Muslim District

The Muslim district in Xi’an, China, is situated in the middle of the city center, north of the Drum Tower. A majority of the population are Hui Chinese, descendants of traders from the Middle East traveling to China along the Silk Road from the seventh century, during the Tang dynasty. Through generations of cohabitation and intermarriages with Han Chinese, many have adopted Chinese traditions and the lifestyle. Today approximately 32,000 Hui reside in the area.

Entering the Muslim district from the broad and busy streets of downtown Xi’an is like coming to a different world. The streets are narrow, and the houses are mostly one or two storeys, in a Ming or Qing-dynasty style. Here the pedestrians compete for the right of way with both cars and tricycles. The pavements are filled with chargrills filled with food for sale and souvenir shops displaying their goods. It is noisy and smoky, narrow and crowded. The dimensions of the streets and height of the houses provide a warm and interesting atmosphere. The houses are built in the local traditional courtyard style, identical to the Han Chinese style. Most of them are relatively narrow towards the front, but can be deep, varying from one to four courtyards. Doing business has been the main profession for the Hui. This is reflected in the traditional organization of the courtyard houses. The production for the extended family’s business took place in the backyard. The middle part was reserved for the living accommodation, hierarchically structured with the oldest generation occupying the rooms in the middle towards the back. Sons with families lived in the side rooms. The front part was reserved for the shop, selling the family’s production. This kind of “production line” is becoming less common (Figure 2).

---

4 The result of this case study was submitted to TRANS-URBAN-EU-CHINA project deliverable D1.1 Report, including good practice examples in Europe and China, derived from the knowledge base, available on http://transurbaneuchina.eu/fileadmin/user_upload/tuec/files/Deliverables/TRANS-URBAN-EU-CHINA_D1.1_POLITO__20190129_V4.0.pdf (accessed on 26 April 2021).
Today, Bakklandet appears as an idyllic district and with favorable living conditions. It has become one of the city’s most important tourist attractions and is known far beyond the country’s borders. Trondheim tree houses are now considered some of the most important in Europe. The goal of the activists was reached, but with one drawback; today, Bakklandet is so attractive that housing prices have shot up, thus excluding many from living there. A large part of the original population moved to new suburbs, and people with higher levels of education and income moved in. Bakklandet has experienced a gentrification process—saving the built environment but changing the everyday life and culture.

4. Xi’an Bei Yuan Men Historic District: The Muslim District

The Muslim district in Xi’an, China, is situated in the middle of the city center, north of the Drum Tower. A majority of the population are Hui Chinese, descendants of traders from the Middle East traveling to China along the Silk Road from the seventh century, during the Tang dynasty. Through generations of cohabitation and intermarriages with Han Chinese, many have adopted Chinese traditions and the lifestyle. Today approximately 32,000 Hui reside in the area.

Entering the Muslim district from the broad and busy streets of downtown Xi’an is like coming to a different world. The streets are narrow, and the houses are mostly one or two storeys, in a Ming or Qing-dynasty style. Here the pedestrians compete for the right of way with both cars and tricycles. The pavements are filled with chargrills filled with food for sale and souvenir shops displaying their goods. It is noisy and smoky, narrow and crowded. The dimensions of the streets and height of the houses provide a warm and interesting atmosphere. The houses are built in the local traditional courtyard style, identical to the Han Chinese style. Most of them are relatively narrow towards the front, but can be deep, varying from one to four courtyards. Doing business has been the main profession for the Hui. This is reflected in the traditional organization of the courtyard houses. The production for the extended family’s business took place in the backyard. The middle part was reserved for the living accommodation, hierarchically structured with the oldest generation occupying the rooms in the middle towards the back. Sons with families lived in the side rooms. The front part was reserved for the shop, selling the family’s production. This kind of “production line” is becoming less common (Figure 2).

Figure 2. Muslim district in Xi’an. Credit: © Lisbet Sauarlia.

Another change in this area is the introduction of chain restaurants. They are introducing a new style and layout that is in harsh contrast to the traditional style. Some shops and restaurants are also going deeper into the courtyard than before, some all the way, breaking the tradition with house owner living and doing business in the same dwelling. Locals with the financial capacity have chosen to move out to new, more modern apartments in the suburbs.

The practice that all sons inherit means that more people are entitled to a share of the courtyard house. This creates serious pressure on space. The traditional system with extended families is splitting up into nuclear units. Several floors are added on to what used to be a one or two-story wooden housing area. Inside the courtyards there are aluminum gates, protecting each nuclear family’s privacy. Many also choose to rearrange their houses so they can rent out rooms to migrant workers. Wooden structures are replaced by concrete. The result is added indoor space and more apartments for families. Indoor bathrooms and kitchens make life more convenient. It does, however, also create smaller, darker outdoor space with no room for common activities and very little ventilation. This creates safety issues by making access for emergency services difficult (Sauarlia 2013).

