Article

The Architectural Typology of Contemporary Façades for Public Buildings in the European Context

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Abstract: In contemporary architecture, a border between an exterior and an interior—a façade—is variously designed in terms of form, style, response to climate or culture, individual approach or tools used. Despite the diversity and multi-tread theoretical and practical discourse, the Authors propose the typology of contemporary façades for public buildings (open to society) in the context of European cities by extracting comprehensive architectural features. The term systematic reflects the complexness of the issue by the newly proposed element. Namely, it is a representation of a particular architectural feature with the use of scale. The elaboration consists of (1) an introduction with a literature review and thesis, (2) our aim and method, (3) a historical background; case studies, and systematics introduction (4) conclusions with typology proposal.

Keywords: contemporary architecture; façade; theory of architecture; external architectural expression; public buildings

1. Introduction

The façade design of public buildings (open to society) is a complex issue. It results from several contextual factors: urban (Koolhaas 1995, 1997), cultural and social (Moles 1977; Stam et al. 2020), economic (Venturi et al. 1977), spatial and law (Biegański 1974; Dominiczak 2008). Yet, the most important is the architect's approach. It influences building's outside consistent with the form (Venturi et al. 1977; Rowe and Slutzky 1997), material (Zumthor 2006; Carl 2019), structure, tectonics, geometry, plan (Le Corbusier 1985), recalls the context or its contradiction (Koolhaas 1995, 1997) and other elements (Owadowicz 2018; Kwiatkowska 2019). In this elaboration, the façade is a thermal barrier between exterior and interior (Gregory 2008). However, as Carl (2019) recalls Feldtkeller (1989), when we consider architecture, it goes beyond simple separation. It states both an environmental compartment (Kamal 2020) and an aesthetical manifestation (Ghomeishi 2021). The elevation is an envelopment of function and a building's structure. It can be almost non-existent (dissolved, transparent), full (opaque) or a combination (mixture, connection) of the two. It allows for the establishment of a relationship between exterior and interior (Carl 2019). We consider facades of the public buildings defined according to the broad European context, so meant for open access, services and gatherings, according to Lexico.com (2021) UK Dictionary: 'A building used by the public for any purpose, such as assembly, education, entertainment, or worship'. Although, specific definitions describe such places as governmental (Collins 2021), the wider concept of the notion is popular in architecture and urban planning, i.e., De Vries (2021), Project for Public Spaces (Project for Public Spaces 1975–2020), and others (Journal of Laws 2019; Building Performance 2021) and affects external envelopment design.

There are many publications dedicated to the architectural expression and design in contemporary buildings. An example is a series of Jodidio (2010a, 2010b), which presents newly built icons. Album-like publications of that type propose an enticing overview of

architectural solutions, leaving an analytical and critical part to the readers. More focus on an architectural analysis may be found in a book by Gregory (2008) 'Key Contemporary Buildings. Plans, sections and elevations. The Author gives a convincing chapter division, according to the buildings plan. It is as listed: centralized and radial, linear, terraced and stacked, orthogonal, eccentric, courtyards, cityscape response, followed by infills, additions, and extensions. He shows the influence of mentioned shaping onto buildings facades. Elevations are an outcome and a whole with the overall edifices shaping. Thus, the publication became one of the inspirations in our considerations on contemporary architecture. Next in the research was the publication by Venturi et al. (1977) 'Learning from Las Vegas' focused on the symbolic expression of architecture, followed by parallel considerations of Koolhaas (1997) regarding the manifestation of wealth and happiness with and in architecture. They both highlight the role of the facade in communication between the architect, investor and audience or user. Furthermore, in those books the architecture and its elements are coherent. The next piece to the puzzle—namely material— adds Zumthor (2006), who focuses on architectural expression resulting from textures and colours and a way of their use. This book brought us a closer view on building and extracting its particular elements, in case of this elaboration—facades.

The elevations have existing typologies, maybe more understood as divisions, yet none is general, and neither captures the essence of architectural design. The basic division is on the structure and building materials, usually prepared by producers to categorize their products (steel, wood, glass, etc.). There are also very detailed studies with a focus on one aspect, like the adaptive solutions by Tabadkani et al. (2021), where Authors discuss different types: active, passive, biomimetic, kinetic, intelligent, interactive, movable, responsive, smart, switchable. Brzezicki (2014, 2021) made similarly detailed studies for elevations finished with glass. An enticing study by Mika (2017) focuses on a typology of concrete façades, divided by different rhythms of precast structures. While Caetano and Leitão (2016), focus on façade dependency from algorithms and pre-defined parameters applied in the computer-tool based design, and Saleh and Jaafar (2020) on growing solutions. This group of research is important and reflects on the technical aspect of design. However, they serve to summarize one aspect and are not comprehensive.

