

The Frontage

Uncovering the Public-Private Interface through Sampling and Categorization of Micro-Morphological Solutions at Street Level

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Abstract: This paper addresses the problem of realizing the potential of the urban experience in the detail of what we perceive as urban; the relationship between buildings and cityscape; private and public, inside and outside; through urban form in the public-private interface of street frontage. It asks how we can develop a random sampling and categorization of micro-morphological solutions at street level into fundamental knowledge of an urban typology, which work as a tool to produce urban form.

The paper describes categorisation of types through *directed content analysis*. By developing existing theories of interface typology into an initial coding scheme through a process of coding, type and pattern identification, we use a survey of photographic examples as a basis for refining and extending these and thereby exploring relationships between defined categories.

The research presents interface relationships comprising two main dimensions, *depth and spatial interaction of the threshold* and *visual and physical permeability of the façade* each including 4 main categories with variations. We define this element as *façade-threshold* through a matrix of interdependent relations with interface types providing a defined knowledge of this relationship, which can contribute to the understanding and development of better design solutions where urban micro-morphology influences our urban experience.

1. Introduction

This paper addresses the problem of realizing the potential of the *urban experience* through urban form. With urban experience we understand the content of what we, with reference to Ildefons Cerdà, perceive as *quintessence for urbanization*, the relation between buildings and streets. A common expression in today's urban planning practice is "active facades" which is a reference to a lively street and facilitation for commercial activities. The frontage of a private building face the public domain, but the public-private interface at street level is much more complex, than just openings for commercial activities. Think about your street and your experience of moving through the spaces and places it comprise. How do you get from this street and in to your private home, how do you walk from the most public to the most private? How many spaces do you have to break through before you are completely inside? Our experience of this particular part of the urban morphology is firstly *visual*; we get information through what

we see. And it is *tectonic* while we sense the materials, smells and sounds. But it is also *bodily*, by how we move and feel frictions and obstacles, and it is *interpretable* by how we combine these experiences to orient in the cityscape (Figure 1). The *frontage* represents the relationship between buildings and cityscape, a negotiator between private and the public urban space and thus inside and outside. The frontages define the street and presents possibilities for encounters between different territories e.g., between home and city. These potential connections include dimensions of both material and social character. Our task is to discuss this interface as a micro-morphological urban type and to find a suitable concept that define it. .

2. The frontage as public-private interface

When Ildefons Cerdà, as a part of his search for a grand urban theory in the mid19th century, described the relation between houses and streets as the *quintessence for urbanization*, he delved deeply into the origin of the streets and their tight, indissoluble relation to the buildings which they served, both as an entity connecting ways and buildings but at the same time as an economically and legally challenge of city production and financing. (Soria y Puig & Serratosa, 1999). In the decades and centuries after there was a fall and rise in focus considering the characteristics and capacities of this small micro-morphological relation. Nearly hundred years after Cerdà, M.R. Conzen presented a different approach to this relation through the term *Frontage*, which included an interface between street and *the boundary of a plot* (Conzen, 1960). As such, the *plots* defined buildings and played the important role of town development. In his seminal Alnwick study, Conzen presented the term *Frontage types* as measurements of individual plots, including the length of street line taken up by it and classified as two main Frontage types a and b with fractal variations; halves, quarters and three quarters. More recently, Karl Kropf has established a framework to combine different approaches in his *Generic structure diagram* (Kropf, 2014). This framework shows relations between micro-elements of materials and structures and macro-elements of streets and urban tissues, including buildings and plots on different vertical scales and their relation to the street. The diagram frame a discussion on the varieties and complexities included in micro-morphological research, *the frontage as public-private interface*. These three theoretical approaches has been important for our investigation of the relation between buildings and streets. In addition a range of studies on morphological characteristics of form (Kickert, 2016; Palaiologou *et al.*, 2016; Samuels *et al.*, 2012; Zoller & Wüstenrot, 2014), structure (Hanson, 2000; Hillier & Hanson, 1984; van Nes, 2008) and iconography of the public-private interface, and its correspondence to social capacities such as urbanity; liveability, walkability, use/activity (Minoura 2016), behavior and prevention for crime (van Nes, 2008) as well as perspective qualities such as experience and territory (Habraken & Teicher, 1998). As such, this relation has been widely researched and described, but very few have engaged in questioning this as a typology and thus be able to conceptualize it.

