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Urban form and the resilience of Chinese villages during rapid rural-to-urban transformation

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Abstract

The rapid urbanisation of the last decades in China has seen many areas transform at record speed from rural to urban built-up land as the cities grow outwards and land is requisitioned. Farmland is turned into swathes of factories, enclosing old villages at the edges of the city, while migrant workers are arriving from the distant rural provinces of western China. This research investigates the changes of the urban form and social structure in the case of the Huangyan-Taizhou region over the last 20 years as the area transformed. Different transformation paths among the villages of the region will be investigated and how unequal distribution of spatial opportunities and adaptability of urban form connect to long-term resilience. For that, computational mapping methods through satellite imagery and accessibility analyses have been combined with qualitative observations and interviews. This has been embedded in the theoretical discourse around urban segregation by Hillier and Vaughan, the concept of operational landscapes by Brenner and informality by De Certeau. The findings show that urban built form has a direct impact on the resilience of villages in the struggle to establish alternative sources of income after their agricultural land is transformed. Adaptability of the surroundings and the potential for informal activities are crucial for villagers' and migrants' livelihoods. The potential of the urban fabric to generate movement from a wider catchment area has an impact on the creation of businesses in the villages. This has shifted to the transformed areas away from the rural parts of the research region. However, on a local scale the villages are still the centres of social activity and identification, especially after they become surrounded by new industrial built-up land, which is not able to create comparable urban characteristics.

Keyword: Chinese urbanisation, Land Transformation, Space Syntax, Urban Village, Informality

Introduction

The rapid urbanisation of the last decades in China has seen many areas transform at record speed from rural to urban built-up land as the cities grow outwards. Global demand for goods fuels the construction of more and more factories at the outer edges of the city, with migrant workers arriving from the distant rural provinces of western China. As the city grows, it incorporates former farmland, traditionally under control of grassroots village collectives. Factories often keep relocating to take advantage of the cheap land and labour costs at the very edge of the city. This is referred to as the Urban-Rural-Interface. By selecting a specific research region in Taizhou, Zhejiang, it will be investigated what happens to the spatial and social structure, when the Urban-Rural-Interface moves through an area. Especially the agency of individual villages to shape the process and the ability of formerly rural villagers and migrant workers to adapt their everyday-life spaces will be examined. For that, regional spatial data will be evaluated, and space syntax accessibility analysis is

conducted. This quantitative approach is accompanied by a qualitative study of previously conducted fieldwork and photographic data. This research has been conducted as part of the Urban Rural Assembly (URA) research project, funded by the German Federal Ministry of Education and Research (BMBF). The following research questions are being investigated: First, it will be looked at how the urban-rural structure of Huangyan-Taizhou changed and what the role of the village collectives was. The second question is what the implications of the urban fabric transformation are on economic resilience of the villages. Finally, it is examined how informality manifests in the research region and how it relates to the wider transformation process.

Background



Figures 1-2. Old informal buildings and new rebuilt housing units in the Huangyan-Taizhou research area. Source: Urban-Rural-Assembly Research Project.

Land Transformation and the Urban Village

As the city grows, it reaches the limits of urban land and the beginning of what is classified as rural. The urban municipality starts to requisition that rural land from the village collective it belongs to, turning it into urban land. This process requires appropriate compensation to the members of the village, which is mostly subject to the negotiating skills of village chairmen. The compensation mostly includes a one-off cash payment that is then distributed among the villagers. Also, some of it may be collective land that can be retained by the village community to build on it for profit. In other cases, relocation may happen to newly developed buildings or flats, sometimes including a highly sought-after urban hukou. Since compensation of farmland is a lot less costly than that of built-up land, the buildings of the villagers are mostly spared and the plots they stand on remain village land, which means that the village collective keeps on existing even after its surrounding agricultural land has been absorbed into the urban land of the city. This gradual enclosure has earned them the name Urban Village, or *Chengzhongcun*. Having lost their farmlands, the villagers turn to more urban occupations, often in the informal area through renting and creating their own business (Wu et al. 2013). The arrival of migrant workers, or floating population, is thus a blessing to most villagers (Li and An

2010). They are hoping to make a living in the many factories that are in the transitional area between urban and rural land, called the Urban-Rural-Interface. As the city grows outwards, factories with unskilled labour demand move with it to take advantage of cheap land prices and informal tax arrangements with rural villages (Li and An 2010). This forms a reciprocal relation with migrant workers, who also rely on cheap rent and informal arrangements due to their hukou status (Yan and Wei 2004). The factories also depend on proximity to the urban villages that can accommodate the workers (Liu et al 2010).

