Room at the top – the roof as an alternative habitable / social space in the Singapore context

Prof Jason Pomeroy, RIBA
Founder of Pomeroy Studio

Introduction
Roof-tops can be something of a paradox. In some instances they have been forgotten spaces of refuge for the underprivileged where, in cities such as Hong Kong, they have been the reserve of complete shanty communities forgotten by society and planning processes (Chui, 2008). Yet they have also been celebrated spaces for the privileged, as expressed in the art deco penthouses of 1930’s Manhattan - skyscrapers being the legible icons that were symbolic advertisements for the buildings, their clients, architects and, indeed the entire city (Eisele, 2003 pp12-13). However, what Betsky refers to as the democratisation of view (Betsky, 2005 pp7-8) challenged any exclusive preconceptions of the roof top by providing opportunities for society to survey the city as a means of recreation and delight - the Empire State building being a case in point. Its 86th floor observation deck afforded a fee-paying public an opportunity to marvel at a rapidly changing skyline that stood as a symbol of the city’s prosperity (paradoxical given the great depression); and drew as much income through visitor receipts in its first year of opening as was taken in rent that year (Tauranac 1997). Le Corbusier’s 5th point in Vers une architecture similarly highlighted the importance of roof top terraces to not just replenish the area consumed by the building but to also provide space for social health and well being (Frampton, 1992, p157).

However, with population increase, consequent urbanisation and the erosion of the public realm, there has been an increasing reversal of societies’ perception of roof top spaces. As space becomes an increasingly valuable commodity worth preserving, alternative means of densifying our cities whilst retaining the necessary social infrastructure to ensure interaction and co-presence has brought air rights and roof top spaces of existing and proposed structures into greater consideration.

With the consensus amongst demographers that half the world’s population are now living in cities, and with a continued trend towards inner city migration (UNFPA 2007), could it not be argued that the sustainable ‘democratisation of roof top space’ should be considered in conjunction with the democratisation of view in order to address two fundamental issues that beset civil society and its effects on the built environment: densification and the depletion of the social space?

This paper considers the practicalities of utilising the roof to increase built up density of urban habitats aswell as their use as alternative social spaces in the Singapore context. A brief introduction to density and an historical overview of the transformation from the generic ‘city of spaces’ to the ‘city of objects’ will seek to demonstrate the often neglected domain of the roof top as a means of densification. It will proceed to consider roof top extensions as habitable environments, before presenting their ability for adaptation as venues for social interaction and recreation in Singapore. It will be argued that they should be included alongside the conventional urban spaces of the street and square (public) or alternative social spaces of the mall, arcade, court or hotel lobby (semi-public) in the broader open space infrastructure for civil society’s appropriation. It will further argue that in their current guise, they are semi-public domains that will require the re-investigation into existing social boundaries and a greater symbiosis between public – private interests to create more civic roof top environments. Before we consider the roof top as an alternative means to creating higher densities, it is important for us to firstly define density.

The high density environment
As highlighted by Cheng, the term ‘density’ may appear familiar at first glance, but is actually more complex upon closer examination (Cheng, 2010, p3). There are varying measures that include physical density, which is the concentration of individuals within a geographical unit (Ibid, p3). People density has different permutations that include the regional (the ratio of a population to the land area of a region), the residential (the ratio of population to a residential area), and the occupational (the ratio of the number of occupants to the floor area of an individual habitable unit) (Ibid, p3). Measures of building density further demonstrate multiple interpretations. Plot ratio considers total gross floor area of a development to site area, whilst site coverage represents the ratio of the building footprint area to its site area (Ibid, p4-5). Furthermore, perceived density is about the interaction between the individual and the space, and between individuals in the space, which requires the concepts of spatial density (the perception of density with respect to the relationship among spatial elements) and social density (the interaction between people) to distinguish between the two different aspects of the former (Ibid, p12).

