



Micro-units and Co-living Spaces in Post-industrial Surroundings. The Human Dimension in Adaptive Reuse Projects of Historic Buildings Converted into New-Generation Student Residence in European Cities

Krystyna Kirschke, Paweł Kirschke,
and Elżbieta Komarzyńska-Świeściak^(✉)

Faculty of Architecture, Wrocław University of Science and Technology,
Wrocław, Poland
elzbieta.komarzynska-swiesciak@pwr.edu.pl

Abstract. As the increasing demand for sustainable investments together with the changing environmental and economic conditions are currently observed, adaptation and conversion of historic buildings gains in popularity. This has simultaneously led to the creation of a new area on the housing market that is often referred to as co-living. It is about apartments or houses with shared spaces and amenities. These two trends are reflected in adaptive reuse projects of historic industrial buildings converted into co-living spaces with extremely varied target uses. This paper analyses design strategies for managing the historical character of post-industrial buildings in converting them into new-generation student residences as exemplified with a series of investments in European cities. We presented many challenges relating to micro-units and co-living spaces design in historic buildings along with corresponding solutions. We also set some methodological directions and certain guidelines and principles for research in this field. In conclusion, we discuss certain disadvantages and limitations of these kinds of investments.

Keywords: Adaptive reuse · Co-living · Heritage building preservation · Human dimension · Human factors · Student residence · Student Hotel

1 Introduction

For several decades, business models involving the adaptation of historic post-industrial buildings for service purposes have been quite commonly used in European countries [1–6]. This resulted in the creation of office complexes (e.g. *The Factory* Berlin, *Technology Park* Berlin *Humboldtthain*, *Les Magasins Généraux* building in Paris, *Monopolis* in Łódź, *COOP* in Brussels), boutique hotels and hostels (e.g. *Vienna House Andel's* and *Focus* in Łódź, *Hostel Fabryka* in Warsaw), and multifunctional service and residential centres (e.g. *Kanaal* in Antwerp, *Le Conterie* on the Murano Island in Italy,

Gasometer in Vienna, *Loft Zawisza* in Gliwice, *De Girarda* lofts in Żyrardów, *Browar Lubicz* in Kraków and *Browary Wrocławskie*). The flats located in them vary in terms of standard and surface area ranging between about 25 to 40 m². For a dozen or so years, in academic cities student residences keep emerging also in abandoned post-industrial buildings. These complexes offer a wide range of services, co-working spaces and micro-apartments with surface areas from about 12 to 23 m². The target user group includes students, especially foreign scholarship holders, and Y and Z generation people who have already completed their studies, started their carriers, but still highly appreciate community living and the so-called sharing economy [7–9]. None of these people actually treat this form of residence as their target; they usually rent premises for up to 12 months, sometimes longer (for the duration of student exchange, study, or corporate contract). They are also ready to limit both their assets and private living space (minimalism trend) in favour of maximizing the common, social space. “Global nomads” interested in short-term rental are another group of users [9].

Due to the availability of human resources and facilitated distribution of finished products, until the mid-20th century, some types of factories: bakeries (Fig. 1), printing houses (Fig. 2), breweries, power plants and light industry plants were located in the city centres or on their outskirts [3–5]. Many years later, due to significant urban sprawl, these locations have become extremely attractive, offering tenants of revitalized facilities quick access to the bustling city centre or to university campuses. The growing popularity of using post-industrial facilities for residential purposes is also supported by the quality of their architecture, comparable to that of civic buildings [3, 10–12]. Examples include *Izrael Poznanski’s Factory* in Łódź, now the *Manufaktura* shopping mall, *AEG Turbine Factory* in Berlin, or the *Mamut* bakery in Wrocław [12] being converted into a student dorm (Fig. 1). It even occurred that industrial buildings were treated as a “show of force” of the city authorities, as was the case with *Bankside Power Station* in London, successfully rebuilt into the *Tate Modern* [13]. An additional factor that makes it easier for investors to succeed in business is that former factory facilities are relatively cheap. This is due to the fact that historic buildings, for technical and environmental reasons, can no longer fulfil their original function, and at the same time, as architectural historic sites, they suffer from many adaptation restrictions imposed by local building restorer’s offices [11, 12, 14].



Fig. 1. (left) *Basecamp* dormitory complex (designed by Grupa 5 Architekci) - adaptive-reuse and extension of *Mamut* bakery in Wrocław planned to be realised in 2020 (PL). On the left: ceramic-cladded floor storage building adapted for main entrance zone and dormitories, on the right: new wing of the *Basecamp* dormitory (visualisation by Grupa 5 Architekci [15]).



