

Transitional Spaces: Reconciling Conflicts in Dense Housing Projects

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Abstract

Density strategies are generally perceived as a powerful leverage for sustainable built environments. Reality unveils however a more nuanced appreciation. While the 'Prosperity' pillar of sustainable development is mostly covered, dense building developments tend to lack addressing 'here and now' social and environmental aspects of sustainability, which could mortgage the recognition of the embedded sustainability value and benefits that such projects offer. Design research on European demonstration and best practice sustainable dense housing projects uncovered 'transitional spaces' as a possible outlook.

This paper verifies the feasibility of 'transitional spaces' as a reconciler for conflicts regarding sustainability in dense housing projects. First, based on theoretical insights, density is identified and commented. Second, the problem statement is underlined by a balance on the concept based on strengths and weaknesses. Third, backed by a literature study, sustainable transitional spaces are proposed as a promising reconciling hypothesis. Fourth, case study research on demonstration and best practice projects, as well as research by design on real-life test cases explore, unveil and develop stated hypothesis.

It is concluded that due to intrinsic features and related consequences, dense building strategies contain besides perceived advantages, also barriers for achieving sustainable built environments. The implementation, the activation and the full deployment of 'transitional spaces' is promising in delivering full sustainable successes in dense housing projects. Suitable sustainable concepts for this (re)solution space likely result in beneficial synergies leading to a broader base for both density strategies and sustainable development.

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1. Introduction

The idea of density as a sustainable concept, as a powerful leverage towards sustainable built environments, is collectively agreed by international panels (technocrats and academics) on conventions and targets such as The Brundtland Report (1987), The earth Summit at Rio de Janeiro (1992) and The Green Paper on the Urban Environment (CEC) (1990). As a consequence, it is noticed that within the building sector, contemporary housing developments implement this strategy of density in a rigorous way. There seems to be an urge, a necessity for density when planning and designing new housing projects, regardless the scale (e.g. building block, neighbourhood, district), the typology (e.g. apartment, single family house) or the morphology (e.g. slab, tower, infill, low rise).

History, and unfortunately recent set up projects, unveils however a more nuanced appreciation. While the 'Prosperity' pillar of sustainable development is mostly covered (due to intrinsic features), dense building developments tend to lack addressing 'here and now' social and environmental aspects of sustainability. This deficit causes conflicts which could mortgage the recognition of the embedded sustainability value and benefits that such projects offer.

Design research on European demonstration and best practice sustainable dense housing projects uncovered 'the transitional space' as a possible perspective for stated deficit. Due to specific and embedded features of transitional spaces in dense housing projects (e.g. organizational, spatial, ownership status) it is plausible to state that these spaces contain potential to be uploaded with measures leading to both social and environmental qualities. Qualities intended to prevent conflicts. This paper verifies the reconciling ability of transitional spaces in dense housing projects.

Designed methodology, and structure of this paper, starts with an identification of density. Non exhaustive insights are provided in section two regarding quantitative and qualitative features. Illustrative and prevailing qualitative features, the push and pull factors, are listed, leading to a balance for density and ultimately the problem statement of this paper. Second, based on typological and morphological points of view, a possible first counteracting approach is mentioned. Third, in the core of the research, a reconciling hypothesis is formulated based on a literature review on the aspects of sustainability and especially on sustainability in transitional spaces. The feasibility of stated hypothesis is verified in section four. While the trend of densification is also noticeable in European demonstration and best practice projects regarding sustainable housing, case study research is conducted on the transitional spaces of these up front projects. In addition, research by design verifies the hypothesis in mainstream dense housing projects. Section six discusses the outcomes and reflects on proposed reconciling hypothesis. Towards the conclusion, issues and perspectives finalize the paper.

This paper adds to the knowledge of density strategies, housing projects and more in specific of dense sustainable housing projects. It identifies the transitional space as a solution place for reconciling conflicts and so for sustainability.