The issue we are addressing in this paper is not the *street frontage* as such, but the making of a typology comprising micro-morphological solutions of public-private interface that occur at street level and become foundations of our urban experience. The image below demonstrate how a whole range of different micro-morphological solutions in just a small part of street create the spatial conditions for our experience.

The aim of this paper is to discuss whether it is possible to *operationalize* urban experience into a tool for current design practice. The research questions posed are; How can different solutions of public-private interface at street level be categorized as types and morphological variants? Can we develop a *precise concept* that describe this micro-morphological part of the city?

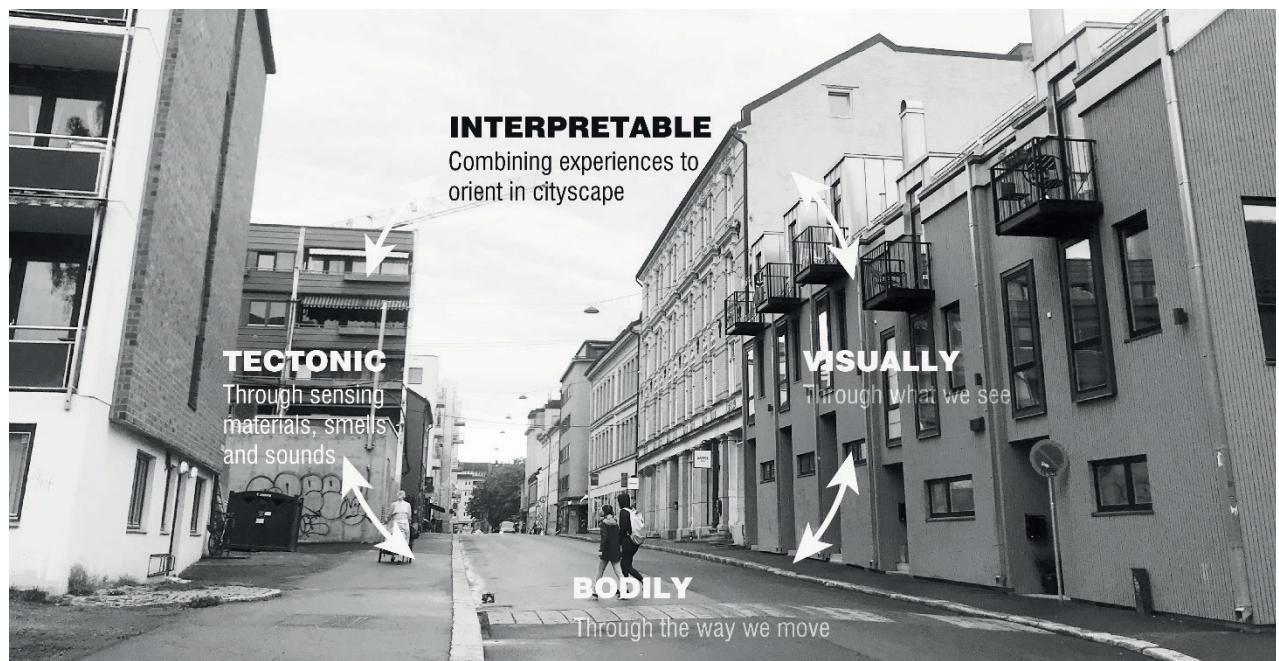


Figure 1. *Urban experience*.

