City ports as a place for iconic architecture and the meeting point for sustainable ideas: the cases of Antwerp and Hamburg

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Abstract. This article focuses on sustainable development practices used by two major European ports, Antwerp (Belgium) and Hamburg (Germany). The main idea of this research is to analyze which sustainable projects are included in the ports’ activities. One of the main assumptions relies on the possibility of iconic architecture to promote sustainable ideas through city branding. Thus, special attention is given to how iconic buildings construct the connection between can facilitate city branding through sustainable solutions. Urban landmarks are considered an instrument of city branding and a tool for promoting sustainable solutions. The Hamburg Port case and its iconic building, the Elb Philharmonie, and the Antwerp Port case and its iconic building, the Port Authority Building, are analyzed. Keywords: iconic architecture, sustainability, city port, urban landmark, urban development, city branding

1 Introduction

What is it possible to say today about sustainability? How do cities, their institutions, and main actors contribute to sustainable development? Which instruments, technologies, or strategies affect the most to become sustainable?

Growing global attention to sustainable issues, the complexity of public-private interactions and new technologies emphasize the need to change and adopt new management techniques and policies for small, medium or large companies, governmental institutions and global corporations. It can also concern the variety of environmental solutions, the application of new economic models or the emphasis on social solidarity and preserving cultural values. Talking about city ports, it is necessary to mention not only efficient management instruments but also the potential contribution to social and environmental concerns. In these circumstances, the port authorities receive the new role of community managers that regulate, foster and promote communication between stakeholders [1]. In these

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circumstances, sustainability reporting as a public articulation of sustainable contribution facilitates the communication of companies’ performance in social and environmental solutions.

The global flow of people, finances and information involves different areas of human life to compete and interact, including the area of architecture, urban design and development. Cities aim to contribute to global competition, in particular by branding territories through worldwide known agendas and social actors. Some of them pretend to become a part of a global village, others promote local identity and unique historic or cultural heritage [2].

The examples of iconic architecture and star architects are considered habitual in the discourse of urban development and renovation. It is an efficient way to reconsider urban spaces, bring new life to certain urban areas and attract the attention of city administration, locals or tourists to the potential of the territory. Moreover, the accumulation of experience, knowledge and reputation forces cooperation and branding power as far as iconic buildings are understood as a crucial part of the area and all together they define and transmit common values.

Furthermore, it is also possible to consider such iconic buildings as a symbol or even a manifestation that transmits sustainable ideas. These ideas can concern environmental issues, technological approaches to design and building, economic profits from the use of sustainable materials or cultural sustainability expressed in reconsidering or redesigning urban or cultural heritage. By attracting attention to themselves, such iconic buildings can captivate the existing problems and offer solutions.

This article gives a perspective on sustainability issues through the activities of European ports and their iconic architecture. Moreover, it opens the discussion on how it is possible to combine and benefit from sustainable practices and iconic architecture in the concrete area. For instance, in the way of preserving heritage and reconstructing historical objects to transmit new symbols, messages and functions to the building and its physical environment. Additionally, it is necessary to mention the transmission of common values that can be defined through sustainable discussion and promoted through iconic architecture expressed in design as well as new functions or meanings for the area.

2 Methods

One of the ideas used for urban development and renovation is the transformation of former industrial or heritage buildings in major urban landmarks. In these terms, any disused or abandoned building instead of being just destroyed can receive new designs, meanings or functions. This practice also concerns entire industrial zones and areas. In particular, some of such projects become worldwide famous through the work of star architects (e.g., Le Corbusier, Zaha Hadid, Rem Koolhaas, Herzog & De Meuron). In modern conditions, star architects with a particular “signature” design and recognizable forms quite often are defined as a brand itself.

Furthermore, it is possible to apply this method for city branding and place marketing. Firstly, any urban area can benefit from urban renovation, in particular by preserving urban heritage. It is possible by placing iconic architecture and defining new urban landmarks and, thus, locating symbolic capital [3]. Secondly, iconic architecture is a 21st-century trend that replaced modernist architecture and expresses symbolic meaning or messages worldwide [4]. Thirdly, by developing and promoting an urban renovation project, by highlighting the contribution of prominent architectural bureaus or urban planners it is easier to attract financial or informational support to the location [5]. Finally, such urban landmarks usually become a point of tourism attraction. They create attractive tourist spots in a city, define new tourist routes and even change the prices in the residential and commercial real estate contexts [6; 7].
In other words, iconic architecture deals with urban heritage and in a positive perspective develops new urban landmarks; in a negative perspective, there is always a probability to harm the originality or significant design structures of renovated buildings [8; 9]. Additionally, there is a very complicated issue with the historical areas and urban heritage preservation. To achieve harmony and balance between old and new, it is necessary to deal with international preservation standards, local identity, local communities and local authorities’ demands. Last but not least, it is significant to consider and re-imagine the general urban context where a potential urban landmark is situated.