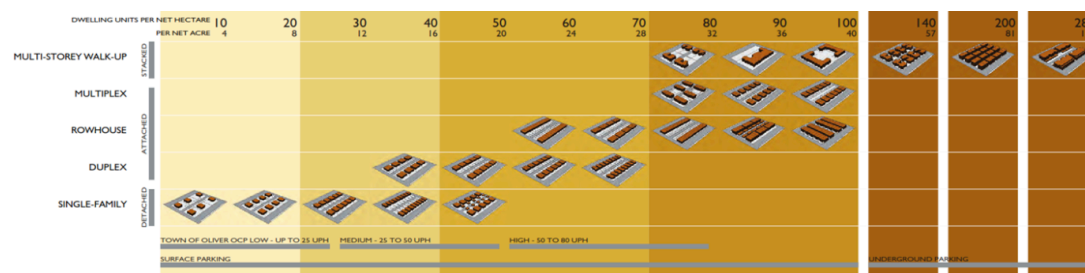
This paper is derived from the second part of an ongoing doctorate dissertation on sustainable dense housing projects (Janssens, ongoing). As the research methodology

focuses on case study research and research by design on a selection of housing projects within the context of Europe, the outcome of this study is tentative and preliminary and needs further discussion and verification.

2. Features of Density

2.1 Quantitative

When planners and designers talk about density, they often use and/or refer to the quantitative approach. Common in this discussion within housing developments is the basic parameter: units per hectare (UPH). Another prevailing parameter, not specific for the housing sector, is the floor space index (FSI). The higher the amount of units or the higher the index, the denser a development is.



In figure 1 some reference values are mentioned, illustrated with possible typological and morphological compositions.

Figure 1: Housing density scale. Source: Neighbourhoods Lab – Design Centre for Sustainability at UBC (University of British Columbia, Canada).

Density is, besides a matter of figures, also and maybe more important a matter of perception. The same density value could be appreciated differently depending on the sociocultural background, the living habits. This perception and appreciation of density is often the result of historical developments.

2.2 Qualitative

Quantitative features are used during planning and design processes, as a tool, a reference, a guidance. At the end, the project needs to have qualities. This subsection identifies strengths and weaknesses regarding qualities of dense housing projects.

The concept of density has some important positive quality features:

- Efficiency of transport, due to spatial concentration of actors and proximity of core destinations
- Less need for motorized transport, reducing transport energy and emissions
- Reduced commuting distances
- Less and efficient infrastructure and energy use (micro, meso and macro level)
- Prevention of the transformation of Greenfield land and reduction of the loss of valuable habitats
- Affordability, both on investments costs as on operating costs
- Support base for facilities & amenities which increases the attractiveness for living in the city
- Increasing the interaction between people (with talent) resulting in innovation.

Regarding the last point, Florida (2008) states: “When people – especially talented and creative ones – come together, ideas flow more freely, and as a result individual and aggregate talents increase exponentially: the end result amounts to much more than the sum of the parts. This clustering makes each of us more productive, which in turn makes the place we inhabit even more so – and our collective creativity and economic wealth grow accordingly. This in a nutshell is the clustering force. One consequence of the clustering force is a sorting of regions into an economic hierarchy.” Glaeser (2011) defines this phenomenon as ‘Tacit Knowledge’.

On the other hand, density may lead to conflicts, conflicts due to some important weaknesses:

- No or disappointing privacy (physical, visual, sound, ...)
- Infringed views
- Limited solar access
- Limited natural light inside and outside buildings
- Low fordability, low visibility
- No or limited recognizability, high uniformity
- Despite high population: social isolation, exclusion, limited social contacts
- Low air quality
- Trapping of anthropogenic heat from buildings within the urban fabric
- Creation of long wave radiation from sealed surfaces that contribute to increase the urban heat island effect
- No or low biodiversity – fauna and flora
- Rigidity / no spatial expandability.

2.3 A Balance of Density: Quality Deficit

The French architect Le Corbusier and Jane Jacobs both defended density as a positive attribute for urban life. Le Corbusier based his arguments on functional grounds, while Jacobs presented a more social approach with her vision of people interacting in streets, propitiated by a mixture of activities, old buildings and small blocks.

When balancing listed features of density, we can conclude that there is possibly a quality deficit on the micro level: poor living conditions, low residential qualities leading to conflicts, both inside the project and between the project and its surroundings. Of course, the degree and range of this deficit depends on the density value and on sociocultural and historical aspects (interpretation of features as ‘problems’ as such).