3. Methodology – sampling photos, sketching theory

We have investigated these questions in parallel and along two directions; a photo documentation and sampling of existing examples of this urban element. And a literature review of how this element is treated in urban design theory and text books in urban planning and architecture, with the aim to find an *operational theory* (Figure 2). Based on a directed content analysis of the photos and a critical reading by “sketching the theories”, we have sorted and categorized the existing examples according to the *operational theory* of urban design, the theories of typologies defining building-street relation. We randomly selected, sampled, documented and produced more than 2500 photographs of the building-street relation from real-life contexts in both Norway and abroad. The operational theory of typologies provided us with a theoretical framework that directed our research, results and analysis. We sorted and interpreted the raw data/photos through a systematic process of *coding* (through sketching) and *pattern identification* (through categorizing) with purpose of *refining* existing and *developing* new types and a typology. This approach to categorization can be described as *directed content analysis* where existing theory help establishing and identifying key concepts or variables as initial coding categories (Riff *et al.*, 2006). The process from sampling and sketching of categories (Figure 3), led to a matrix of types (Figure 4). A type in this matter is neither a building, nor a street. We are searching for the particular characteristics that enable us to classify them as a type by the development of a set of related but distinct categories within this phenomenon.

Our method developing the types and typology is situated in the *making disciplines* of design and architecture, bringing in an understanding of design through diagrammatic reasoning, through drawings and diagrams. This spatial knowledge production in our research comprise *diagrammatic development of types produced through relational thinking and drawing*. We have interpreted and drawn theory into visual categories that we have recognized through the empirical material. We have sorted the material and analysed characteristics of this material into diagrams of types that are synthesized into a typology. This process includes activities such as ab-

straction, connection and systems and transaction. As such, the method of using drawings has accompanied the whole process from raw to refined data comprising *sketching* of initial coding scheme, *drawing* of categories, analyzing and *developing* diagram types and synthesizing typology. While academic tradition largely produce spatial knowledge through verbal and textual accounts (with images, maps and diagrams only playing an illustrative role), a few researchers have recently called out for a more comprehensive approach including visual development and reasoning. Dovey and Pavka (Dovey & Pavka, 2019) suggest that the *language of urban thinking* also includes knowledge *embodied* in diagrams and maps central to discourses of spatial knowledge, and fundamentally relational rather than reductionist. Revealing general patterns of both sociality and spatiality, they can contribute to the description and development of morphological types connected to urban complexity and experience.

The procedure involved a seven step process of drawing out and into types: A_operational theory_creating initial coding scheme of depth configuration, B_Coding and sorting of raw data in initial coding scheme, C_Refining coding scheme based on processed data, D_operational theory_introducing levels of visual and physical permeability, E_Defining the matrix – Synthesised knowledge developing types, F_Defining the typology_diagrammatic representation of types generating an analytical tool.

4. Operational theory – Dimensions of visual and physical permeability

Our problem is that the urban element we are investigating belongs to neither the building nor the street, but overlap and relate these two main structures in the urban tissue. The literature review (Figure 2) shows at least four different typologies addressing the micro-element of the building-street relation forming the precedents for this research (Bobic, 2004; Dovey & Wood, 2015; Gehl et al., 2006; Habraken & Teicher, 1998).

These four typologies focus on different aspects of the building-street relation (Figure 2) presenting opportunities to *break through* or *move along* the physical boundary of the building wall. The most detailed typology in our operational theory is Milos Bobics (2004) *entrance typology*