Moreover, as some scholars denote, heritage or conservation-led regeneration today can be associated not only with social and economic urban development but also with a sustainable agenda [10; 11]. The inclusion of a sustainable agenda in the modern understanding of urban development and renovation is a crucial part of urban planners, architects and city administration. It can concern various environmental, economic, cultural, and social contexts such as energy and water efficiency, resilience, light and air pollution, and materials life cycle impact. Adaptive reuse includes structural redesign and functional reconsideration that can be also reflected in some social or economic profits (tourists flow, local business development, working places etc.) [12; 13]. Additionally, the general idea to preserve and protect in the present the heritage of the past responds to the definition of sustainability to pass down the symbols and ideas of one generation to another.

The focus in this paper is given to such urban areas as major city ports that work as city main entrances and can potentially place and promote sustainable solutions. Firstly, a port can be understood as a trading place in a city, an urban landmark for a community that implements some sustainable ideas. Secondly, a port can act as a symbolic place, in particular, if talking about iconic buildings and star architecture as well as urban heritage regeneration. Thirdly, a port can participate in city branding, in particular by promoting applied sustainable solutions or incentives. It is assumed that the circular economy model is applied through spatial territorial dimension. Therefore, a city port by strengthening the resources (built environment, cultural heritage, energy and mobility, waste management, water management, industrial production, circular design, citizens and communities) can promote a strategy for implementation of the circular city model in historic cities [14].

In particular, this paper is oriented on iconic buildings in ports that can embody the above-mentioned ideas of city branding, sustainability and urban heritage preservation [15; 16]. By incorporating cultural and aesthetic meanings, these buildings become a source of financial investments and new tourism destinations. Furthermore, they can become world-known iconic manifestations of the city’s political, social, and economic strategies.

3 Results

The main goal of this paper is to consider the implemented initiatives by Antwerp and Hamburg ports towards sustainability and then reconsider their iconic buildings, the Port Authority building in Antwerp and Elb Philharmonie in Hamburg. These buildings are not declared as primarily representing the use of sustainable solutions but can become symbols of sustainable changes.

Both ports participate in the World Port Sustainability Program [17], which units global leadership initiatives among ports worldwide that contribute to sustainable development projects and solutions. This program aims to empower the port community actors to promote and support efficient communication between businesses, governments and other stakeholders for reaching sustainable goals. The program itself has six main priorities to focus on digitalization, infrastructure, health safety and security, environmental care, community building, climate and energy.
Such initiatives as dealing with smart and sustainable logistics [18; 19] or environmental footprint [20; 21] not only foster the implementation of sustainable solutions but also positively affect green port marketing [22]. Moreover, the role of stakeholder communities can affect the use of different techniques, programs or solutions: by sharing common values in a community it is possible to achieve common sustainable goals [23; 24].

3.1 The Hamburg port, Germany

Hamburg is the second largest city in Germany with a population of over 1.85 million inhabitants. The Hamburg port is the largest seaport in Germany and the third largest in Europe [25]. The port area where the city port is its core is called HafenCity; it had several phases of urban development and renovation, as consequences of the great fire, war destruction and general economic transformation of the district [26]. The whole neighbourhood area of HafenCity today includes industrial (maritime industry as shipping companies, logistical services, certification and consulting firms as well as small local service providers, national and international companies), commercial (retailers, catering, design, media and cultural industries) and residential zones; there are various public urban spaces, too. On the one hand, it is possible to talk about HafenCity's local identity through its international importance as a city port with specific urban culture, urban design and residential use.

On the other hand, it is necessary to include in the local identity the sustainable agenda of Hamburg Port. By reconsidering technological actions with the main focus on energy efficiency, sustainable buildings, and intelligent transport systems with optimized emissions, Hamburg Port aims to improve ecological aspects [27]. In the sustainability report, the Hamburg Port Authority defines key indicators for business performance by implementing sustainable initiatives and the importance of having a dialogue with main stakeholders [28].