Fig. 2. (right) *Basecamp* dormitory complex (designed by Grupa 5 Architekci) realised in Łódź in 2017 – adaptive-reuse of Dzielowa Printing House (PL) (photo by Grupa 5 Architekci [16]).

2 Up-to-Date Research and Methodology

Our research analysed the functional and spatial arrangements in dormitories built in the late twentieth and early twenty-first century in adapted post-industrial buildings of European cities, where the focus was to adapt the facility to the needs of human, individual users at the same time taking into account selected issues imposed by restorer’s offices.

A review of literature has shown that there are papers published in magazines and professional portals on conceptual or implementation projects meeting the above-mentioned criteria. These are all case studies [5, 11, 12, 17]. However, there are no scientific papers synthesizing the knowledge on locating student dorms and micro apartments in post-industrial historical buildings in the European culture [18–21]. On the other hand, the issue of the architectural and urban revitalization of post-industrial areas discussed in numerous articles [14, 17, 21–23] and monographs [1–6, 10], and it was also subject of a series of conferences and competitions (*ProRevita, Rewitalizacja*). Similarly, dormitories, micro-apartments and co-living spaces have been discussed in European literature, but these authors focus mainly on newly designed facilities [7–9, 24, 25]. Such investments in adapted post-industrial buildings constitute a relatively new phenomenon, hence there are few papers describing and synthesizing knowledge on the subject [11, 12, 22].

The analyses presented in this article put special emphasis on the process of “humanization of the factory”, i.e. the transformation of its initial post-industrial functional layout, into a complex combining groups of micro-apartments and co-living spaces intended for students. These analyses were presented separately for each of the functional zones mentioned above, with attention being paid at the same time to the specific character of their organisation in the re-constructed facility. All the aspects of our analysis have been reflected in the adopted chapter layout. Problems related to restorer’s requirements and technical issues universal enough to be discussed in relation to a larger group of facilities have been mentioned in places where this was directly

related to the functional and spatial layout of the buildings in question. Our basic research method included case studies (*in situ* analysis, process and design documentation studies) and our participation in numerous projects involving revitalization of historic buildings for service purposes developed in *research by design* framework [11, 12, 15, 16].

3 Adaptation to Micro-apartments

The idea of providing minimum living space in combination with a wide range of offered common space inspired architects fascinated by the idea of the welfare state already in the interwar period [8, 26, 27]. It was in this period that the *Isokon* and *Kensel House* buildings in London were completed followed by such facilities as a hotel house containing miniature *maisonnette* flats at the WUWA housing estate in Wrocław (Breslau until 1945), and the study entitled *Die Wohnung für das Existenzminimum* [Flat for the minimum of existence] was conducted for the city of Frankfurt [26]. In modern, commercial complexes of microflats, the extreme limitation of their surface area results from the ideological assumptions described above, but also from the desire to ensure maximum profitability of the investment [9]. Such a unit, intended mostly for one or two people, is divided into three functional areas: mini-hall, bathroom and open space housing two contrasting functions: living room (sometimes with a kitchenette) and bedroom (Fig. 3A–D).

Multi-storey residential wings of co-living complexes are usually located in former warehouses (Mamut bakery [12, 15]) or offices (printing house in Łódź [16, 17, 30]). Their functional layout consists of two (Fig. 3B) or three (Fig. 3A, C, D) longitudinal bays, but the latter, three-bay solution (with the middle bay being the traffic space) being more suited to the new function. In buildings of this type, two residential units (with surface areas ranging from approx. 12 to approx. 23 m² each) usually fit between the main structural axes, whereas in the case of post-industrial buildings the average span is approx. 5.5–6 m. Each of them is 2.5–2.8 m wide, which allows for a functional arrangement similar to a hotel room (Fig. 3A–D). In the microscopic entrance area, in addition to a wardrobe or hangers, entrance to a compact bathroom with shower can also be found (width approx. 1.1–1.8 m, area approx. 2.5–3 m²). The so-called residential area (an area with a full width of the module intended for bedroom), the depth of the interior and supply of daylight derive from the depth of the external traffic routes of the adapted building and are on average 6–9 m. The lighting in such a room also depends on the size and location of windows, which is closely related to the façade module of the historic building, which is usually subject to restorer's protection [12]. In contrast to new investments, almost each of the units in the adapted building differs slightly in terms of surface area and interior layout. Thus, it becomes less realistic and less economically viable to implement fully standardized, multifunctional furniture there.