The more general overview we found in the study on the perception of the building, based on its façade by Ghomeishi (2021). He distinguishes four basic concepts: originality, complexity, clarity and meaningfulness, followed by features material, appearance, articulation, colour, texture, form, and then size and shapes of windows, balconies, decorations. Another highly broad and comprehensive is a book by Carl (2019), entitled: "Deep Skin Architecture. Design Potentials of Multi-Layered Architectural Boundaries", focused on three-directional, and physically deep façades. Furthermore, a universal approach is present in state-of-the-art research on local case studies present Rangkuty and Widyastuti (2019) for Chinatown in Malay or Piutanti (2019) for Kayu Tangan. The three later publications inspired our studies with a quantitative and qualitative study of facade elements. Yet, the elaborations did not focus either on typologies or on comprehensiveness. Their character is local. The literature review showed no attempt to generalization of state-of-the-art knowledge on contemporary architectural expression of facades. Moreover, some of the analysed concepts are so detailed that the typology can be applied only for specific buildings, i.e., pre-cast, growing or parametric. Studies reveal a visible gap in the discussion on the theory of the architectural design of contemporary facades. There is a need for comprehensive classification of contemporary facades despite their technologic or material solution and regardless of the design tool used. It should be applicable despite the localization or climate. The only highly limiting factor is the function since it influences facades design significantly. The study aims at a public function of accessible buildings, open without visible limitations (invisible like monitoring accepted) and connected to public urban spaces. Such a design approach affects the facades providing a representational—not necessarily monumental—character, visibility and recognition (Jabłonska 2012; Jabłonska and Furmanczyk 2020). The outer envelopment reflects among others:

○   higher room hights,
○   multistorey halls,
○   wide doors for a large group of users,
○   need for more distinctive materials,

Then, in industrial or residential buildings. Mentioned features are common for public buildings of different functions, like commercial, cultural, service, and multifunctional complexes. Multifunctionality is nowadays most common in public building design providing enterprises economic feasibility.

As outlined, the discussion on the architecture of contemporary facades is complex and multi-threaded. Yet, we argue that: there is a possibility to form the typology of contemporary façades for public buildings in the European cities context by extracting comprehensive architectural features.

2. Aim and Method

Firstly, the paper falls into the thread of research on nowadays architectural external expression. Considerations included various design approaches, driven by the nowadays fast development of building technology. We supported the selection with literature and case study reviews. Literature and data studies concerned the field of theory of architecture with a focus on contemporary solutions. Our investigation considered renowned architects' writings, manifestos and sectional reviews of collective works. We supplemented findings with designers' personal opinions gathered from interviews, professional journals, articles and company websites.

We engaged several research methods. Firstly, data was called (in-situ and with literature review) and underwent study and organization. Afterwards, the material was review and analyzed critically. Our main goal was to select most sectional and representative cases, addressing aspects found in literature:

- architectural character (Venturi et al. 1977; Zumthor 2006; Gregory 2008),
- opaqueness or transparency—understood both as a system—a phenomenon (Apostolou 2016; Rowe and Slutzky 1997; Janson and Tigges 2014) and a see-through effect of material (Brzezicki 2014, 2021),
- light access regulations (Tabadkani et al. 2021),
- algorithm design (Caetano and Leitão 2016),
- and others.

The criteria for selecting objects for case studies were:

- the period: contemporary—created in the last 30 years till 2021:
  - ○   thus, including the overall design process starting from the initial concept, through a design process, construction, and its 'settling in' in the surroundings.
  - ○   historic buildings appear only as a background for contemporary implementations and were not studied in detail.
- the area area:
  - ○   a focus on European cities.
  - ○   the USA and Japan appears only as a reflection of comprehensiveness.
- stylistic diversity and design methods.
- public function—analysis focused on commercial and cultural buildings, serving general society, accessible, open and connected to public urban spaces like squares (meant for community and tourists).
- in-situ—we present only those examples that our team studied on site.

Site studies considered many and varied cases, where we present samples from this selection) and were performed on collections of gathered graphical material: photographs, drawings and schemes. On the basis of previous considerations and divisions found in literature (Carl 2019; Le Corbusier 1985; Gregory 2008; Ghomeishi 2021), analysis considered:

- walls:

- ○ occupied surface towards openings,
- ○ proportions and dimensions,
- ○ form and material,
- ○ level of transparency or opaqueness,
- ○ with or without divisions (character of divisions: harmonic, distorted and disharmonic),
- windows:
  - ○ occupied surface towards wall and placement (harmonic, distorted and disharmonic),
  - ○ proportions and dimensions,
  - ○ form and style (contemporary, modernistic, eclectic, historic, or other, with or without frame),
  - ○ material,
- doors:
  - ○ occupied surface towards wall and placement (harmonic, distorted and disharmonic),
  - ○ proportions and dimensions,
  - ○ form and style (contemporary, modernistic, eclectic, historic, or other, with or without frame),
  - ○ material,
- roof:
  - ○ form and material (flat, gable, curved, or other),
  - ○ visible from street level or invisible (occupied surface towards wall),
  - ○ proportions and dimensions,
  - ○ style (contemporary, modernistic, eclectic, historic, or other),

Selected examples of the analysis is presented with tables summarizing descriptions of case studies.

2.1. Case Studies Organization

Coprehenisvness requires diversity. But, case studies need clear organisation in simple categories. To establish them, we turned to the basic definition of the facade, so a boundary—a limitation of the building, protection from thermal changes and an element of obscuring or exposition. We understood that this boundary is either opaque or transparent to the eye, regardless of its form, function or material. Though it is only one of the possible classifications, it gave us a generality we pursued in our study. On this background, we divided cases in the aspect of the design of architectural expression of a facade:

- opaque,
- transparent,
- connected (of the above two).

We aimed at finding the most general categories that will allow us to find common architectural features for different facades designs. It does not exclude any other classifications and typologies. During further analysis, the initial division required subdivision. In the following sections, we present reasons for further clarification of the three categories.