The projects on environmental care imply Sustainable Development Goal 12 “Responsible Consumption and Production”. For instance, the “SeaClear project” develops an efficient, cost-effective, and innovative solution for marine litter that leads to ocean pollution; the “Hamburg Sustainable Fleet” project aims to reduce air pollution and positively work on climate protection and develops an environmental protection strategy. Another project, “Onshore Power Supply” aims to reduce air pollution by supplementing CO2-neutral electricity from the public power grid.

Its digitalization projects include, firstly, the initiatives to use innovative digital technologies for more efficient and intelligent port infrastructure management and optimisation (“Virtual Reality for model-based port infrastructure management” and “Secure Truck Parking”). Secondly, it concerns the use of 5G mobile connectivity that offers new fields of applications and services (“5G-MoNArch”). These projects support Sustainable Development Goals 8 “Decent Work and Economic Growth” and 9 “Industry, Innovation and Infrastructure”.

Furthermore, there are some projects to improve the existing or build new sustainable infrastructure to contribute to the Sustainable Development Goals 8 “Decent Work and Economic Growth” and 9 “Industry, Innovation and Infrastructure”. Thus, “smartBRIDGE Hamburg” collects real-time digital data for structural diagnosis and monitoring that increases infrastructure life cycles and operational efficiency.

Finally, there are the initiatives to build a community that responds to the Sustainable Development Goals 4 “Quality Education” and 11 “Sustainable Cities and Communities”. For instance, the “homePORT” project as a maritime real laboratory offers meeting space for innovative co-design ideas, citizen participation, port actors, research institutions, and start-ups.
In other words, in Hamburg port, there are enough environmental, innovative and technological as well as social initiatives to support a sustainable development agenda.

3.2 Elb Philarmonie (Hamburg)

This concert hall was built in the HafenCity quarter of Hamburg, on the Grasbrook peninsula of the Elbe River, in the direct neighbourhood of the historical district Speicherstadt. The construction period of this among the largest in the world buildings lasted from 2007 to 2016 and the project cost raised from an estimated €241 million to €866 million. In 2018, TIME magazine ranked the Elb Philarmonie among “World’s Greatest Places 2018” from among 1200 candidate places [29].

This project is defined as a key project of the new Hafencity urban development. Moreover, it is represented as an iconic building with ambitious design goals that represent a hoisted sail, water wave, iceberg or quartz crystal resting on the top of an old brick warehouse [30]. The project was developed by the Swiss architectural bureau “Herzog & de Meuron”. Such iconic building affects the social positioning and urban identity of a city and brings to the city new functions as chamber music hall, restaurants, bars, a panorama terrace etc. [31].

The main idea of the project was to combine old and new as an example of cultural heritage adaptive reuse. This idea can be considered sustainable in the context of preserving the old and rebuilding it into new modern forms and designs. Thus, the original brick façade, a former tea and cocoa warehouse Kaispeicher A (built in 1963), stays as a building base and is combined with a glass superstructure and wavy rooftop [32]. With 26 floors it reaches its highest point at 108 metres; from the 8th floor, the Plaza, the public can observe the views of Hamburg.

It was projected as a cultural centre with three concert venues for organ music, chamber music and jazz concerts. Moreover, this building hosts a hotel with 244 rooms, and 45 luxury apartments and offers spaces for educational events, conference rooms, restaurants, bars, and a spa.

This iconic building annually attracts tourists from all over the world. Some of them come to explore the design, the architectural forms, and the pieces of art of star architects; others aim to visit the concert, rent a room or book a table with a panoramic view in the restaurant there. In this way, the iconic building plays a central role in city branding, the tourism industry and the city economy; besides, it functions as an urban landmark that can transmit specific ideas, values and attitudes, including the sustainable agenda.

3.3 The Antwerp port, Belgium

Antwerp is the second largest Belgium city with around 1.2 million inhabitants. The Antwerp port is the second largest port in Europe after Rotterdam and the largest integrated (petro)chemical cluster in Europe. Its integration with the city benefits in social and economic matters [33]. The port authorities declare their interest in working towards sustainable development by fostering green port policies [34], green supply chain management [35] and creating fruitful cooperation between people and the environment [36]. As some scholars denote, the declaration of sustainable development goals and integrative thinking have a cumulative effect on implementing and deepening the integration of sustainable solutions [37; 38].