Strengths are mostly top down oriented, while the weaknesses are bottom up oriented. No or limited support base for the concept of density is found with the actual users, the residents. Density is felt as a burden, not as a successful concept, not in the least for a sustainable built environment. Breheny (1995) warns that the gains may be trivial relative to the pains.

3. Reasoning a Counteracting Approach

In order to create density, dwellings must be linked and stacked. The way dwellings are clustered depends on the configuration, which could be described geometrically. The housing typology and the chosen morphology determine the geometric configuration. Based on Leupen & Mooij (2011) this could be a clustered low-rise, a row, a mat, an urban villa, an infill, a slab, a block or a tower.

It is seen that housing projects with different configurations can still have the same density figure (UPH or FSI) (see figure 2). In contrast, despite the same quantitative feature, the qualities could be totally different, as are the conflicts.



Figure 2: Different configurations with the same density figure: $FSI = 1(m^2/m^2)$.
Source: Rodríguez-Álvarez (2014).

By defending the concept of density, Le Corbusier focused on a combination of tower-blocks and vast open spaces. History unveiled that this approach, prevailing in many modernist views, results in real qualities on the ground floor, the public level, but often has led to conflicts in the upper floors, both the collective and the private parts. Other configurations with the same density could turn out in totally opposite results. So, the choice for a configuration is important.

4. Building An Innovative Reconciling Hypothesis For Stated Quality Deficit

The counteracting approach clarified in section 3 could never be a holistic solution for all scales and all parts of dense housing projects. Also in existing buildings this choice is not an option due to the existing, rigid configuration. In order to avoid or resolve conflicts, a more specific, downscaled and fine tuning approach is required. Following subsections build an innovative reconciling hypothesis.

4.1 Sustainability As A Quality Aim

The development of the reconciling hypothesis starts with the general aim for quality, for sustainability. According to the definition of Our Common Future (WCED, 1987), a sustainable development necessitates a focus both on 'here and now' issues and 'elsewhere and later' matters. Following Our Common Future, numerous efforts were made to operationalize the concept. The most common attempt is the triangular representation with three pillars "environment", "society" and "economy". In some contexts these pillars come to be referred to as "Planet, People, Profit", following Elkington (1995). In recent years the term "Profit" was changed for "Prosperity", and

“Politics”, which aims for participation in decision making, was added to the pillar model.

The two most tangible pillars of sustainable building are ecological (Planet) and social (People) aspects. Buildings have adverse impacts on environment during their entire life spans, starting during construction works and going up to demolition until handling of the waste. In order to reduce these effects, the central principle of ecological sustainability within the building sector is flow management. This implies a diminishing of flows, the closing of loops, the prevention of negative flows and at best the creation of positive flows. This pillar stood at the start of the development of sustainability, and since then there is a broad consensus regarding its components (see table 1).

In recent years, focus split in favour of the people pillar, the anthropocentric approach. Buildings meet demands. These are besides functional and physical also based on social matters. The social aspect of sustainable development cares about the welfare and well-being of users and residents. Focus lies on the core concept of livability, introduced by Van Dorst (2005), which concentrates on emotional and sensorial requirements. Available literature is limited so in order to make social sustainability discussable, a set of components is compiled (see table 1).

ECOLOGICAL COMPONENTS (PLANET)			SOCIAL COMPONENTS (PEOPLE)		
EN E	ENERGY	heating, cooling, lighting, ...	IDI	IDENTITY & IDENTIFICATION	recognition, cultural embedding, ...
WA T	WATER	potable, rain, brown, black, ...	SIA	SOCIAL INTERACTIONS	privacy, social contact, social control, ...
MA T	MATERIAL	construction, techniques,	SCO	SOCIAL COHESION	amenities, management, involvement, ...
AIR	AIR	indoor, outdoor, ...	SEC	SECURITY	privacy, safety, ...
WA S	WASTE	construction, domestic, demolition	HEC	HEALTH & COMFORT	requirements, needs, quality of life, ...
TR A	TRANSPORT	motorized (carbon) vehicles	FLE	FLEXIBILITY	adaptability, expandability, ...
SOI	SOIL	displacement, ...	AVA	AVAILABILITY & ACCESSIBILITY	usability, functional differentiation, ...