2.2. Conculsions Formulation

The third step is based on the preceding research stages and aimed at establishing a contemporary, comprehensive classification of the architectural expression of facades. Cooperative analysis and synthesis of deductions from case studies in each category and classification allowed to formulate conclusions. We devote the tool for theoreticians and practitioners of architecture, urbanism, spatial planners and critics. A broader group of recipients in the European society should find it convenient as well. It can serve together with mentioned systematics and other classifications.

3. Discussion

3.1. Short Historical Background

Within the article limitations, it is an impossible task to reflect on all crucial aspects. However, even a synthetic outline is necessary to sketch the background for further considerations. The architecture of façades connects strictly to a style and design method selected by an architect. Thus, we shortly elaborate on diverse approaches and architectural styles. We highlight their impact on facades design.

In the modern period, architectural 'form and function' is purified and simplified, bringing to mind more science than creation (De Botton 2014). Its purity reflects in all its dimensions: solids, plans, urban context, construction (Le Corbusier 1985), but it does not argue with earlier architectural styles (De Botton 2014). Modernists stressed the importance of regularity, homogeneity, content and hierarchy (Kahraman 2015). Thus, the only acceptable detailing is of structural elements (Le Corbusier 1985; Cruz 2012; Mika 2017; Nicholas and Oak 2020; Brzezicki 2021). To recall Frank Lloyds Wright words from 1953: 'Organic means Part-to-Whole-as-Whole-is-to-Part' (Graff 2018) or 'form and function is one' (Cruz 2012) and Le Corbusier (1985) from 'the plan' all architectural elements arise. The glass becomes 'aesthetics of progress' (Carl 2019, p. 31), and revealing skeleton structure is a new phenomenon of transparency (Rowe and Slutzky 1997; Kang and Park 2021). Facades constitute an integral part of the architecture, based on new pre-cast and skeletal structures. In his implementations, the composition, relation of proportions and forms, revealing the interior outside and reverse, the correspondence between full and empty is an essence and integral part of the whole building.

Next, postmodernism denies the purity of form and gives rise to greater freedom in architecture. It was initiated in the late 1940s and spread globally in the second half of the 1970s. Buildings with postmodernist features appear even today (Hopkins 2020). This trend responds to dissatisfaction with the previous modernist movement. Criticism contains ignorance of the context and cultural features, anonymous and too sterile expression, monotony, and carelessness about building users (Cunliffe and Loussier 2006). Sawa-Boryslawski (2005) explains the prefix 'post' as 'apart from' meaning cutting off from modernism. The facades of postmodernism stand out pluralism and complexity of different styles, materials, details. They are eclectic, also including pastiche, joke, ironic exaggeration, and context. Vivid colours and highlighted architectural divisions form exposed building coverage. It is easy to understand where the wall ends or the roof starts, and bordered widows occupy solid walls. Designer or client preferences outweigh technical progress (Klotz 1988). Van der Rohes': 'less is more', and Sullivans': 'form follows function', is now paraphrased by Venturi as 'less is bore', and Tschumi with 'form follows fiction' (Hopkins 2020). In Jencks (1981) called postmodernism 'an eclectic mix of traditional or local codes with Modern one'. However, postmodern architecture also met with criticism. Kahraman (2015) describes postmodernism as struggling and compromising modernism. Moreover, juxtaposes the features of both movements emphasizing their contrast in the field of regularity, fordism (mass production) and content (depth). Harvey (1990) wondered whether postmodernism was not commercialization, domestication of modernism.

The next important trend influencing façades design is deconstructivism. The term 'deconstructivist' appeared in an exhibition at the Museum of Modern Art in New York in 1988 to define a group of new style architects, where designs inspired with the ideas of the French philosopher Jacques Derrida. The representatives of deconstructivism strongly argued with the vision of a homogeneous society imposed by the modernists and excluded the rigid rationality from their designs, thus creating an architecture of opposing geometries (also full and transparent) reflecting the heterogeneity of the modern world (Wong 2010). 'The Single Uninterrupted Line in Frank Gehry's Sketches' as Charitonidou (2021b, vol. 10, p. 16) states, can be an example. This approach affects the deconstructed facades, which are either hard to distinguish from other building elements like roofs or inter walls or physically stick out from a structure.

Shifting on the timeline from the modern and postmodern period up to unnamed styles of Today, Kozłowski (2013) notices that in a contemporary building divide between layouts, roofs or facades is rather loose. At this moment elevation, roof, entrances and glazing, and to some extent, even interior become one form. The complexity of the design raises as computer tools advance (Caetano and Leitão 2016). It suffices to evoke decomposed works of Frank Ghery with 'serpentine lines' (Charitonidou 2021b, vol. 10, p. 16) or Zaha Hadid (along with her company), reflected in her drawings titled 'The Pick Club' Hong Kong 1982–1983 and recalled by Kozłowski (2013) in his publication. Likely Zumthor (2006) compares contemporary architecture to present-day deconstructed music, or Nouvel searches of innovation (Charitonidou 2021a, vol. 10, p. 14) tend to free architecture from geometric boundaries. Interestingly enough, such solutions can create symmetric or asymmetric relations towards context, sometimes almost denying it. Here the specific attitude of Rem Koolhaas (1995) is mentioned, or the creation of exposed contrast, e.g., a dark blob of Kunsthaus Graz (arch. Peter Cook and Colin Fournie—Spacelab) placed inside the historic town centre. Today, formerly impossible visions are a reality: Burj Khalifa surprises with height, Swiss Re Tower with an atypical shape and Capital Gate with a substantial deviation from the vertical position. Widely spread glass facades required new adjustments, protection from the sun and users' privacy. Making the goal more realistic enabled significant technological development of integrated elements (Bell and Kim 2009). Modern glazing systems are in widespread use in the facades of skyscrapers and high-rise buildings, which results in the further development of hybrid facade systems (Christian 2006). Façade is a manifestation of aesthetics, vision, architects' importance or originality (star architects). Thus, style diversification has reached a new level of complexity.