Its climate and energy projects that primarily contribute the Sustainable Development Goal 7 “Affordable and Clean Energy” include the initiatives of the installation of solar panels on the roofs of the warehouses (“North Sea Port – Solar Park”) and the use of hydropower as green energy projects (“Hydro turbine”). The contribution to the health safety
and security issues that are primarily connected to Sustainable Development Goal 3 “Good Health and Well-Being” consists of the following projects: public and private fire services in communication that decreases general costs (“Network of Fire Services”); security network as a collaborative arrangement between companies in the Antwerp port area and the local authorities that provides more efficient information exchange (“PIN Project”). Moreover, to protect the workers, the program “Wearable device program” has been developed: digital devices for lone workers, confined spaces, testing and man overboard help to immediately react to unexpected situations and better control life safety at the port areas.

Furthermore, various projects relate to environmental care and contribute primarily to the Sustainable Development Goals 6 “Clean Water and Sanitation”, 9 “Industry, Innovation and Infrastructure” and 13 “Climate Action”. For instance, Port Antwerp uses drones to control and detect oil spills in the port area (“Automated drones to prevent oil pollution”); besides, there is a multi-year program of greening and optimizing the port’s fleet for more environmental-friendly replacements (“Renewing, greening and optimizing the port’s fleet”).

There are some cumulative and collaborative sustainable initiatives, too. For instance, a project that aims to improve key performance data by the use of ICT tools (“PORTOPIA Project”); clean inland waterway transport in the consortium of 17 Dutch, Belgian, German and English public and private organizations (“CLINSH project”). Another project supports mercy ships that enter the Antwerp port with medical equipment and ICT installation (“Mercy Ships”). The collaborative project between Antwerp (Belgium), Aberdeen (Scotland), Constanta (Romania), Klaipeda (Lithuania) and Trieste (Italy) functions as living labs to support the multifunctional role of cities, ports and gateways and demonstrates sustainable mobility between different ports (“CIVITAS PORTIS”). Such collaborations additionally help to build more sustainable communities that incorporate the Sustainable Development Goal 17 “Partnerships for the Goals”.

In other words, the Antwerp port is also sustainably oriented and promotes different environmental, social, technological and collaborative projects that aim to support sustainable development goals.

### 3.4 Port Authority Building (Antwerp)

This government building was built between 2009 and 2016 and is located in the area of Eilandje, in the Port of Antwerp. It was designed by the Zaha Hadid Architects Bureau and acts as the new headquarters of the Antwerp Port Authority. The cost of construction was €55 million. Earlier, the Antwerp Port technical and administrative services and departments were located in different locations in the city; therefore, the project of the Port Authority Building aimed to unite these services and increase work efficiency. Additionally, the restored fire engine hall offers a public reading room and a library.

Today, the building hosts various departments and approximately 500 employees, it works as an international meeting point for the Antwerp port community. The Port of Antwerp is Europe's second-largest shipping port by traffic, handling 26% of Europe's container shipping. It serves about 16,000 ships a year; up to 400 ships can simultaneously moor in it.

The design also aims to combine old and new elements, to preserve the historic heritage and incorporate modern scope on it. The former fire station has a diamond-shaped structure with a glass façade. The extension that simultaneously symbolizes a brilliant (a reference to Antwerp as a city of diamonds) and the hull of a sailing ship (a reference to Antwerp as a port and a trade city) became an urban landmark to be seen from many urban spots around. It also reflects and sparkles the sky and water shades and colours. Even though the building is situated far from the main tourist attractions and seems to be lonely presented in an
industrial area of Antwerp, it regularly fascinates crowds of tourists. Additionally, the building was designed within the energy efficiency framework.

Like in Hamburg, many tourists in Antwerp aim to have a look at the Zaha Hadid building in the Antwerp port. As a tourism destination, this iconic building regularly attracts visitors and acts as one of the symbols of the city. In this way, the iconic building can perform some sustainable ideas, including environmental, economic, social or urban sustainability.

4 Discussion

The findings show that the concept of sustainability in such global structures as city ports is still in the process of institutionalizing and adapting to modern conditions. Some sustainable initiatives deserve the attention of the global audience. Furthermore, there are some programs and solutions that are already implemented in the work of both city ports in Hamburg and Antwerp. However, there is a lack of, firstly, a structural approach to implement such solutions; secondly, consistent informing and promoting of sustainable ideas locally and globally. In these conditions, the iconic buildings can play the role of organized structure that unit all the data, information, actors and stakeholders and creates an appropriate performance of sustainable activities.