As pointed out by Cheng, what these multiple definitions demonstrate is how they straddle different disciplines under different contexts and, more pertinent to this paper, how building density is intrinsically associated with the shaping and densification of urban morphology. In the context of the Asian city, this has materialised particularly in the form of the tall building typology, which has often been perceived as the panacea to spatial shortage and city densification. It owes much to Le Corbusier’s genevaizing cures of clearing the slum and disease that lay behind the Hausmann facades of Paris, as demonstrated in his Plan Voisin. He sought to paradoxically decongest the city centre by increasing the density through high rise building that would contain perfect human cells which correspond most perfectly to our physiological and sentimental needs whilst allowing the automobile to take precedence over the pedestrian (Hall, 2002, p222-225). The likes of Le Corbusier greatly influenced a post war generation of qualifying architects both in Europe and around the world, spawning a legacy of high density development that borrowed heavily from his concepts in order to address slum clearance and an increasing birth rate that would lead to overcrowding. The big cities, many of which were not averse to keeping their own people rather than exporting them to new and expanded towns, read all this as a signal to build dense and build high (Ibid p240-241).

Singapore similarly sought to replicate Le Corbusier’s modern city model in its post-colonial urban development programme that echoed Paris’ quest for urbanisation and sanitisation. His influence can be found not just in Singapore, but in the form of many a global city, and was the subject of Arnis Siksna’s comparison between eight Australian and North American city centres from their founding to present day in respect of block size and form in order to ascertain the effect of particular grids on their subsequent urban development and the potential for increasing density and movement (Siksna, 1998, p253-282).

Gabay and Aravot went further to argue that when inner cities become denser and pedestrian movement increases, the two dimensional plane of the city reaches its elastic limit - forcing the city to move to a second stage of development whereby it can take no more growth without incorporating auxiliary systems and layers, such as transit, parking and subways, to facilitate choice and freedom of movement (Gabay et al 2003, p73). This inevitably thrusts itself into the third dimension in order to cater for increased density and movement.

The shift from an age of industry to an age of technology, coupled with population increase and inner city transmigration has seen the tall building within the ‘city of towers’ become an alluring object of speculation - driven by the consequence of high land prices, economically optimized land use and the desire for a company, city, or country to physically demonstrate power over one’s peers (Sudjic, 2005). However, the research of Sir Leslie Martin et al has demonstrated that there are alternative (and more economic) means of achieving higher densities, not least the exploration of low to medium rise high density typologies such as the courtyard or the terrace (Martin et al, 1972, p36).
What has been considered to a lesser extent, however, is how roof tops and the exploitation of air rights can increase the city’s density, which we will now consider.

The roof top extension as an alternative means of habitation

The exploitation of the roof top and the ‘topping up’ (1) of existing developments has taken place in some of the most populated parts of the World (often illegally), as a means of addressing the issue of densification. The growth of the famed Walled City in Kowloon accommodated a mass surge of illegal immigrants from the mainland during the 1960’s, seeking a better life. Its expansion owed much to the power struggles that took place between British and Chinese governments claiming jurisdiction, but with neither actively administering it. Such contests over space gave rise to an ambiguity of governance that allowed an almost anarchic appropriation of the city and the increasing ‘topping up’ of adhoc dwellings with resplendent community facilities ranging from the local doctor to the grocer (Sinn, 1987, p30-31).