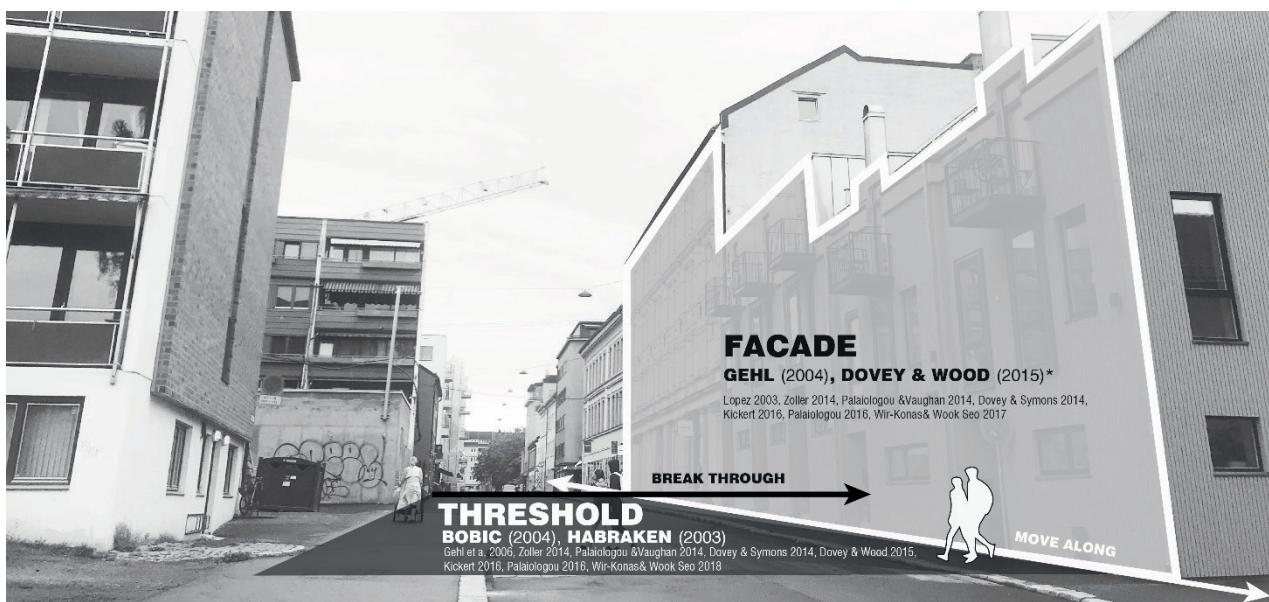


Figure 2. Literature review – a synthesis of perspectives addressing the building-street relation.

including 7 primary types and 40 subtypes. The typology focus on *the permeable link* between the house and the street, in the entrance and topological steps from public to private. Another typology of the permeable access, was developed by Habraken a few years earlier. He developed a multi-scale typology of entrances and gates on all scales from interiors room of a building up to nations based on how they negotiated *movement and flow* between different types of social and legal territories. This two are most concern about the movement *through*, while Jan Gehl's *façade-typology* comprising soft and hard facades, concerns the movement *along* the frontage. His design-driven typology mix aspects of morphology, psychology and value assessment in one combined approach where the building-street interface is classified along a five step axis from A_soft (social, permeable, active, small grain, good details) to E_hard (asocial, blank, large grain, no details). Dovey and Wood (2015) also developed a five-step typology focusing on the physical transition zone, the public-private interface. Their typology includes the *legal cadastral boundary* and not the physical building line as included in Bobic, Habraken and Gehl's work.

5. Defining the matrix

Our research suggest that interface relationship occurs in two main dimensions, *depth and spatial interaction of the threshold* and *visual and physical permeability of the façade*, each including four main types with numerous morphological variations.

We developed the dimension of *Depth and spatial interaction of the threshold* as a synthesis of the photographic data inspired by Bobic and Habraken and their typologies of permeable entrances. We present this boundary between inside and outside as a *threshold*, presented in the dictionary as 'a point of entry or beginning' and 'a strip of wood or stone forming the bottom of a doorway and crossed in entering a house or room.' As such *threshold* is formed of both an object and a relation, it is formed of both the spatial element of form and the active crossing through structure. This duality presented in this term highlights the morphological potential of terminology.