Both iconic buildings, based in constructing on contrasts of new and old, are detached from the urban environment and their historical textures. Presented at the forefront of the areas, both iconic buildings, on the one hand, represent the brand of a place, increase its popularity, become urban landmarks and demonstrate the focus on sustainability. On the other hand, regarding the materials they are far from urban sustainability, however, both promote the preservation of physical space and historical settings and fulfil the modern demands.

This article didn’t aim to primarily compare two city ports and their iconic buildings; on the contrary, the main goal was to consider the variety of sustainable practices there and to analyze their potential to perform the general idea of sustainability through iconic architecture. The data below (Table 1) demonstrates the key characteristics of the iconic buildings in Hamburg and Antwerp. It is worth noting that city ports as main city entrances can increase sustainability engagement by better demonstrating implemented sustainable solutions. In these conditions, their iconic architecture can foster the popularization of sustainable ideas and create a more sustainable and positive image of the city port and the entire city.

Table 1. Comparison of iconic buildings in Hamburg and Antwerp

<table>
<thead>
<tr>
<th></th>
<th>Elb Philharmonie</th>
<th>Port Authority Building</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geography</td>
<td>Hamburg port, Germany</td>
<td>Antwerp port, Belgium</td>
</tr>
<tr>
<td>Year(s) of construction</td>
<td>2004-2017</td>
<td>2016</td>
</tr>
<tr>
<td>Total costs</td>
<td>€866 million</td>
<td>€55 million</td>
</tr>
<tr>
<td>Initiator</td>
<td>Private initiative, no architectural</td>
<td>Architectural competition</td>
</tr>
<tr>
<td></td>
<td>competition</td>
<td></td>
</tr>
<tr>
<td>Designer</td>
<td>Herzog &amp; de Meuron</td>
<td>Zaha Hadid Architects</td>
</tr>
</tbody>
</table>
Design

The combination of old and new: a former warehouse the Kaispeicher and the new modern extension on the top. The structural and decorative elements symbolize specific architectural characteristics; spectacular glass facade has various visual and symbolic elements to the city history and functions.

The combination of old and new: the former fire station and new modern glass extension. It is designed as a sustainable building. The new extension has completely different form, shape, scale, and material; the visual image has references to city functions, history and identity.

Function

Theaters & Performance

Public office

Location in a city

In the HafenCity quarter of Hamburg, on the Grasbrook peninsula of the Elbe River, in the direct neighbourhood of the historical district Speicherstadt. Very central and close to historic areas, former warehouse.

In the area of Eilandje, in the Port of Antwerp. Not so central to the main city attractions. Former trade center and a historic fire station from the sixteenth and seventeenth centuries.

Purpose of construction

To define new focus to the city, new public and entertainment spaces as concert halls, a hotel, a residential block, and a panoramic terrace; new city attraction.

To transform a former fire station from 1922 into a new government building.

Contribution

New urban landmark, new urban functions, new tourism attraction. It offers different services to the locals and tourists. It creates new visual image of the city based on the architectural contrasts. As an urban landmark, it can transmit different ideas, including the sustainable contribution of the port area.

New urban landmark, new urban functions, new tourism attraction. It offers different services to the locals and tourists. It creates new visual image of the city based on the architectural contrasts. Designed as a sustainable building, it has the power and resources to transmit sustainable ideas.

5 Conclusions

This article aimed to analyze sustainable practices at two European ports, Antwerp and Hamburg. The main focus was given to the concrete sustainable steps that each of them operates to join the sustainable agenda. Additionally, the iconic buildings of their ports were considered an instrument of city branding.

It is crucial today to combine different instruments to declare sustainable solutions and steps; it is significant to use, for instance, branding instruments (such as iconic buildings and star architects) to attract global attention, and this attention supports the discussion on the sustainability topic. Even though these iconic buildings in Antwerp and Hamburg are not considered primarily sustainable buildings or constructed mainly with sustainable technologies, they became significant city icons. They demonstrate in which ways it is possible to preserve urban heritage (by combining old and new); and how to attract global...
tourists to the iconic places and buildings through the works of star architects. As urban landmarks, they represent the two biggest European ports that themselves promote sustainable steps in their functioning.

Such a combination of environmental solutions (energy efficiency, health issues, lowering emissions etc.), economic profits by more efficient business models and the focus on social and cultural aspects of sustainability can build a more sustainable input from cities to a sustainable agenda. Moreover, it can become a template for other global ports to repeat, improve and replicate best practices on the way to sustainable development.

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