The legacy of the Walled City lives on in Hong Kong, particularly with land shortage and an increasing population. With a total area of only 1,104 square kilometers, less than 25% of the area is developed land and 40% is forests, natural reserves, or marshland. Such physical constraints impose high urban densities of 29,400 persons per square kilometre, making it one of the densest cities in the World (Ng, 2010, p2). With high housing prices, illegal roof top structures that do not comply to the planning or building control process continue to be the home of 3,962 ethnic Chinese (95.5%), Indian, Pakistani, Filipino, and Nepalese (4.5%) illegal immigrants who face social difficulties in integrating into the Hong Kong community. Of the roof top dwellers, 49.9% have salaries below the median household level for the territory of HK$10,000, or US$1,282 (HKSAR 2008), suggesting that the roof top is still the home of an underprivileged and marginalized sector of an otherwise affluent Hong Kong society (Chui 2008) . Such issues of densification through roof tops and air rights have, however, also been explored legally. In the Netherlands, 1.9 million of the 3.4 million hectares of land surface, (or 55.8%) is designated for income generating agricultural produce that impinges on the opportunity of satellite urbanism (Sukkel et al, 2009, p6)

Roof top architecture has therefore been explored in terms of increasing urban density of established built up areas. In order to address issues of population increase and shortage of housing, the 2002 Symposium The Hague: in search of an extra 2 million square metres of land and housing, set the challenge to 4 architects to each find 500,000sqm for housing and to share their proposals. The architect Eric Vreedenburgh demonstrated that, by identifying the total number of homes in The Hague (215,000) and their average surface area (79sqm), a total housing surface area of 16,985,000sqm could hypothetically yield 6329 new homes within the 500,000sqm allocation after the flatness, structural integrity and accessibility were factored (Melet et al 2005, p157). This research has culminated in a series of projects undertaken in the Netherlands that explore the topping up of rooftops in both the residential and workplace sector, such as the Black Madonna in the Hague by the architectural practice Archipelontwerpers, and JHK architecten’s The Bridge in Rotterdam.

This may suggest that the topping up expansion of rooftop properties could be explored further as a legally acceptable means of increasing the density of our cities. However, whilst legitimising the exploitation of roof top space and air rights, there are a number of issues that are both physically and socially challenging in the generic European city. The preservation of Europe’s historical buildings has led to the old city becoming an urban museum filled with built artefacts that cater for nostalgia tourism and its associated income generation (Ibid, p48). Preservationist by-laws reduce the built fabric’s ability for functional change in addition to their very physical structures being less likely to include further programmes of accommodation through structural adaptation above the roof level. Furthermore, issues of access may reduce the efficiency of the building and make retro-fitting expensive, particular if different uses are ‘topped’ above another that would necessitate separate vertical access.
Post-colonial cities that went through a process of demolishing and rebuilding (thus having structures potentially newer and more capable for roof top topping up) may, however, provide opportunities for application. Singapore, like Hong Kong, is faced with the spatial constraint of being an island. With an urban density of 8350 persons per kilometer and an increasing population that is set to grow from 4.98 million people in 2010 to 5.5 million people by 2050, the need to house the additional population has seen ever increasing plot ratio’s in urban areas (2). This has given rise to an enbloc sale culture. Enbloc sale refers to a process whereby residential buildings of a particular age and plot ratio are sold by resident collectives for both the economic gain of the residents, and the economic opportunities (through the increased plot ratio permitted by the state) by the purchasing developer, who would demolish and redevelop the land. The resultant redevelopment of sites leads to increasing building density to cater for the population increase (3).

However, should the existing housing development retain a certain structural integrity, the ability to create roof top extensions could be a viable alternative to the less sustainable approach of demolishing and re-building through enbloc sale, as per Vreendenburgh’s method. This would make the exploitation of air rights and roof top spaces an additional solution to the densification of Asian city centres such as Singapore by locally increasing existing plot ratio’s and, in doing so, provide an opportunity for further social and spatial enrichment of the city at the roof top level.

Increasing the density through roof top extension in inner city centres makes use of existing energy systems, maximises the use of existing public infrastructure and helps reduce the pressure to develop on open spaces. The importance of ensuring that the existing social and spatial infrastructure is not overloaded however, necessitates the preservation of not only the social spaces on the ground but also the creation of social spaces in the sky to allow for social interaction and a reduction in perceived density. This now allows us to consider the variant exploitation of the roof top as a social space but first needs to be considered in the context of an increasingly eroded public realm.