On the other hand, opposed to the approach of Spacelab, Khoolhass or Hadid, few nowadays architects carefully search for the relations with surroundings. Dominiczak (2008) calls it 'dialogic architecture' (self-translation), and he is relating to the original definition of 'architecture', from Greek 'architéktōn'—meaning 'a builder'—assumed as an art of order creation and '(. . .) building forms and separating spaces for various purposes' (Biegański 1974; Encyklopedia PWN 2020). Furthermore, the idea of architecture as a dialogue appears in the publication of Owen and Lorrimar-Shanks (2015). This trend manifests through buildings' minimalism, functionality and simplicity. There is an augmentation of social awareness connected with the need to organize the space, protection of nature and the surrounding landscape and the pursuit of pro-ecological solutions—understood as both high-tech and low-tech trends, based on efficient use of renewable energies, minimization of the pollution and the use of vegetation. In line with the trend, façades grow with plants and time, but still interior and exterior relation with solid and opaque is crucial.

Summing up the above manifestos, approaches and trends, we found that styles of today are diversified and complex. In some cases, facades are one with the building, in others, they are the external envelope of the building (even detached). We confirmed numerous material and compositional solutions (open-full relation, growing bio-based cladding, kinetic, etc.). Thus, the division into opaque, transparent, connected (of the two) is most comprehensive.

3.2. Opaque Solutions

Despite the selected concept of the architectures' meaning and expression outlined briefly in previous paragraphs, external form relates to all architectural aspects. Here two are extracted: as possible material and structural solutions or as a function of outer skin noticeability ranging between transparency and opaqueness. Starting with full-façade implementations, the authenticity of the external manifestation is visible in the Science Center New Metropolis (NEMO) by Renzo Piano (opened in 1997). The building located in the Amsterdam port and designed to reveal its educational and research purposes by the massive, block-like form of a large ship hull. Green metal facade panels covering the structure should be associated with marine topics and significant passage of time. By minimizing the unnecessary facade glazing, the architect created a coherent, homogeneous

and monumental body. Its vertical divisions inspired by the technology of ship construction. The sloping part of the roof—'ship's deck' functions as a so-called 'fifth' façade, and it is accessible to the visitors, like on a real passenger ship. The Renzo Piano design evokes the 'Theory of the Duck and the Decorated Sheds' of Venturi and Scott Brown (2003), authors of the book 'Learning from Las Vegas', who formulated the theory of a building façade purposed to broadcast a specific message through specific shape. Thus, the Nemo Research Center is a duck-type building according to Venturi and Scott Brown's typology (Kozłowski 2013; Venturi et al. 1977).

Mostly opaque facades occur in the creations of deconstructivist Frank Gehry, e.g., Dancing Houses in Prague, the DZ Bank in Berlin, the Walt Disney Concert Hall in Los Angeles, the Vitra Design Museum in Weil am Rhein or the Guggenheim Museum in Bilbao (from 1997). The last of listed buildings, shaped by bent, opaque, titanium and limestone parts, is the designer response to Bilbao's heterogeneity. It stretches along the river from Main Street. A horizontal arrangement of impressively thin (0.38 mm), wavy, golden and glossy metal strips price vertical elements defining the glazed atrium. Around the leading function, the entire building wraps. As aforementioned in the introduction, this part attracts more attention than the main entrance, located at the street side on level-1. Like the previous example, there is no specific division into walls and the roof. Exterior reflections penetrate the inside, connecting them and providing a fluent, gradual transition between both zones. Opposite to Piano in Amsterdam, Gehry in Bilbao tended to keep the façade's novel outlook, as he chose long-lasting, durable materials which do not develop a patina (Czuber-Filonik 2017). Noteworthy is that in deconstructivists' works, the contradictory and controversial form dominates over the ergonomics. However, with time passage, the need occurred for systematics and composition in design. The answer bases on both continuity and consistency of architecture, construction, context and visual aspects. Peter Eisenman, Frank Gehry and Bernard Tschumi are the best-known precursors spreading the idea of folding—a trend already seen in the Bilbao's museum (Stec 2017; Wong 2010), (Figure 1).

Figure 1. Opaque facade solutions, (**left**) The Science Center New Metropolis (NEMO), (**right**) Amsterdam, The Eye Film Institute, Amsterdam (photographs by the Authors).

The fully developed concept of folding reveals another opaque façade of the Eye Film Institute in Amsterdam—the centre of film culture. The building raised on a waterfront, and its roof is not clearly defined as well. Architects at Delugan Meissl Associated Architects inspired by a film, an illusion created by staged coordination of space, movement and light. An overall shape forms 'the scenery architecture'. Its dynamic geometry evokes the illusion of façade movement, gaining more optical lightness through reflections in the water. Most of the façade covers parallelogram matrix and trapezoidal panels made of aluminium (Grieco 2012, Kozłowski 2013), (Figure 1).