Space Syntax Framework and Movement Economy

Transforming the built environment also reshapes society. Hillier and Hanson (1989) argue in their seminal work that space is not just a form of expression for a society, but it is also a set of strategies and tools for it to structure itself and maintain a certain order or culture, by means of spatial relations. This information is embedded in the urban fabric of cities, towns and villages. The configuration of the street network is the main generator for people's movement, and thus economic activity (Hillier et al. 1993). The part of the movement intensity that is generated simply by the configuration of the street network is called 'natural movement' (Hillier et al. 1993, Hillier 1996). This natural movement can be precisely calculated through space syntax analysis, with the value of integration describing 'to-movement' and choice meaning 'through movement', coming from network graph analysis measures. Shops and other businesses are found on streets with high integration or choice because that is where movement is taking place. Some correspondence has been shown between indices of deprivation and spatial accessibility (Vaughan and Geddes 2009), as the latter is connected to employment, amenities and the embeddedness in the wider society (Legeby 2009a, Vaughan et al. 2018) as well as access to and participation in lively streetscapes (Legeby 2009b). Similar results have been suggested by Vaughan (2005, 2007), who found that historically, migrant settlements were near active economic centres but were spatially segregated by specific street layouts. This was to avoid high travel costs but also since new, unskilled labour migrants relied on informal job hires through informal networks. Vaughan argued that clustering happened without segregation.

Methodology

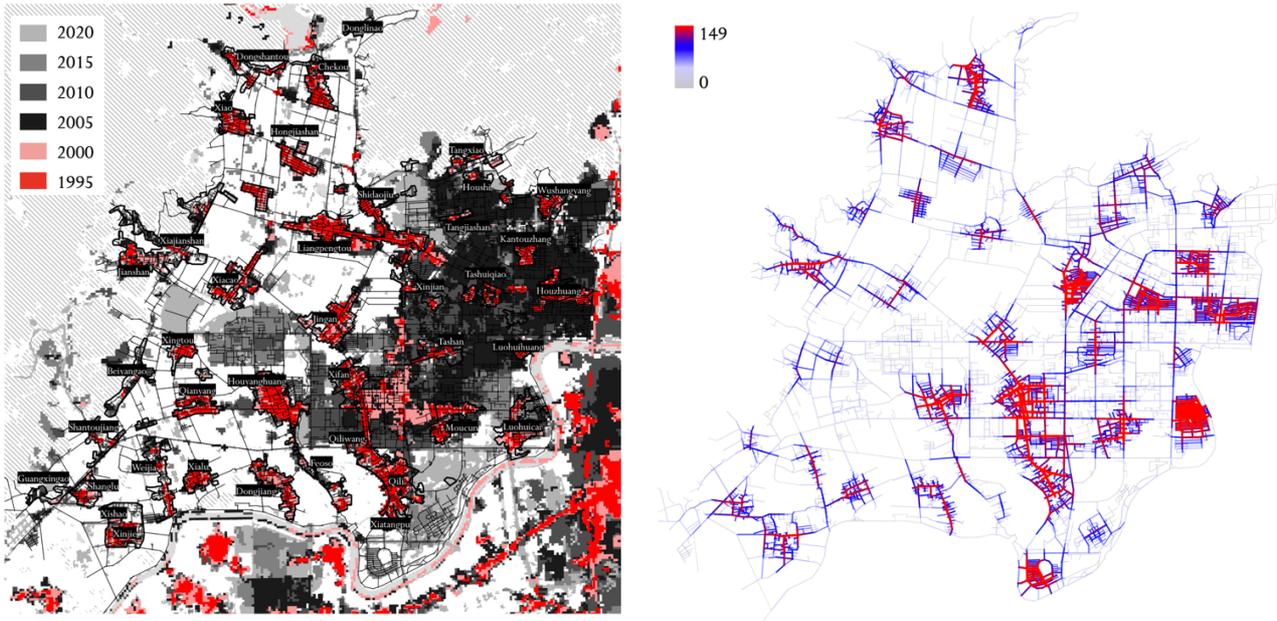
A combination of both qualitative and quantitative research methods has been employed for this thesis. At the heart of the quantitative approach in this research sits the space syntax framework (Hillier 1996). Space syntax analysis is a socio-spatial analysis rooted in graph theory. It uses only the street network and the angular relationships of streets to one another. The underlying data is a manually drawn axial map of the research area. Axial maps are the collection of axial lines, i.e. the longest lines of sight representing the street network. The measures calculated through space syntax analyses correspond to the potential for movement in the urban fabric. For this research, integration which expresses the potential for to-movement and choice which is used to assess through-movement have been calculated. This has been done both for a very local

radius of 400m, or a 5-minute-walk as well as a medium radius of 1600m or 20-minute-walk (short car trip). Due to limitations in travel because of the ongoing Covid-19 pandemic, qualitative fieldwork data collected in 2019 by the URA project was used as no new field data could be obtained from the research region in 2020. The Huangyan-Taizhou urban region is in Zhejiang Province, south of Shanghai. Taizhou City consists of three urban districts, one of them is Huangyan, which is at its eastern end highly urbanised, while on the other side very rural and agricultural in its character. At the Urban-Rural-Interface, the edge of the growing city, sits the new Smart-Moulding-Town development in the Xinqian Neighbourhood of Huangyan. An area of around 7.5 x 7.5 km around this development has been selected as the case study area, giving it the name of Smart-Moulding-Town (SMT) area. Within it, four villages have been selected based on their individual process of land transformation.