EC O	ECOLOGY	wildlife, vegetation, ...	ATT	ATTRACTIVEN ESS	dearness, recreation, ...
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Table 1: Ecological (Planet pillar) and Social (People pillar) components of sustainable development supplemented with illustrative focus points.

4.2 Transitional Spaces As Solution Spaces

When we talk about transitional spaces we implicitly deal with the status of places, and more specific with the transition between spaces with a different kind of user status: the private or the public. Regarding this, it is useful to look at the origin of the word 'private'. It appears to be derived from the Latin word 'privare', which means as much as 'deprived from the public', as Romans believed space belonged to everyone. In ancient Rome there was a strict classification of private and public zones, very well illustrated by a map of Rome by Nolli of 1748 (see figure 3). Everything in black is private, and so 'lost' from the white, the public. Private parts were bedrooms, bathrooms, dining rooms, etc.; public spaces were streets, plazas, atriums, courtyards, etc.

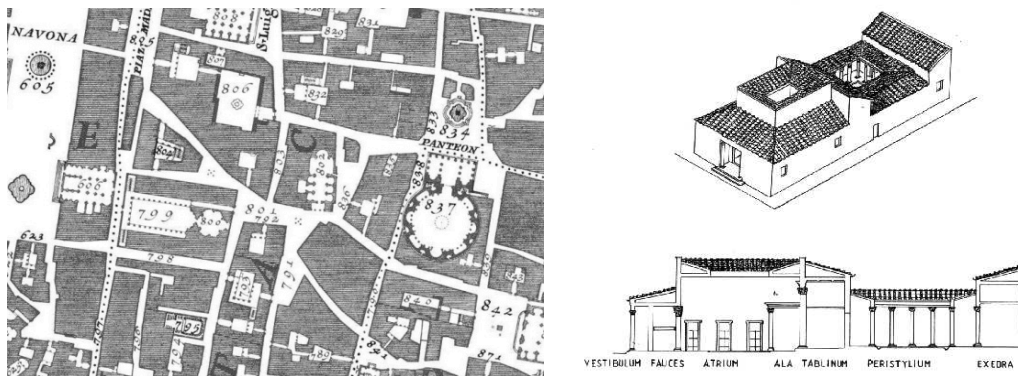


Figure 3: Left: Map of Rome by Giambattista Nolli (1748); Right: typical roman urban villa, with inter alia the vestibulum and the atrium.

Gradually a changing relationship occurred between the private and the public. The appearance and development of an 'atrium' and a 'vestibulum' in typical roman urban villas were the first formal spaces between the public and the private, introducing a gradual change of the user status of spaces. A vestibulum was a formal transition between the public and the private while the atrium represented the private to the public and the peristilium were private outdoor, informal living rooms. (see figure 3)

Within numerous formulated definitions of transitional spaces, the one from Bolos (2009) is mentioned here: ‘Transitional spaces bridge the gap between solely interior and solely exterior. These spaces, in being transitional, take people from outside and through the overlap of nature and building, transfer individuals to a destination defined as inside.’ Transitional spaces are common in both historical and contemporary architectural objects. Depending on the function of the building, their relevance and function differ. Like mentioned earlier, when we want to create dense housing projects, we must cluster dwellings horizontally or vertically or a combination of both. In order to guarantee the usability of these projects, spaces for access, circulation, outdoor spaces, etc. are necessary. We could define those spaces as transitional spaces. Within housing projects we identified 6 different kinds of transitional spaces, based on Van Dorst (2005) and Leupen & Mooij (2011): the public oriented margin zone, the private oriented margin zone, the street/plaza/courtyard, the staircase, the gallery and the corridor (see figure 4).

4.3 Hypothesis

Consulted literature emphasizes the reconciling abilities of primary functional oriented transitional spaces. Bolos (2009) states: ‘Transitional space helps to ease architecture’s interaction with the natural environment, creating a relationship rather than a conflict.’ And more: ‘Transitional spaces are potential agents of unmatched experiential, intellectual, and sensory stimulators. They have also functioned as, and can once again become, the successful mediation of humans upon the earth.’