This threshold allows us to break through the physical wall through different steps of *depth*. The configuration of this depth includes topological and/or territorial steps from the street to the house/flat, from the public to the private. As such, the threshold is directly connected to the structure, syntactical arrangement and relation between different steps. Within this dimension, we have developed *four main types of depth and spatial interaction* that define and present structural connections and configurations between private unit/block and public space, described through *diagrams*. They include interesting sub-types that shows a range of formal types and examples of spatial interaction between form and space. Three of the types operate at micro-morphological level, describing the transition of the building on its plot in relation to the street (direct, setback, projected). The last main type operates at block-street level (integrated) and describe a deeper transition from public to private space. This deep threshold type has numerous sub-types and topological steps that can be investigated further through structure diagrams of depth configuration. The *direct* type is strictest and most clear transition between public and private space without any kind of overlaps or spatial transitions. Building, plot and territory meets in the same line facing the street directly.

The *setback* type (subtraction of building mass/space) include a zone of overlap setback from building line within the building mass. The setback creates a covered area physically connected to outdoor public space, a space that define distinct rooms sometimes with specific materiality for roof, walls and floor. It also provides longer façade length and has often been used as expan-

sion of shop windows on smaller plots. The type present a visual expansion of the streetscape from the public into the private domain. The physical subtraction of building mass can occur at street level, over or under connected by steps. Distinction and demarcation of public and private spaces is not as clear as previous type, as public and private space here share territories. *The setback type include seven sub-types: raised street, under building, colonnade, carport, loggia, alcove and niche.* The *projected* type (addition of building mass/space) include a zone of overlap outside from building line. The main building line includes a zone or a margin where building elements, permanent and/or temporary, adds on outside the line sometimes within the plot and sometimes out into the pavement and public space. The elements can be attached to the building in two ways, by projecting out into the public pavement or by creating a distance between building and public space within the private plot (example: front gardens). The type is more complex than the setback and connected to usage within or outside property – or building boundaries. It includes the whole span from spontaneous appropriation (though placements of plant and kids toys) to permanent structures such as steps out into the pavement. As such this type presents ambiguities including practice of appropriation as well as legal distinction.

The last type, *integrated*, included several layers of overlap between building and public space. The type consists of spatial connections and transitions integrated in and as a part of the urban block. It occurs though a sub-division of the urban pattern when public and/or collective space break through the urban form of the block. Buildings and entrances relate out and around a surrounded collective space like an inner street/mews, courtyard or arcade that again connect out to the street. The transitions are complex with a range of layers from public and collective to private, and can further be investigated through configuration analysis using of the generic structure diagram (Kropf, 2014) and topological investigations. It is a very common type within the Norwegian context, often presenting collective permeable entrances towards the street.

The refining process of photo material showed different degrees of visual permeability that could not be included in the dimension of physically permeable interfaces, of depth and spatial interaction. As such, different degrees of visual and physical permeability defined an additional dimension added in the analysis process. We developed the dimension of *Visual and Physical permeability of the façade* as a synthesis of the photographic data inspired by Jan Gehl's typology of soft and hard facades and Dovey & Wood's typology for the public-private interface. We present this dimension and transition between inside and outside as *façades*, presented in the dictionary as 'the front of a building' and with origin in the Latin *facia*, meaning "face". The transparency and permeability of the facade includes different degrees contact between the street and the house/flat, between the public and the private. As such, the facade is directly connected to the material performance of the façade, its form components and properties, and thereby the capacity of creating relations through visual and bodily senses. The façade is the negotiator that takes care of the two pair of capacities, *transparent/non-transparent* and *permeable/impermeable*. As such it is the clearest physical and morphological boundary between inside and outside. This dimension allows us to *move along* the physical facade through constantly changing morphological contexts, and thereby presenting opportunities for urban experiences.