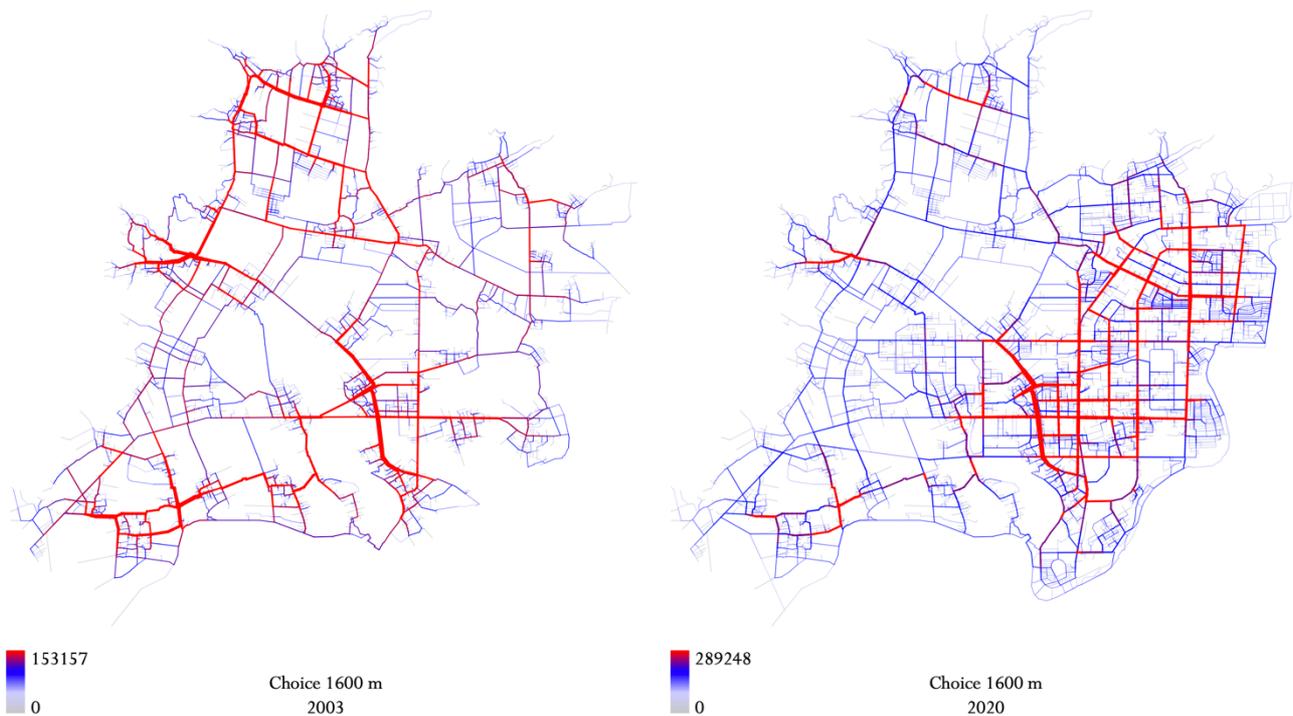
Results and Discussion

Villages In a Sea of Industry

Figure 3 shows the age of the built-up land in the research area from land classification. The old villages get surrounded as farmland is transformed all around them into industrial land. As can be seen, this process is more advanced on the side of the approaching city towards the east. Residential areas are mainly developed within or attached to existing villages, which is due to the land transformation rules. The city requisitions agricultural land but only very rarely village dwellings. Farmland is simply swapped with industrial land which lacks the diverse mix of active land uses typically found in urban environments. Interviews across the area have shown as well that the villages remain the main factor for the inhabitants in ordering the social fabric of the wider area. The villagers have their *hukou* (household registration) in their village, the migrants live in those villages as well. The village collectives are organising political decision making and each village has a village announcement board in its centre (Interviews and Observations Field Trip 2019). Figure 4 shows that this is reflected in the space syntax integration analysis on a 400m radius of the area, as the old village cores are being picked up. While villages further away from the urban-rural-interface and the progressive land transformation remain the same, some of the transformed villages show increased accessibility through the added residential roads and their layout as villages, even after complete rebuilding. This sets them apart from the surrounding industrial land, and the integration analysis on this scale can show this separation very clearly. The implications are that during a 400m (5 min) walk, one would be likely ending up in a street that is where the old village centres are or were in the past. The village areas are the most dominant spatial environment for the inhabitants, and it is very likely that local pedestrian activity happens within them.