The roof top as an alternative social space

The decline of the public realm, the increasing privatisation of space and its subsequent bestowment of public domain characteristics has been well documented. In social terms it has been attributed by Richard Sennett to the rise of secularism and industrial capitalism (Sennett, 1976). It has been considered by Margaret Kohn as a construct of a process of commoditisation in which something (be that object or space) can be bought or sold (Kohn, 2004). It has also been deemed by Brian Field as an economic response to privatization through the provision of public goods that may be of benefit to more than just the purchaser / consumer (Field, 1992). In physical terms, these authors have gone further to make reference to the physical manifestations of privatised spaces that have responded to such societal need, ranging from the arcade, the retail mall and the hotel lobby respectively. Collectively, they represent a body of urban morphological models that are semi-public domains but bear public domain characteristics.

Population increase, transmigration and the increasing publicisation of privatised space through the development of city centres has placed social and spatial strain on the existing open space infrastructure that has historically been used for both movement and social interaction. Alternative, semi-public social spaces (for example, the arcade, mall, court and hotel lobby) that can help support the conventional, public open spaces associated with civil appropriation on the ground plane (for instance, the street and the square) need to be sought to replenish the loss of open space for health, well being, recreation, interaction and movement as we continue to build skywards. In this respect, the roof top may continue to play an increasingly important role in shaping the open space network within the city, as demonstrated in Singapore.

Singapore’s post-colonial embracing of principles outlined in Le Corbusier’s Ville Radieuse saw the paradoxical displacement of the local from the centre of the island to the peripheral government housing schemes (the Housing
Development Board, or HDB) to make way for an economic re-colonisation by international interests (Tremewan 1994). The eradication of much of the low rise colonial shophouses in order to make way for a ‘city of towers’, and the outlying Kampungs (4) to make way for Unite style housing, also saw the removal of the rich opportunities for nurturing social interaction and co-presence. In the case of former, the ‘5 footway’ within the shophouse typology was a public pedestrian thoroughfare that was maintained by municipal authorities and offered respite from the tropical sun and rain. On the one hand, it permitted motion and surveillance by the dominant Colonial power; on the other, it provided a means for casual exchange, trade and commerce (Ooi, 2004). In the case of the latter, the veranda (or Serambi as it is known in Malay), was a private space that was maintained by the dwelling owner and provided a means of relaxation as well as neighbourly interaction under the shade of the house structure. It too permitted casual surveillance through its elevated position, though this time of the village community.

50 years of urban development has seen a land-scarce Singapore adapt its open space strategy to include a mix of further alternative social spaces, such as the shopping mall and void deck for civil appropriation. These bear a certain resemblance to their respective historical precedents (i.e the shophouse and kampung). The void deck, an open social space at the base of the typical HDB public housing block has spatial similarities to that of Le Corbusier’s unite’s – an object lifted on pilotis in undefined urban space. In social terms, the void deck was meant to instil a sense of community through a communal space programme that would re-interpret the low rise, kampung village life for the displaced Singaporean unwittingly transplanted into a high density living environment. The function therefore changed during the course of the day – ranging from a place to play chess in the morning, to a recreational space after school, to a late night venue for conversations amongst residents. However, the States’ preoccupation with creating a modern and efficient nation that mitigated complacency also meant an implicit social engineering that engendered multi-racial occupancy and correspondent designs that were neutral to social groupings.

If the void deck was to create localised opportunities for social interaction and co-presence for the displaced Singaporean, then the Shopping Mall would in the first instance provide an opportunity for transient, international groups of expatriates and tourists to escape the tropical climate via the air conditioned confines of the retail environment. However, it should come as little surprise that later generations of Singaporeans – unfamiliar with the communal lifestyle engendered in the kampung, would seek recreational refuge in the retail mall and not in the culturally alien void deck – a societal step change catalysed by the integration of the Mass Rapid Transport System (or MRT) that would link the peripheral HDB developments to the centre and eventually allow for a greater social mix between the local and the visitor in the heart of the city via a continuum of social space (Heng et al 2006).