Through the process of the content analysis we developed 4 distinct types of façade characteristics with different degrees of permeability and capacities. The four main types within this dimension define and present visual and physical degrees of connection between the private unit/block and public space, described through *diagrams*. Three of the types are connected to degree of visual permeability, describing different extent/amount of visual contact between inside and outside (closed, one-way transparent, transparent). The last main type describes the physically permeable façade and is closely connected to Bobic's and Habraken's approaches. The

Closed type of the facade present no visual or physical relation between inside or outside. As such it has no capacity of transition but can include tectonic experience through rich material details and/or iconographic elements such as graffiti, or ornamentation. This type of façade could be interpreted as not being able to support urbanity, however we presents this type as engaging a different capacity of socio-spatial relation. As such, the properties this morphological type presents must thoroughly be investigated to address the rich variety of urban experiences urbanity presents. The Opaque window is a type of closed translucent façade defining the transition between the closed and the next main type, the *one-way transparent type*. This type presents one visual relation from inside to outside, from private dwelling out into public space, and works as a way to secure private interests. This relation becomes physical through materiality, as a window with properties defining one relation known from interview rooms, or through the use of different floor levels and/or indoor furnishing such as curtains and plants etc. It is a very common way of securing private interest within the Norwegian context when built form fails to address territorial transition between public and private interests.

The next two facade types are generally included as the main types within the vague term *active facades*, currently prominent within the Norwegian context. *The Transparent type* of the facade creates visually accessible openings between inside and outside. The type include a range of different transparent elements, from a small window to a whole glass façade, presenting different possible connections and degrees of visual permeability. The properties of this type presents the capacities of relating the inner life of a building with the public life of the street. The *Permeable type* include physical openings in the facade between inside and outside. There are a range of possibilities within this category that we experience moving along the street. For example we can measure the density of permeable physical openings, the *entrance-density*, by counting the amount of doors pr. street length finding an index of permeability along the street (Palaiologou *et al.*, 2016). Knowledge of this presents probabilities for socio-spatial encounters. In addition, counting transparent and permeable types on both sides and across the street presents degrees of *inter-visibility*, a capacity relevant for an experience of safety and control (van Nes 2008). Morphological traditions in different countries presents different approaches to the connective element of the building-street interface. In Norway, the connective element is often included in and as part of the buildings and flats, stacked on top of each other. In comparison, the English terraced house use the connective element of the outdoor street where housing is stacked next to each other. The different permeable types are therefore in the first example collective and in the second individual, presenting both higher inter-visibility and entrance-density.

6. Defining the typology of façade-threshold – including a new term of synthesized knowledge

We suggest that the two main dimensions and their main types can be presented in a *matrix of types*, of combined and synthesized representation of *relations*. This matrix include both the physical boundary that define inside and outside (façade) that we move along, but also the element that allows us to break through this boundary (threshold). As such, it links different theoretical perspectives into one combined and comprehensive approach defining sixteen unique types both including facades and thresholds. This linkage we address through the development of the matrix offers a new, combined and precise concept describing this micro-morphological part of the city.