By broadening and interpreting the mentioned natural environment in the context of dense housing projects as the built and sociocultural environment, transitional spaces are seen as reconcilers regarding possible conflicts with the surrounding natural environment, but also conflicts with the sociocultural environment, inside or outside the housing project on both the project level and the neighborhood level.

Due to the fact that transitional spaces are inextricably linked to the concept of dense housing projects, and these spaces are within the sphere of influence of the project team (public parts exceeds most individual projects; private is lost space, cfr. Romans), it is plausible to state that these spaces have high potential to act as solution spaces. They are manageable and not or only limited users dependent.

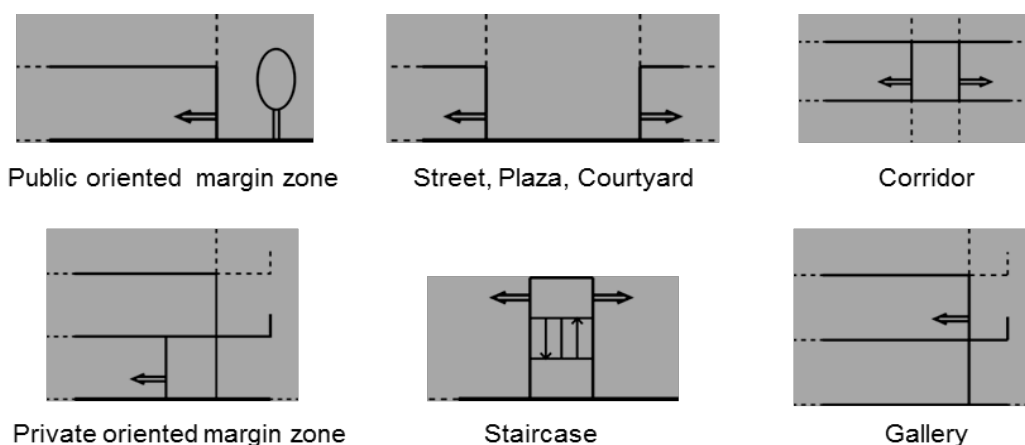


Figure 4: Identified kinds of transitional spaces in housing projects.

Based on these findings, following hypothesis is formulated:

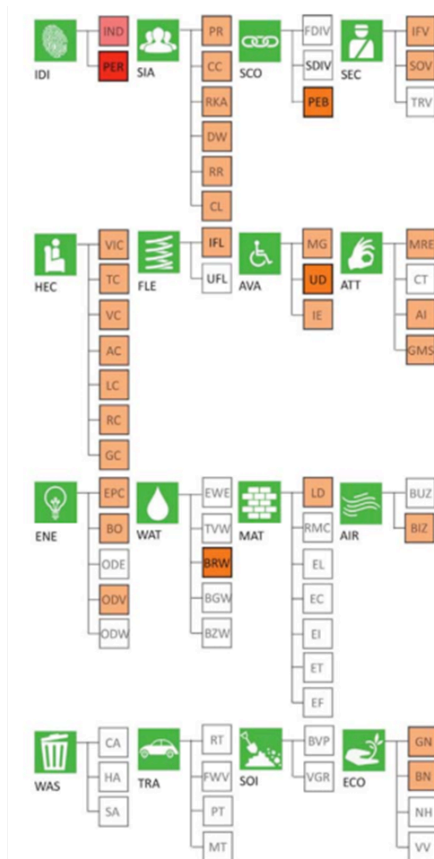
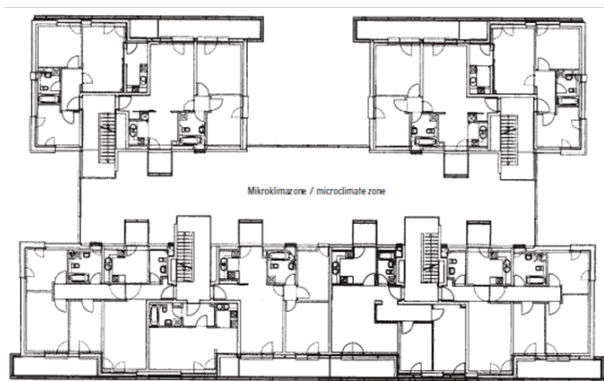
The integration and full utilization of both intrinsic and potential features of transitional spaces according to the aspects of sustainability in dense housing projects has the ability to reconcile prevailing conflicts and moreover create full sustainable projects.