Such ground-scraping or even subterranean social-space infrastructure is however being increasingly lifted to loftier heights in order to cater for physical and social growth, and to address the depletion of social space. The Singaporean government’s advocacy of above ground level social spaces within the tall building that compliments the urban vocabulary of street, square, sky way and concourse is starting to see the traditional void deck being vertically extrapolated to form intermediary and / or rooftop social spaces in the form of sky courts and sky gardens respectively. Early examples, such as Bedok Court, a popular Singaporean housing estate, sought to embrace the socio-environmental properties of the traditional veranda spaces of the Kampung tradition, and replicate them in the sky (Bay 2004, p333-343). Its ability to provide flexible social spaces that could be spatially adaptable according to the dwellers social need whilst not compromising the percolation of natural light and ventilation into the apartment also resonates in more recent residential examples, such as Newton suites, Singapore (5). In both examples, the ability to include the vertical open spaces within the high density object, and in doing so catalyse social interaction within the shade, shelter and comfort of planted terraces, goes some way to fostering more coherent vertical communities.
Sky courts as an alternative social space could be a worthy addition to the urban vocabulary. There is, however, still a certain reticence to their incorporation into the tall building typology. This is often due to the perception that the sky court contributes to a loss of lettable or sellable area, thus requiring government agencies, such as Singapore’s Urban Redevelopment Authority, to legislate the incorporation of such sky court spaces and offer planning incentives (6). Roof top gardens however, may be perceived as an easier social and economic ‘win’, given the roof top’s pre-existence that does not compromise the envelope of the building. Recent tall building developments in Singapore have seized upon such roof top opportunities, most notably in two schemes that have marked the Singapore skyline. Their raison d’etre however could hardly be more different – one being associated with entertainment and leisure and operated by a private entity; the other a social housing scheme that is government operated.

Marina Bay Sands, in the case of the former, is an integrated resort and a destination for meetings, incentive travel, conventions and exhibitions (MICE) that will accommodate up to 52,000 people, making it one of the largest such facilities in Asia. The 3 prominent hotel towers stand at 57 storeys and will be crowned by a sky park 200 metres above the ground. The 1.2 hectare park will be the World’s largest public cantilever with observatory, housing roof top pools, bars and restaurants, space for performances, in addition to lush tropical landscaping and a 360 degree panoramic skyline.

The Pinnacle, in the case of the latter, represents the HDB’s current morphology of the high density social housing block. Subject of an international competition in 2001, the winning scheme comprises 7 blocks of 50 storeys in height, and will contain 1848 family units when similarly completed at the end of 2009. It represents several firsts for public housing development in Singapore, including modular plug in façade variations, a plot ratio of 9 and not least the fact that 11 sky gardens reinterpret the void decks of the past HDB blocks as a series of elevated public open spaces. The intermediary gardens at the 26th floor serve the residents only, whilst the 50th floor roof top garden is accessible to the public in addition to residents.

In both cases, their roof top gardens demonstrate Singapore’s commitment to creating a vertical garden city and a willingness to implement planning policy guidelines for onward physical realisation. Socially, the incorporation of such alternative social spaces in the sky reinforces the existing ground and subterranean open space network of street, square, void deck and the more alternative social spaces of the integrated retail mall and MRT concourse. With increasing densification and the continued move skywards, the roof top garden also democratizes open space for occupants of high density environments by negating the need to go to street level to engage in recreational activities. It also provides the opportunity for the visitor or local to play actor in their public interaction with others; and spectator, of a rapidly changing skyline.