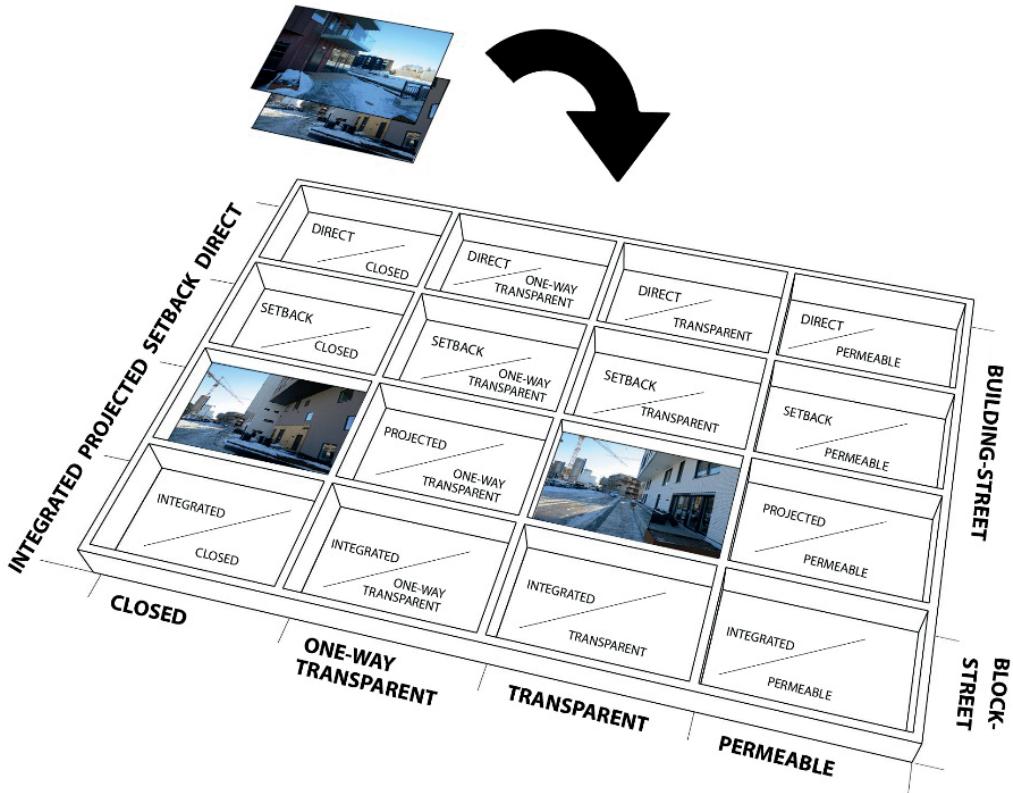


Figure 3. Sorting matrix of the two main dimensions into 16 categories.

We define this concept of interrelating types as *façade-threshold*. We have developed this term to be able to precisely address the two main dimensions of interface relationships that our research reveal. In addition it links form with structure, objects with relations. The term include and develop the dimensions of the established conzenian terminology of the *frontage* and advance the more general term of *public-private interfaces* into a morphologically clear and comprehensive proposition. The concept *façade-threshold* provides a substantial alternative to the more vague terminology of *active frontages/active facades* that currently dominate, particularly within the Norwegian context.

7. Summarized discussion

The final step in the content analysis included a reduction of sorted and categorized visual images into *typological diagrams*. We drew the main characteristics of the photographs into different types as perspective sections and placed these into the matrix of categories. This typological process reduced the different photographs into different patterns highlighted as sub-categories. Finally we refined and synthesized the characteristics into main types of relations, into a range of types of *façade-thresholds*. The process of categorization and type creation enabled us to understand the complexity of the streetscape as an unlimited combination of variations within sixteen different main types of the building- street relation. The *façade –threshold* as concept enable us to focus directly on design solutions for that particular urban element, and thus break down the often strong boundary between the building design and the urban design

We established the *typology of façade-thresholds* as presented in the matrix of interdependent