The implementation of sustainable transitional spaces could create a support base both for density (also bottom up) and sustainability leading to mainstream sustainable built environments in the long run. Only when conflicts are tackled the idea of density as a sustainable concept, as is collectively agreed by international panels, is acceptable and is able to act as a powerful leverage towards sustainable built environments.

5. Verification

5.1 Case Study Research on Real-Life Examples

In order to verify stated hypothesis, case study research was conducted on 45 European demonstration and best practice sustainable housing projects. Transitional spaces were analyzed and more specific design decisions and implemented sustainability measures were determined together with their impact on the private and the public parts of the building, as well as on the projects surroundings. By means of a reference scheme regarding components of people and planet pillars, we determined the sustainability profile of the transitional spaces of these dense housing projects. In addition of listing implemented measures, decisions and their outcomes, transitional spaces were also optimized by research by design. This way we wanted to get insights in the maximum possibilities of transitional spaces regarding sustainability, regarding qualities.



By means of illustration of the case study research, figure 5 provides a synthesis of the verification and optimization process for the project 'Kronsberg' in Hannover Germany. The microclimatic street (the transitional space) links the residential blocks, providing accesses, circulation, recreation, green, water, energy, etc. As can be seen by the marked subcomponents, the sustainability profile is very extensive.

5.2 Research by Design on Real-Life Test Cases

In the second step of the verification process existing mainstream dense housing projects were optimized in view of sustainability by focusing on transitional spaces. The aim consisted of figuring out whether and to what extent these spaces could be upgraded into real sustainable transitional places, and so reconcile conflicts, even when the building is already in use. For practical reasons, test cases were selected within the context of Flanders (north part of Belgium). Due to the fact that for decades focus in Flanders was on individual and low density planning programs, qualitative dense housing projects are scarce. As a result there was a huge choice in contemporary projects able to act as a possible test case. All lacked qualities, all had conflicts.

Figure 6 illustrates the test case of a social housing complex 'Potenblokken' in Antwerp, characterized by galleries. As can be seen these galleries were very narrow, very functional, but with no residential qualities. In a designerly way, qualities were added, qualities by which residents could hang out and meet each other on the gallery. In other words create an attractive place for recreation.



Figure 6: Illustrative optimization for the project 'Potenblokken' in Antwerp Belgium. Above: photos of the existing building and gallery; mid: sections of the research by design; below: picture of the optimized gallery.

Figure 7 provides an example of a project in Leuven. An existing car free street between two housing blocks was optimized by incorporating a microclimatic space, margin zones, greenery, water, etc.



Figure 7: Illustrative optimization for a project in Leuven Belgium. Left: existing 'street': wright: optimized 'street'.

6. Discussion of the Outcomes

The verification research made clear that a broad sustainability profile (regarding Planet and People pillars) of dense housing projects is feasible and so preventing-reconciling-eliminating conflicts, by concentrating on transitional spaces. The majority of components of the two tangible pillars of sustainable building could be dealt with in transitional spaces, by embedded sustainability features and/or acquired by sustainability measures and decisions. In addition with the intrinsic sustainable benefits of the concept of density, transitional spaces complete the sustainability profile of projects as a whole.

When we look back at the prevailing conflicts in dense housing projects, it is plausible and feasible that sustainable transitional spaces could reduce or even eliminate these conflicts. This means that sustainable transitional spaces and dense housing projects are a promising combination.