We have analyzed architectural features of exemplary facades with the use of tables. Below (Table 1) we show a few outcomes on analysis on different opaque facades. This approach allowed us to compare solutions between each other, and draw out final conclusions (see Section 4).

Table 1. Exemplary cases of the architectural features analysis in opaque category (self-elaboration, photographs by the Authors).

No.	Building Name and Localization Photograph	Analysis
1	The Science Center New Metropolis (NEMO), Amsterdam (Europe), 1997	walls: curved (plan), widening upwards (section); occupied surface ≥ 60%, copper sheets, opaque, solid, contemporary, cladding with clear harmonic rhythm; windows and doors: flat, occupied surface ≤ 60%, rectangular in modules, harmonic rhythm, contemporary, framed, glass; roof: curved (plan), inclined, flat, visible from street level; contemporary, wood appearance, grass.
2	The Markthal, Rotterdam (Europe), 2014	walls: linear (plan), curved (section); occupied surface arr. 50%, stone, opaque, solid, contemporary, cladding with clear harmonic rhythm; windows and doors: flat, occupied surface arr. 50%, rectangular in modules, harmonic rhythm, contemporary, framed; glazed curtain wall–frameless, suspended, linear (plan), curved (section); roof: flat, invisible form the street.
3	Centro de Recepción de Visitantes Turismo de Córdoba, (Europe), 2013	walls: linear (plan and section); occupied surface ≤ 60%, stone, opaque, solid, contemporary, cladding with clear harmonic rhythm; windows and doors: flat, occupied surface ≥ 60%, rectangular, contemporary, frameless; roof: flat, invisible form the street.
4	The City Center (shopping mall) LasVegas, (Nevada, USA), 2009	walls: linear (triangular, irregular plan) widening upwards (section); occupied surface ≤ 60%, steel, opaque, solid, contemporary, cladding with both clear harmonic rhythms and deconstructive distortions; windows and doors: flat, occupied surface ≥ 60%,, rectangular, contemporary, frameless and with thin frames; roof: flat, visible form the street, steel cladding with both clear harmonic rhythms and deconstructive distortions.
5	Chiesa del Santo Volto, Torino (Italy), 2006	walls: linear (star-shaped plan), linear (section); occupied surface ≤ 60%, brick, opaque, solid, contemporary, cladding clear harmonic rhythms; windows and doors: flat, occupied surface ≥ 60%,, rectangular, contemporary, masked (hidden) with mesh; roof: inclined towards the center, invisible form the street.

3.3. Transparent Solutions

Along with fully opaque facades, there exist transparent ones. Nowadays, the impression of the non-existent outer skin is the most sought-for effect. Its purpose is to dissolve a boundary between an exterior and an interior through blurring a façade. Illustrative examples are Apple Stores in New York (USA) and Tokyo (Japan), or underground parking exit kiosks near the National Forum of Music in Wroclaw (Poland), (Figure 2). In each of

those cases, a building disappears and an interior blends with an exterior. Such an effect is possible due to the visibility in all directions. The presence of material distortions in corners should be considered negligible, while the actual structure boundary is only thermal (Brzezicki 2014). Transparent sheets provide numerous aesthetic and functional benefits: the possibility to adjust the intensity of natural lighting and heating. Some solutions allow choosing between transparency or translucency of individual panels by applying a voltage potential (Saint-Gobain 2020). The outer boundary dissolution advances with external blinds made of glass, additional covers and rhythmic placement of geometric elements. The building on Odrzańska Street No. 11 and 12 in Wroclaw (Poland) serves as an illustrative example (Figure 3, Table 2).

Table 2. Exemplary cases of the architectural features analysis in transparent category (self-elaboration, photographs by the Authors).

No.	Building Name and Localization Photograph	Analysis
1.	Porta Susa railway station, Torino (Italy), 2009	walls: curved (plan and section), occupied surface < 10%, steel stracture (harmonic rhythm) windows and doors: occupied surface > 90% glazed curtain wall roof: curved, visible from the street level
2.	Tokyo (Japan), Omontesanto, 2014	Walls: none windows and doors: occupied surface = 100% glazed curtain wall with glass construction, visible logo located inside roof: entirely glazed, on a glass structure, visible form the street
3.	Parking exits from National Forum of Music in Wroclaw (Poland), 2015	Walls: none windows and doors: occupied surface = 100% glazed curtain wall with glass construction (in green colour) roof: entirely glazed, on a glass structure, visible form the street
4.	The Odrzanska Street 11 and 12, Wroclaw (Poland), 2020	Walls: linear (plan and section), composed, occupied surface in total: ca 50%, historic form, simple, geometrized (extension and superstructure), three-dimensional décor—frosted glass panel attached to walls windows and doors: occupied surface ca. 50% glazed curtain wall with glass construction roof: gable, partially visible form the street

Figure 2. Transparent facade solutions—full interior-exterior visibility, (**left**) The Apple store in Tokyo, Omontesando, (**right**) parking exits pavilion at the Plac Wolności, Wroclaw (in the background The National Music Forum).

Figure 3. Soft elevation transitions—dissolution of structural elements blends the interior with the exterior, (**left**) commercial building, Tokyo, (**right**) rhythm at the Odrzanska Street 11 and 12, Wroclaw.