Walls units are used for the kitchen, bathroom, bedroom and lockers along with free-standing and mobile furniture items (Fig. 4). In the case of narrow traffic routes, the relatively large height of post-industrial interiors (approx. 3.5–4.5 m net) provides

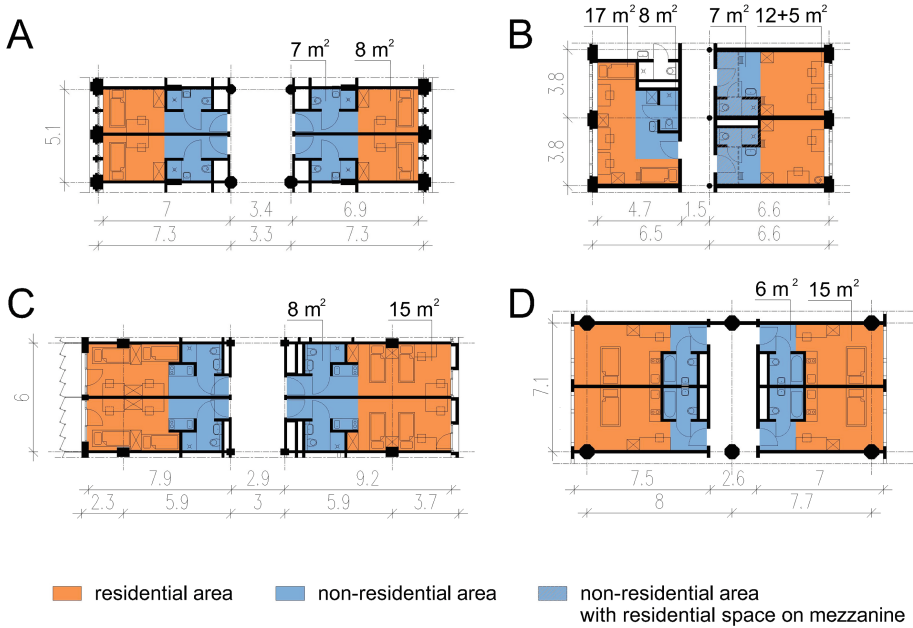


Fig. 3. Residential units' plans of: A. *Basecamp* dormitory (designed by Grupa 5) - adaptive-reuse of Mamut bakery in Wrocław (PL) (by E. Komarzyńska-Świeściak based on [14]). B. *G27 CIEE Global Institute* dormitory (designed by Macro Sea) - adaptive-reuse of Emil Gursch typefoundry's factory in Berlin (by E. Komarzyńska-Świeściak based on [28]). C. *Basecamp* dormitory (designed by Grupa 5 Architekci) – adaptive-reuse of Dzielowa Printing House in Łódź (PL) (by E. Komarzyńska-Świeściak based on [15]). D. The Student Hotel Amsterdam City (designed by Penta Architecten BV BNA) - adaptive-reuse of printing house and office buildings of *Parool* and *Trouw newspapers* in Amsterdam (by E. Komarzyńska-Świeściak based on [29]).

an opportunity for enlarging the residential space by constructing of a mezzanine with a bed (*Basecamp* dormitory in the former Dzielowa Printing House in Łódź, Fig. 3B, Fig. 5 [16, 17, 30]), by comfortable use of bunk beds (*G27 CIEE Global Institute* dormitory in Berlin [28, 31–34]). Usually, in the residential wings, there are also spaces dedicated to building closer relationships between residents of a given floor or group of rooms (e.g. common living room, kitchen and small niches in the corridors). They are implemented within a single traffic route and structural module, between the residential units or in places impossible to transform into rooms (e.g. in corners of a building). Depending on the standard of the investment, there is one such a zone for a couple or a dozen rooms (e.g. 35 rooms in the Macro Sea investment [28], 8–11 rooms in the Student Hotel project [29], 25 rooms in *Basecamp* in Łódź [16]).



Fig. 4. (left) Interior of residential unit in The Student Hotel Amsterdam City (designed by Penta Architecten BV BNA) - adaptive-reuse of printing house and office buildings of *Parool* and *Trouw newspapers* in Amsterdam (photo by Macro Sea [28]).



Fig. 5. (right) Interior of residential unit in *Basecamp* dormitory (designed by Grupa 5 Architekci) – adaptive-reuse of *Dzielowa Printing House* in Łódź (PL) (photo by Grupa 5 Architekci [16]).