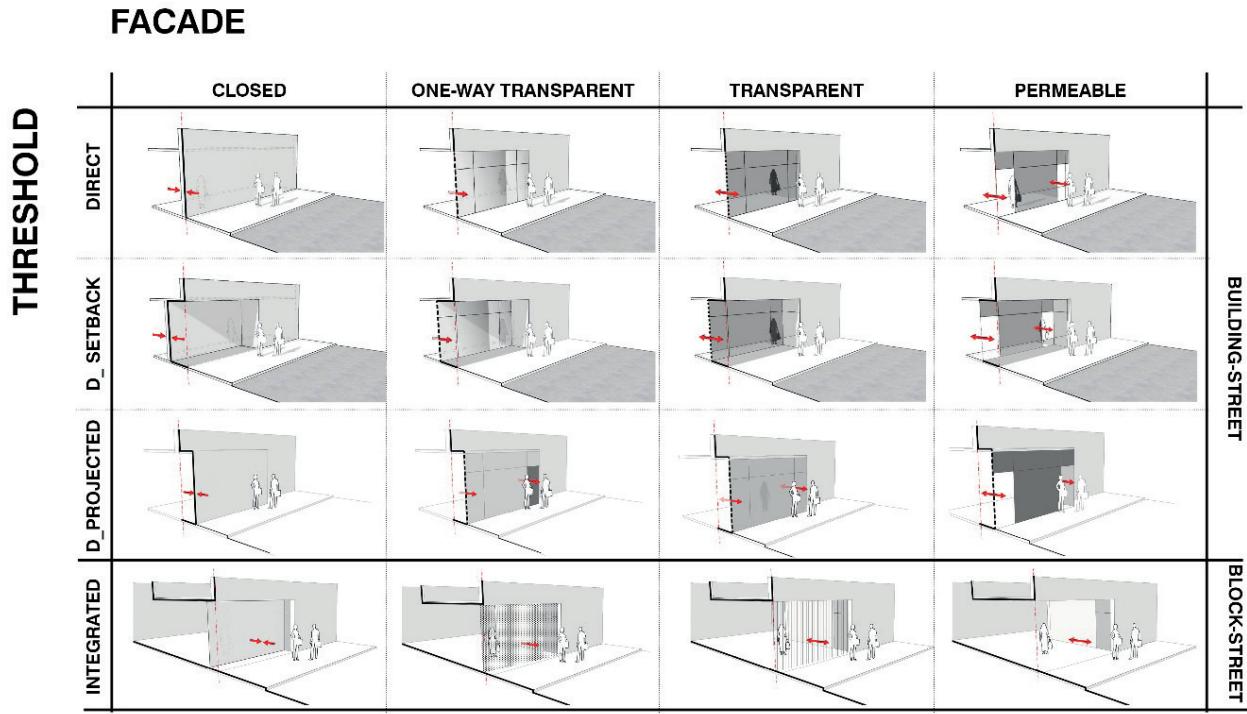


Figure 4. Typology – matrix of the facade-threshold with 16 unique types.

relations, and presented it in a catalogue of interface types that provides a defined morphological knowledge. The matrix of typologies give us the opportunity to use it as a part of *mapping/analysis*, as a part of *presentation* or as part of *thinking* (conceptual), it gives us a way to see, present and understand the world. The categories of typological variations of public-private – displays not only the range of possible solutions, but also the hidden complexity in the urban development. The public-private interface is not alike allover, but address different questions ie about property rights and overlapping spatial use and ownership and in accordance to this; several unlike economical commitments and opportunities.

The aim of this paper is to problematize the urban experience of walking in a city and to contribute to the development of better design solutions through an understanding of how urban micro-morphology influence this. Our experience of how walkable a city is relates to the building-street relation. In new project developments, infill or larger building structures, there are often demands of achieving qualities described through the vague terminology of *active facades*. This term aims to give form an agency, without being able to clearly define the characteristics that comprise it. The value-loaded term presents expectations of a future lively streetscape where buildings are developed through an intention of “eyes on streets”, known from Jane Jacobs’ seminal work. By introducing the façade-threshold as an urban element with its own characteristics, agency and value, we argue that this presents the first step in developing a more precise and focused discussion on how to secure this character and quality in both the building design process and the urban design and planning process. The term also presents an opportunity of making complex relations manifest in types and a typology, which again can help developing legislation and regulation affecting planning and implementation, and the

link between these. In addition it can help understanding the rights connected to both objects (land/buildings/facades) and relations (access, territory, threshold).

8. Conclusion

We suggest that the typology and terminology developed through this research can operationalize solutions that presents good conditions for urban experience. The *façade-threshold* belongs neither to the building nor to the street, but to the city and with the word of Cerdà; an element that might be understood as the quintessence of the urban.

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