3.4. Connections

As stated by Gregory (2008) or Czyżniewska (2009) distinct trend addresses historic buildings. It offers a way out of historicizing or designing a so-called new monument. This approach became necessary due to progressing intensifications in the downtown urban tissue. Kwiatkowska claims (2019) that contemporary architecture follows trends of the 20th century when architects were looking for new forms of expressions while working within monumental building substance. The newly added elements were not to dominate the original landscape. Therefore, they referred to modernism, minimalism, purism, cubism or abstractionism were commonly applied solutions. Original elements are the asset granting unique character of implementation. Examples from Wrocław (Poland) illustrate the trend Platinum Palace, Hotel Monopol, The Granary Hotel.

The Granary Hotel—a five-star boutique hotel located in the city centre of Wrocław, 24 Mennicza Street, was built on the ruins of the 16th-century granary, which also served as a hall for malt production (The Granary Hotel 2020). The building initially destroyed during World War II and burnt down completely in 1970. In 2005, Star Group Poland decided to

transform remains into a luxury hotel by entrusting conceptual design to architects from the Gottesman-Szmelcman office and architectural design to the studio Ozone in Wrocław (Hotelarz 2009; Hotel Granary 2010, Przebudowa Słodowni Pańskiej we Wrocławiu).

　　The outer shell received a clear distinction between original and contemporary façade elements. Glazed bands of new dormer windows, which serve as rooms external walls, contrast with the roughness of the former granary brick walls. This set works well. The horizontally divided glazing consists of two parts with dark window frames—to emphasize the industrial effect and form a distinct rhythm in the façade. To comply with directives of the Historic Preservation Office, the rest of the roof slope is transparent and hidden behind horizontal brise-soleils. It becomes well-illuminated and visible at nighttime. Asaf Gottesman writes about his project: 'the container of human activities within a glass, transparent box, filtered by timber louvres (Gottesmann Architecture 2020). Interestingly, facade elements being building structure are also a substantial part of interior design, due to modern structural elements wooden frames filled with double-glazed units. 16th century rough, brick walls with small window openings emphasize the historical character of the building (Hotel Granary 2010), (Figure 4).

Figure 4. Contrast to underline the border between the old and the new (to emphasize historic character of the building), (**left**) The Granary Hotel, Wroclaw, (**right**) The Hotel Monopol, Wroclaw.

　　Platinum Palace Boutique Hotel (operating as a hotel since 2010), 204 Powstańców Śląskich Street in Wrocław, the former palace of the Schoeller family from 1906 (known German entrepreneurs), was designed by Felix Henry (Hotel Platinum Palace 2020). The building positions in the Heritage Register, strictly supervised by the Historic Preservation Officer (in polish language: Wojewódzki Urząd Ochrony Zabytków we Wrocławiu 2020). The hotel represents the style of late historicism with classical-baroque elements, sculptural and stucco decorations. The palace successfully preserved consists of original elegant and monumental form. The parade entrance is highlighted by a portico with four represen-tational columns, while at the back, there is a ceremonial staircase with richly decorated balustrades. However, new hospitality required an extension to host all interested guests. A minimal and simple, contemporary four-story cuboid appended the rear of the building. It complements the main residence, and there is no competition in the dialogue between these two buildings. The new part keeps similar colours but in different, modern materials. Arrangements of the facades correspond with each other: the lowest story hides partially in the ground, then two stores and the third are separated from the rest with massive cornice—with dark straight, horizontal bands protruding from the façade. The top floor of the new building accentuates the substantial glazing of walls. The relationship between the form and the function is apparent in the size and arrangement of windows. Bathrooms have narrower, irregularly placed windows, whereas those of residential areas form a legible

rhythm—one above the other. Panes of glass soften the border between the interior and the environment, and trees penetrate rooms. Moreover, the building reflects the greenery and the sky and remains hidden in the landscape.

The oldest hotel building in Wrocław—Hotel Monopol, designed by Karl Grosser in Neo-Baroque Art Nouveau style, is located at 2 Heleny Modrzejewskiej Street (Błądek and Tulibacki 2003, p. 116). It has operated since 1892. The latest design dates back to 2009 (Hotel Monopol 2020) with changes introduced by the current owner Liwa Holding. The general renovation upgrades with the new extension, with Marcin Janowski as an author (Kraków, Poland based architect). The complex consists of two buildings the hotel and a trading house. Latter critically damaged during World War II. Rebuilt in the second half of the 20th century as an exclusive café, it re-joined the hotel complex. With the latest upgrades, both buildings received a glazed superstructure containing a usable roof and terrace. The new part remains hidden behind horizontal brise-soleils in grey finishing. From its interior, the city's landscape serves as the 'walls' of the room—with a view of significant buildings in particular: historic opera house, late-gothic church and mentioned National Forum of Music. The architect applied contrast to enhance the external expression of contemporary facades. Walls of historical parts show traditional stone masonry and red brick tiles. Rich ornaments of pilasters, columns, cornices and dormers add up to complete the picture. A new and minimal form provides well-balanced contrast of materials and colours. The whole implementation corresponds with the thesis of Melet and Vreedenburgh (2005). It states that the development of large cities relies on upwards-oriented constructions, i.e., vertical buildings. This trend dates back to the 20th century, and it imposes that the area of a roof should serve as a base for building's expansion. Another significant example of such superstructure is the law chancellery at Falkestrasse in Vienna by Coop Himmel(l)blau. The design from 1988 is a manifesto of modernity and innovation that corresponds with the author's philosophy, stating that postulated radical redefinition of architecture: 'it must burn' (Zukowsky 2016), (Figure 4).