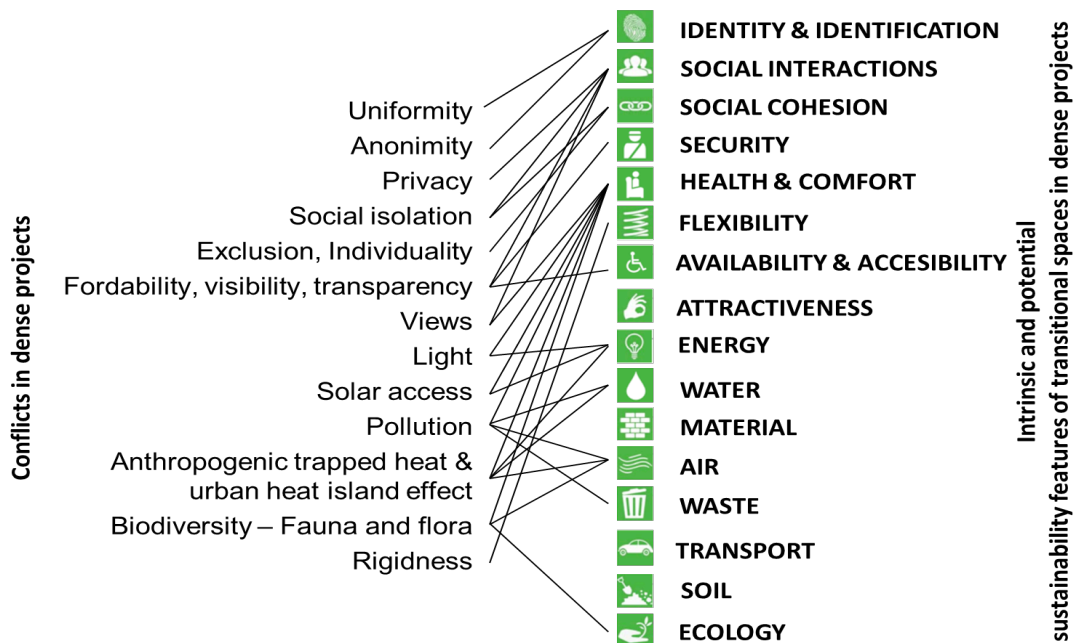


Figure 8: Tackling of conflicts in dense housing projects by sustainable transitional spaces.

And maybe the potential is even higher. Rodríguez-Álvarez (2014) states: ‘One of the consequences of urban concentration is that more people are demanding an additional supply, thus increasing the externalities of cities’. In other words, one of the consequences of density are source – sink problems following the Ecodevice Model (Van Wirdum, 1982) (Van Leeuwen, 1973, 1981) (Tjallingii, 1996).

We see that some sustainable developed transitional spaces respond by implementing measures which closes loops. Examples are:

- internal cultivation: food > e.g. kitchen gardens, small scale allotments,
- reuse/buffering/infiltration: water > e.g. wells, ponds, canals,
- generation: energy > e.g. solar panels, bioclimatic design,
- internal handling of flows: water/waste > e.g. greenery, recycling station,
- needs: space > e.g. open plan, flexible walls,

They decrease the dependence of external resources and prevent passing on problems to higher scales. They think global and act local with local, internal benefits both on planet and social aspects.

7. Remarks: Issues and Perspectives

The subject, the research and its outcomes raises some remarks. What follows are non-exhaustive issues and perspectives brought up by the author.

Research unveiled that not all kinds of transitional spaces are as promising, and that relying only on transitional spaces in order to create full sustainable projects is not feasible. A good selection of promising transitional spaces during the concept phase of a project is needed. The street, the plaza and the gallery seems to be the ones with the most potential. Besides a good selection, designers should aim for synergies. On the one hand between the different transitional spaces, and on the other hand with sustainability measures on other levels or in other building parts. Creating a durable core combined with a sustainable shell is such an example. The core could in this regard be the private spaces, while the shell is/are the transitional space(s). The durable, private core could be upgraded with low tech, basic and long term sustainability measures, while the sustainable, public shell has potential to implement high tech, flexible (accessible for maintenance, changeable, addable), short term measures. Figure 9 shows a project that meets this concept: ‘Futura’ in Zoetermeer The Netherlands.



Figure 9: The project 'Futura' in Zoetermeer The Netherlands combines a durable core with a sustainable shell, a sustainable transitional space.