However, the premise of creating successful public spaces in the sky is not without scrutiny, and one needs to consider its grounded cousin, the void deck, in such a consideration in conjunction with Bernstein’s discourse on visible and invisible pedagogies (Bernstein 1975, p23-41). The void deck is a public space of the State – it allows civil society free passage but has explicit rules of town council governance (e.g: no ball games) that permit residents and visitors to act and spectate in a particular way and abide to civil conventions that do not conflict with the socio - political stability of the place. There are further implicit rules of governance (e.g: the space can be used by social groups to play cards on a particular day of the week) that are born out of the resident community’s appropriation of the space that may instil a sense of social exclusion for the non-resident, in a similar way a retail mall or hotel lobby may be priced to exclude particular economic sectors of society.
In the case of the Pinnacle, the 26th storey intermediary gardens have explicit rules of governance as to who can enter and who cannot – they are ultimately privatised spaces for the sole use of its residents and are thus encoded with explicit rules of exclusion, despite being deemed public by State. Its 50th storey sky garden, again deemed public, also has explicit rules of governance but are encoded with implicit rules of exclusion with the proposed levying of an entrance fee to gain access to it as an observation deck. Those who can afford to pay for a view will enjoy a panoramic skyline; those who will not or cannot will be excluded by their own choice or economic circumstance. Thus, in this case, it could be argued that the freedom of passage and ability to appropriate the roof top space as one feels free to socialise in the public domain of the street and square runs the risk of being nullified; not, as one would assume, by private interests anxious at the preservation of their asset, but paradoxically by State governance that would under normal circumstances promote greater levels of inclusivity in the use of open social space by local and visitor, resident and non-resident.

The Pinnacle would suggest that sky gardens are destination spaces that capitalises on their elevated position to glean panoramic views for Man to appreciate his own urban creation. They can also be deemed semi-public social spaces - physically constrained by the very structures that retain them; strongly classified as to their function, and socially constrained by the implicit rules of a community or the explicit rules of the institution, company, association or group that governs them.

Conclusion

Roof tops need not be a forgotten realm, but should be re-celebrated as a space that can support the densification of our cities by providing greater surface area for living and playing. As a living space, they could help solve the increasing inner city migration issues by providing new homes without compromising land area or the existing urban grain. As a playing space, they allow us to enjoy pleasant skyline views or partake in recreational activities that support health and well-being. They can also serve to replenish the loss of open space for civil appropriation in their inclusion within the existing urban space vocabulary of the square, street, arcade, void-deck, concourse and skyway.

For the sky garden to be truly public however, conventional social boundaries will need to be re-investigated. The freedom of movement vested in the street and square will need to be applicable to the lift, stair or escalator, necessitating a cultural step change of acceptance by the occupants of buildings who will need to share such circulatory space with strangers. There will also need to be a greater symbiosis between public and private interests in the design process and in the management thereafter. Assigning responsibility to just the State runs the risk of explicit rules that may be deemed overtly controlling that could lead to a sterility or even spatial redundancy; submitting to particular civil group interests run the risk of being socially exclusive and engendering territoriality. The creation of the most successful public spaces, according to Peter G Rowe, have been born out of the shared values of civil society and State, where citizens can engage in public activities and debate among themselves, as well as with the state about matters of public interest...at the best of times there is often a convergence of these interests, as numerous institutions and other entities find something in common across the boundaries that usually separate the state and civil society, and therefore are in a position to create something civic (Rowe 1997). With the increasing democratisation of roof top space empowered through governmental legislation, perhaps the adoption of the roof top as a public space atop the private object supports the symbiosis between private and public interests, represented by civil society and State respectively; and will help democratise the roof-top for greater civic appropriation.

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Notes
(1) ‘Topping up’ is a term for building on a roof, often adding the same social, functional and even architectural programme on an existing building in the interests of increasing volume and density.
(4) The Kampung is a traditional village comprising of dwellings and essential conveniences, often created using locally sourced materials and is indigenous to South East Asia.
(5) Newton suites can be found at www.wohadesigns.com> [accessed 10 August 2010]