We have decided not to follow Gregory's (2008) infills, additions terminology and used the term connections. For it includes architectural compositions likening two different elements of a contrast nature. An example of both such connections and analysis that we performed presents below juxtaposition (Table 3).

Table 3. Exemplary cases of the architectural features analysis in connection category (self-elaboration, photographs by the Authors).

No.	Building Name and Localization Photograph	Analysis
1	The Depot History Centre, Poland, 2016	walls: linear (plan and section), occupied surface > 70%, brick, opaque, solid, composed, stylized form and decor windows and doors: stylized, rounded windows with mullions, historic, harmonic, original location of openings, triangular glass tympanum, occupied surface < 30% roof: gable with skylights, invisible form the street connections: 60% historic, 40% contemporary
2	The Caixa Forum Madrid (exhibition gallery + auditorium), Spain, 2008	walls: linear (plan and section), occupied surface > 80%, brick, opaque, solid, original form and decor, superstructure of iron panels windows and doors: trapezoidal, leaning windows, contemporary, irregularly placed, occupied surface < 20% (historic part), flat glazing hidden behind perforated iron panels, occupied surface ca 50% (modern superstructure), glazed, contemporary, moved back entrance roof: flat, solid, opaque + perforated, visible form the street (includes two floors) connections: historic 50%, contemporary 50%

Table 3. *Cont*.

No.	Building Name and Localization Photograph	Analysis
3	Concordia Design Wrocław, Poland, 2020	walls: linear (plan and section), composed, occupied surface in total: ca 50%, historic, stylized, original form and décor (primary building), simple, geometrized (extension and superstructure) windows and doors: occupied surface ca 50%, rectangular, transparent, harmonic rhythm, all at the heights of the original openings, glazed curtain wall and doors roof: entirely glazed, on a metal structure, visible form the street connections: historic 30%, contemporary 70%
4	Las Arenas de Barcelona (shopping mall), Spain, 2011	walls: brick, curved in plan, opaque, solid, form characteristic for bullrings architecture, occupied surface > 90%, colorful elements windows and doors: harmonic rhythm, original elevation openings, historic form and rich decor roof: contemporary dome, visible from the street, superstructure with circular terrace providing 360 degrees panoramic view connections: historic 80%, contemporary 20%

4. Conclusions

The Authors (we) propose the architectural typology of contemporary façades for public buildings (open to society) in the European context. Facades of buildings meant for society, and accessible openly from squares or shared urban spaces have characteristic features. On the one hand, they manifest interior architectural parameters, like wide doors, communication routes, high stories, multi-floor halls and atriums, or gathering spaces. On the other, outer development fix quality materials corresponding to fire safety codes and excessive use, and the need for time-long durability. The overall design responds to the representational aspect of public architecture. Moreover, multifunctional activities occur in elaborated buildings. Thus, we decided to base the proposed classification on the most common feature of all analysed cases—so the level of transparency and opaqueness.

The classification consists of three levels and categories on each. Three basic divisions have a scale character, reflecting the architectural feature intensity of the facade design, while one upper their composition. In total, we propose six sub-types and as follows:

- Uniform—assumes that architectural features of a building can be designed as uniform.
- Gradual transition—characteristic for facades awarded with a substantial number of external-internal architectural elements that create a gradual effect on the facade, on their plane or between interior and exterior.
- Connected—understood as combined façades, usually (but not only) planned as outcomes of historic structures refurbishment processes. Such solutions characterize a clear distinction between elements.
- Historical and Contemporary—assumes that building external form is:
  - historical—built in the past—timeline according to the current dating,
  - contemporary—built recently—timeline according to the current dating (in this article it is last 30 years—full building cycle from concept to public acceptance of the construction),
  - mixed—connection of past and newly built substance (Figure 5).
- Transparent and opaque—assumes that building external form can be designed as:

- transparent—with the use of openings, windows, doors, cracks, curtain walls, and so on, which provide unblocked view or communication between an inside and an outside,
- opaque—with the use of full walls, massive compartments, closures, where there is no simple visual connection between an inside and an outside,
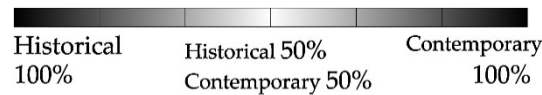- mixed—with all phases of mixed compositions (also in a gradual manner).

Figure 5. The graph showing granular relation between historical and contemporary category.

Materials and structure allowing to achieve such effects are diversified and characteristic for both new and past solutions. This sub-type is expressed as the gradual scales (Figure 6).

- Composed and decomposed—assumes that building external form can be designed as:
  - composed—which bases on proportions, composition of architectural details, or rhythm,
  - decomposed—where proportions, composition of architectural details, or rhythm are purposely distorted or completely omitted,
  - mixed—where proportions, composition of architectural details, or rhythm or their distortion or lack are connected.

Figure 6. The graph showing granular relation between transparent and opaque category.