4 Adaptation for to Multifunctional Co-living Spaces

Selected projects and their implementations, which use a combination of residential zones with micro-apartments and co-living spaces, have a functional structure closer to that of a hotel or hostel than of a typical dormitory [9, 19, 20], as exemplified by the *Studentenheim Gasometer* in Vienna, which offers rooms in apartments intended for several people [22]. Therefore, adaptation to such a function requires taking into account the specific character of the functional and spatial model resembling that of a hotel [21]. Its very essence consists in the existence of two structural units. The operational one, which consists of four divisions: residential, catering, multifunctional and recreational rooms, and back-up facilities (administrative, social, technical and managerial. In the analysed cases, in the multifunctional and recreational zones, the residents have at their disposal an extensive reception area, a large co-working space, a restaurant and shops on the ground floor (Fig. 6), a laundry room, and often thematic common spaces (e.g. a terrace, cinema room, reading room (Fig. 7), games room, swimming pool, relaxation area). This allows for offering a wide range of additional services, from organized events and community animation to a concierge, laundry and cleaning services.

In the case of adaptation of post-industrial facilities, preservation of factory equipment and infrastructural facilities presents another special issue. These are the so-called movable technical monuments, which stand for the genesis of a given place, e.g. printing presses, conveyor belts or ovens. Depriving the factory of its movable heritage (provided that it has been preserved) deprives it of its significant historical value [23, 34]. Showcasing such elements in interiors dedicated to dorms may be less obvious, however, in appropriately selected places such a procedure allows for giving the

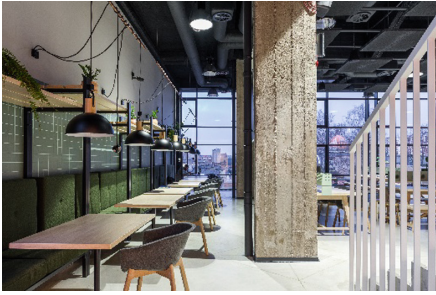


Fig. 6. (left) Interior of a restaurant in *Basecamp* dormitory (designed by Grupa 5 Architekci) – adaptive-reuse of Dzielowa Printing House in Łódź (PL) (photo by Grupa 5 Architekci [16]).



Fig. 7. (right) Co-living space in The Student Hotel Amsterdam City (designed by Penta Architecten BV BNA) - adaptive-reuse of printing house and office buildings of *Parool* and *Trouw* newspapers in Amsterdam (photo by Penta Architecten [29]).

interiors a unique character, referring to their former function. The co-living zones are particularly well-fitted for this purpose, as it was envisaged in the *Basecamp* dormitory design in Wrocław (a fragment of a bread baking oven [12, 15]) and implemented in *The Paper Factory Hotel* in New York (two printing machines [35]).

5 Conclusions

With selected examples, we have illustrated the problems faced by an architect who adapts post-industrial buildings to modern hotel apartments, which are expected to preserve the authenticity of a given historic building while at the same time providing comfort and a sense of community to its users. The analysis of functional and spatial layouts allows us to conclude that specific zones of an industrial building (supply, production, storage and dispatch, as well as office rooms) and appropriate diversification of the spatial and structural layouts used allow for choosing optimal design solutions for adaptation of these facilities to the needs of a new generation of dormitories. What seems the most obvious is to establish service shared spaces in former production halls, and rooms in multi-storey wings that originally housed technology lines or offices. It is crucial to configure new functionalities in such a way as to match them to the historic structure, taking advantage of its advantages and limiting the destruction of the original facility structure, which usually constitutes the most valuable element of a post-industrial historic building [23, 35]. Only then is it possible to preserve its “spirit” of a given building, which makes the adapted facility unique. The discussed investments, although they do not guarantee full repeatability and standardization of design solutions and entail the necessity of incurring adaptation costs, offer attractive locations and a space enriched with eclectic, Art Nouveau or Modernist details, as well as renovated, monumental façades made of concrete or faced with ceramics, sandstone and granite. All in all, the adaptation of post-industrial buildings to

the needs of modern users should be considered as an important form of protection and preservation of architectural monuments. Such a revitalization project will certainly be continued, mainly due to the attractive location of these factories. The fact that the construction of turnkey micro-flats in a standard sufficient to provide basic living conditions at an affordable price [8, 9] requires significantly lower financial outlays on the part of the investor than in the case of a hotel or an A-class office building will certainly provide a significant development impulse as well. Therefore, it should be expected that many post-industrial complexes may be transformed into dormitories combining micro-apartments with co-living and co-working spaces, which is justified by the huge interest of the public and the possibility of achieving high rents.

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