This lack of common space will most likely affect the everyday life of a family. From being extended families, with shared social and economic life, there is now no room for common activities. Jean Paul Loubes described the same, but with reference to the Xi’an Muslim community at large. “Public space is the place for public facilities, services and functions. It is the place of expression of collective life
in its social, economic dimensions. Public space is the place of collective memory. It allows the access, practice, preservation of the monuments in a city, which are the common historical and cultural heritages of the group” (Loubes 1997, p. 97).

The mosques in the area can be described as living monuments. Most of them are built in the traditional Chinese temple style, with open courtyards divided by gates. There are about 10 mosques inside the district, the most famous being the Great Mosque, built during the Tang Dynasty. It is also the biggest, with five courtyards. In 1956 it was protected by the Historical and Cultural Site Protection at the Shaanxi Province Level, and in 1988 put on the list of Major Historical and Cultural Sites Protected at the National Level. It is a busy mosque with Muslims coming for their daily prayers, domestic and international tourists visiting, and children playing.

In a globalized world and a long-open China, the Arabic cultural influence on people is getting stronger. For example, more and more people are wearing clothes that signal their religious and ethnic background. As pointed out earlier, the layout of the houses is in traditional Chinese style, but there will be markers identifying their background. This can be, for example, a picture of Mecca or Chinese characters with Arabic style on the wall.

The building regulations for the area are not always followed. One is the heights of the buildings. Especially around the monuments, houses should not exceed a certain height. It is meant as a buffer zone to protect the monuments. Additionally, the permitted number of floors outside the buffer zone is not always followed. New architectural styles and materials are introduced, breaking with the tradition. Loubes claims, “There is a new urban scenery: arches incorporated in the design of windows and doors, vaults, and cupolas. These signs clearly manifest that one is in an Islamic space” (2013, p. 97). The traditional Chinese tiled roofs are replaced by flat roofs with terraces, giving a different expression. In 1982 Xi’an was on the national list of famous historical and cultural cities, and the Muslim district marked as one of two protected zones. Different attempts by the government to modernize and preserve certain part have not been successful due to the local inhabitants’ engagement (Akavarapu 2019). It has been a bottom-up process, resulting in regulations not being followed. Loubes (2013) goes as far as to claim there is a lack of building regulations resulting in a new and vernacular architecture.

5. Conclusions

Two very different cases have been presented here, but with some clear similarities. They are both historic districts, what we can call lived-in-heritage. Local engagement has been essential for turning them into what they are today. Civil actions and negotiation with a government agency have had a vital impact on the development. Both areas have become popular to visit, both for locals and
tourists—the Muslim district by offering exotic food and atmosphere, and Bakklandet by being an idyllic area with coffee shops and restaurants.

Both areas have experienced significant transformations, in terms of tangible and intangible culture. For Bakklandet, the transformation can be described as a process of gentrification. Many of the original inhabitants had to move out to rowhouses or apartment blocks in the suburbs after the municipality took over their homes. The civil actions against the municipality’s plan to demolish and turn the area into a four-lane motorway were led mostly by resourceful people, with high education and/or economical status. When the municipality finally turned, they sold the houses they had expropriated to private persons. In the new zoning plan, it was even decided that Bakklandet was now to be considered cultural heritage and that any changes to the built environment had to be approved by the Cultural Heritage Management Office (Kittang 2014). Even though the houses are small, and there are severe restrictions regarding what an owner can do with the house, Bakklandet is a popular area, something that is reflected in high property prices.

The Muslim district has also experienced expropriation of properties due to the government’s plans to modernize and upgrade some areas, and people have been forced to move out despite protests from local inhabitants. Even so, most of the owners are the same and have inherited the property from the previous generation. There are however some wealthy locals who have chosen to buy apartments in the suburb. This is similar to what happened in Bakklandet, but whilst this is seen as a step up and an improvement in life in Xi’an, in Trondheim it is regarded as a loss, and was something that first happened to the working class that used to live there. The suburbs are not as attractive as the center. Whilst property prices on Bakklandet have gone drastically up, the Muslim district can offer cheap accommodation, especially for migrants working in the area.

As described above, the Muslim district was appointed as an area of historic value at an early stage. The narrow roads and the wooden courtyard houses surrounding The Great Mosque are of historic interest and of vital importance for the Hui population’s identity and everyday lives. However, regulations are not followed and vernacular architecture is threatening the area as a historic district. Additionally, new symbols are added, emphasizing the roots of the Hui as Muslims descending from the Middle East. New identity markers are created, based on an interpretation of the past.