Materials and structures used to achieve such effects can be diversified and characteristic for contemporary and historical solutions (Figure 7).
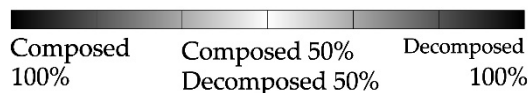

Figure 7. The graph showing granular relation between composed and decomposed category.

In the typology: uniform, gradual transition and connected are forming the highest level, which describes the architectural features of the facade. It is an easy task to state if the form of the building is homogeneous or mixed. The following element is the description of a historical or contemporary origin, with mixed options. The third step is to describe the level of transparency or opaqueness and composition towards decomposition. We express these assumptions in the following graph (Figure 8).
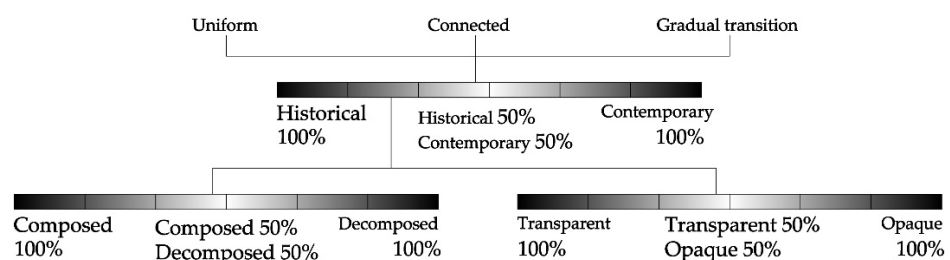

Figure 8. The architectural typology of façades for public buildings in the European context—the Authors proposal.

The comprehensiveness of the proposed typology is in its scale form, and visible when we analyses the existing and mentioned typologies. In the case of Tabadkani et al.'s (2021) adaptive facades, intelligent or responsive solutions can be placed in any of three levels dependent on a characteristic of architectural expression. Analogically, the aspect of the biological elevation component is just another building material—solid or semi-transparent. Below (Table 4) we present the juxtaposition of our typology use.

Table 4. The examples of proposed typology use (self-elaboration, photographs by the Authors).

No.	Building Name and Localization	Photograph	Type of Fascade *
1	The Markthal, Rotterdam (Europe), 2014		• Connected • Contemporary 100% • Composed 100% • Transparent 50% and opaque 50%
2	The Baljurk, Haag (Netherlands), 2004		• Gradual transition • Contemporary 100% • Composed 50% and decomposed 50% • Transparent 70% and opaque 30%
3	The City Center (shopping mall) LasVegas, (Nevada, USA), 2009		• Connected • Contemporary 100% • Composed and decomposed 50% • Transparent 50% and opaque 50%
4	Calypso, Rotterdam (Nederlands), 2013		• Connected • Contemporary 100% • Composed and decomposed 50% • Transparent 50% and opaque 50%
5	The Eye Film Institute, Amsterdam (Nederlands), 2011		• Uniform • Contemporary 100% • Composed 50% and decomposed 50% • Transparent 10% and opaque 90%

Table 4. *Cont.*

No.	Building Name and Localization	Photograph	Type of Fascade *
6	TU Delft Library (Netherlands, Europe), 1997		• Connected • Contemporary 100% • Composed and decomposed 50% • Transparent 80% and opaque 20%
7	Civil Engineering and Geosciences TU Delft, (Nether-lands, Eu-rope), 2008		• Uniform • Contemporary 100% • Composed and decomposed 50% • Transparent 97% and opaque 3%
8	AC Hotel Cordoba Palacio 5 * (Spain, Europe), 2008		• Connected with gradual transition • Contemporary 100% • Composed and decomposed 50% • Transparent 60% and opaque 40%
9	Centro de Recepción de Visitantes Turismo de Córdoba, (Europe), 2013		• Uniform • Contemporary 100% • Composed 100% • Transparent 10% and opaque 90%
12	Prada Tokyo Aoyama (Japan), 2003		• Gradual transition • Contemporary 100% • Composed and decomposed 60% • Transparent 95% and opaque 5%

Table 4. *Cont.*

No.	Building Name and Localization	Photograph	Type of Fascade *
13	Las Arenas de Barcelona (shopping mall), Spain, 2011		• Connected with uniform • Historic 80% and contemporary 20% • Composed 100% • Transparent 10% and opaque 90%
14	Tokyo (Japan), Omontesanto, 2014		• Uniform • Contemporary 100% • Composed 100% • Transparent 100%
15	Concordia Design Wrocław, Poland, 2020		• Connected with uniform • Historic 30%, contemporary 70% • Composed 100% • Transparent 50% and opaque 50%

* Here % was discretionary based on the visual appearance of the facade. In need of precise description, the elements must be measured and % can be calculated.

Presented comprehensive typology attempts to organize architectural theory on recent design trends in the architecture of exteriors. It is limited to the European context of large cities, contemporary solutions of the last 30 years (till 2021), and public buildings of commercial and cultural function. Systematic reflects the complexness of the issue by the newly proposed element. Namely, it is a representation of a particular architectural feature, like:

• Uniform
• Transparent
• Connected, etc.,

With the use of scale. Proposed classification may evolve and expand over time. In the future, we plan to investigate its applicability to other examples of architecture. Nevertheless, it states a step in the discussion on the contemporary theory of architecture. It should be the subject of further expansion and development, in compliance with time and new solutions or findings. It is the voice in the ongoing discussion about contemporary architectural philosophy and design.

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