We saw that the upgrading capacity of certain transitional spaces in existing projects is sometimes limited. This means that initial achieved qualities of these spaces, or realized conflicts of these spaces or of these projects as a whole, are irrevocable. In order to eliminate these irrevocability's, recommendations regarding dimensions, proportions, positioning, etc. should be taking into account during early design stages of new projects / transitional spaces. This way, the sustainability profile of a project can evolve during the buildings life span. Transitional spaces could in this regard be seen as 'flexibility options' (Janssens & Verbruggen, 2012). Another perspective could be the add ability of transitional spaces as a whole. This concept has already been implemented in outdated, unsustainable dense housing projects. Figure 10 illustrates this perspective by the project 'Ellebo Garden Room' Copenhagen Denmark.



Figure 10: The project 'Ellebo Garden Room' in Copenhagen Denmark implements addable transitional spaces in order to increase the projects sustainability profile.

When discussing the feasibility of sustainable transitional spaces, all pillars of sustainability should be taken into account. Aiming at the tangible Planet and People aspects implies considering both the Prosperity and Politic pillars of the operational framework of sustainability. Regarding the Prosperity pillar, a financial study is of course needed due to the proposed development of the transitional space in to a 'place'. Also the believed extra space could pose some issues. However, it is assumed that in fact no additional space is required, at least not on the project level. What in fact has to change is the ratio between the private and the public parts. The ratio between the total size of the individual dwellings and the private outdoor spaces, and the area of transitional spaces. Providing smaller private and bigger public space will be an important incentive, for both the financial feasibility and the proper use of the transitional spaces. This 'proper use' (actual use, no confiscation, etc.) together with e.g. the management and the maintenance are important points of attention of the Political pillar.

8. Synthesis – Outlook – Conclusion

8.1 Synthesis

The starting point of this research was the awareness of conflicts occurring in dense housing projects. Despite intrinsic sustainability features of density, pin-pointed weaknesses resulted in the identification of low residential qualities leading to conflicts and no bottom up support base for dense housing developments. As a counteracting approach it was mentioned that the strategy of densification should be implemented in a qualitative way. Reasoned decisions regarding typology and morphology are important, although the limits (only new build, no comprehensive scope). The focus of this research was on pointing out the possibilities of sustainable developed transitional spaces in view of preventing, reducing or even eliminating conflicts in dense housing projects. Developed and verified hypothesis made clear that the full utilization could be promising.

8.2 Outlook

This research has its limits. A more elaborate research is needed on a wide range of cases. Such a research should provide answers to questions like: What is a good private-public ratio index? What are recommendations to keep in mind for transitional spaces in order to safeguard later upgrading? What are possible incentives for creating a support base for implementing sustainable transitional spaces? Could sustainable transitional spaces be more feasible, more acceptable than the cohousing concept? Could the idea reconcile the, in some regions prevailing, ideal image of living in detached, low density developments with the necessity of group housing, of densification, of living in the city? Etc.

8.3 Conclusion

Besides aiming at a thoughtful density figure, taking into account the sociocultural context, and a reasoned decision regarding the projects configuration (morphology, typology, ...), architect-designers and other project partners should focus more on transitional spaces. These spaces have the potential to act as a powerful leverage for not only social sustainability (often intrinsic embedded in the concept), but also ecological sustainability (acquired by deliberate actions) resulting in both internal and external benefits. Intrinsic and embedded qualities could be added with potential and acquired measures and decisions, in both existing (with terms and conditions) and new build projects.

The main key to success is the recognition and attention of architect-designers for the development of 'places' instead of 'spaces'. Transitional spaces should be seen as an opportunity, not as a necessity. 'Place making' is crucial. This corresponds with the finding of Bech-Danielsen (1998). He means that the 20th century and modernism led to the loss of 'places' which were replaced by abstract 'spaces'. A 'place' is formed by the inhabitants and their participation, in design as well as in daily life and coming transformations of the artefacts. This 'place making', together with a proper private – public ratio index is crucial in developing sustainable transitional spaces as solution or reconciling places for possible conflicts, and for strengthening the

collectively agreed idea of density as a sustainable concept in view of sustainable built environments.

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