The transformation in Bakklandet and the Xi’an Muslim district showcases that community plays an important role. Community building in urban transition is a key element for preserving the value of historical districts (neighborhoods). In the case from Norway, when facing the municipality’s transition plan to Bakklandet in the 1970s citizens of Trondheim initiated a series of actions against the original local government plan and forced the municipality to change the idea of turning
a historical neighborhood into a freeway passage. Those activities redefined the neighborhood and enabled community building. The case from Xi’an demonstrated how traditional life rituals and Hui religion empowered the community, which allowed the local inhabitants to unite and raise their voices, and eventually forced the local municipality to change its regeneration plan in their district. Additionally, the local community of the Muslim district adapted to new livelihoods and transformed its nationhood into a popular tourist attraction. Those two cases display the importance of involving all relevant stakeholders and identifying their roles in the process of urban transition, which is one precondition to leading a sustainable socially inclusive urban transition. Both cases exhibited that the government administration-dominated exclusive transition plans in this article, the freeway plan in Bakklandet and the urban regeneration plan in the Muslim district in Xi’an, may receive resistance from the local community. Heritage in a socially inclusive city is the place to keep the joint memory and show our reaction and interpretation to the past, which helps us reshape identification of ourselves. Through the two cases this article exposed, it is clear that urban transition in a historical district and neighborhood is a delicate and complex process. The two cases cannot be labeled as a model for creating a sustainable socially inclusive city transition pathway, i.e., Bakklandet has become a standard product of gentrification with the original inhabitants absent in this area. Additionally, in the Muslim district in Xi’an, the new livelihood and multi-generation gathered in a space that used to be only for one family has released serious negative impacts on the physical living environment, which has devalued the tangible heritage in this area.

The challenges to balancing the regeneration of the quality of living and safeguarding the value of the heritage is substantial. As a living space, ancient residential buildings provide limited functions and mismatch the comfortability to modern lifestyle, which is one of the reasons to upgrade the historical neighborhood. Meanwhile, the authenticity as a principle of heritage conservation demands the urban regeneration in historical districts interfere minimally with the historical buildings in order to maintain the historical information. Our suggestion to overcome the challenges is to host a series of debates and workshops between experts (conservationists) and local inhabitants to identify the scope of the projects, which can balance conservation and fulfill the requirements for upgrading the living condition.

The movement of regeneration in the historical district might harm the original inhabitants and force them to move out of their houses. The people-centered approach can make sure the original local community is involved in the process of urban regeneration. However, it still has the risk of letting the local community choose to move out of their neighborhoods. The upgraded infrastructure and improved living quality after the urban regeneration increased the cost of living, resulting in some original residents, especially low-income families, moving out of their neighborhood.
The urban regeneration also increased the values of land and buildings as real estate products, which let residents sell their houses when the upgrades are finished in order to improve the living condition. In order to avoid this situation, a cost-benefit analysis can be performed for the local inhabitants to predict the consequences of the regeneration process in their neighborhood, especially from the economic perspective. Based on the analysis, a regeneration plan in historical neighborhoods should support low-income inhabitants, not only to liberate the historical physical living environment but also the local inhabitants who, as the intangible heritage enablers, wish to remain in their own neighborhood.

The past living culture and prevailing lifestyle might be disconnected. With less support than modern urban infrastructure, for instance lack of tap water supply, gas pipe and district heating, the local community retains traditional daily activities, for example getting water from well and cooking and getting heat from the stove, which generated living culture and custom. Those traditional daily activities are disrupted when modern infrastructure is introduced to the neighborhoods. Additionally, living culture and custom are generally a vague joint social memory. In order to avoid the situation, detailed documentation of those activities is required and the proper demonstration and presentation of those activities after the regeneration will help maintain the social memory.

The cultural heritage showcase in the regenerated area and heritage-based commercial behavior might interfere and conflict with the high quality of the living environment. The privacy of living will be interrupted by the tourism in historical districts as well as the joint social life in the community. The feeling of intimacy from joint community activities will be decreased if those community activities continue to be a showcase for the tourists.

Author Contributions: Conceptualization, L.S. and Y.W.; methodology, L.S. and Y.W.; investigation, L.S. and Y.W.; resources, L.S. and Y.W.; data curation, L.S. and Y.W.; writing—original draft preparation, L.S. and Y.W.; writing—review and editing, L.S. and Y.W. Both authors have read and agreed to the published version of the manuscript.

Funding: This research received funding from European Union’s Horizon 2020 research and innovation program under grant agreement No. 770141.

Conflicts of Interest: The authors declare no conflict of interest.

References


© 2021 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (http://creativecommons.org/licenses/by/4.0/).