Figures 3-4. Age of the urban fabric and Space Syntax Integration 400m analysis showing old villages in 2020.



Figures 5-6. Space Syntax Choice 1600m analysis showing intermediate scale movement through new-built areas.

Shifting Movement to the Urban: Economic Opportunities and Access to the City

The space syntax analysis for a 400m (five-minute-walk) radius shows the old village cores both in 2003 as well as in 2020, suggesting a continuity in the role of local villages for structuring residential space. Looking at the results on a larger 1600m scale (20-minute-walk, short car drive) in figures 5-6, a different trend can be observed. This scale has seen a dramatic shift with the building-up of land from an equal distribution of accessibility across the research area before the large-scale land-transformation towards an urban-rural-

divide as the urban-rural-interface moves through the area. The ability to draw a large amount of movement from across this scale relates to the economic potential of space and thus the value of land after the transformation. Shops, restaurants, markets, and workshops rely on customers. Factories need to have good access to the transport network and the surrounded villages have an additional income from renting accommodation to migrant workers. It becomes apparent that in 2020, there are clear beneficiaries of the transformation, while others have been overtaken in their relative position among the area's villages. The distribution is thus a lot more unequal than at the beginning of the land transformation in 2003, towards more spatial inequality and thus different opportunities for the inhabitants in terms of access to urban resources and the opportunity to maximise the return on their village land during the moment of requisition.



Figure 7. Space Syntax Choice 1600m analysis showing intermediate scale movement through new-built areas.

Conditions for small shops and businesses: opportunities for migrants and locals

Opening a small business plays a big role as a tool for survival in adapting to the new living conditions for both migrants and local villagers. For villagers, it is a way to generate income since land transformation has taken away agricultural land as their base of subsistence. In the compensation process, property or sums of money may be distributed among the village population which can mark the start for self-employment. In the same way that it is common to subdivide flats to rent out to migrant workers, property can be subdivided to accommodate a small business. As shown in figure 7, movement plays an integral role to the emergence of commercial activity measured by shop and restaurant locations. The accessibility of the transformed land thus generates an “economic potential” by directing movement and thus purchasing power to certain areas. While it becomes clear from the mapping that shops and restaurants are almost always found on streets with high ‘natural movement’ (Hillier et al. 1993), other streets with similarly high movement values remain empty

of commercial activity. The economic potential is only realised where the land is village land, as those factories are not able to accommodate restaurants and shops and are generally closed-off from the street. The villages become commercial islands too and amenities along the outside edge of the village, facing the bigger roads and factories on the other side, are crucial in serving the wider area and through-traffic. It can be concluded that where high accessibility and village land ownership overlap, there can be shops, restaurants, and small businesses.

The role of adaptability and informality

The aspect of informality that has been touched upon before gains even more importance in this context, as formal access to property is expensive and difficult for informal migrants. Smaller units and short frontages further reduce the price and lower the entry threshold and the attached economic risk (Hall 2011). Thus, environments where informal subdivisions and property ownership are simple, the density and diversity of businesses is higher. This, in connection with enough movement generation, allows hubs like Kantouzhang village to emerge. Organically grown villages (figure 1) that retained their original housing stock offer the possibility of small-scale, incremental, informal changes and tend to be more densely and diversely populated by commercial amenities than rigorously planned, redeveloped ones (figure 2). Despite the rapid urbanisation and the increasing number of multi-storey suburban houses that represent urban typologies, the villagers' behaviour and its visible manifestations reveal that livelihoods are much slower to change. Even rebuilding an entire village as a suburb does not change the fact that the people that live there have until recently been farmers or craftsmen for generations. Their 'ways of operating' (DeCerteau, 1984) do not change as easily as the buildings around them, and they need appropriate spaces for their activities. The less the spaces around them allow for that, the more energy they must spend on making them happen. On the other hand, the more flexible and adaptive they are, the easier it is to prosper for the villagers.

Conclusions

It can be concluded that instead of a diverse urbanisation in the Huangyan-Taizhou area, the agricultural land surrounding the villages is replaced by monofunctional industrial use. As the control over the land mostly changes from the villages to the urban municipalities, the long-term revenue leaves the villages while one-off compensation arrangements are made. The original built-up village land with the villagers' dwellings remains the only form of diversity or urbanity. The process of land transformation starts the transition from rural to urban ways of life. At the same time the public resource that used to be arable land around the villages is turned into the new public resource of urban movement. This relates to Hillier's (1996) concept of the movement economy, after which a city's commercial structures emerge along accessible parts of the urban fabric that generate movement through their configuration. When employing tools to measure the potential for movement in the Huangyan-Taizhou area those opportunities are not evenly distributed and

that through land transformation shifts are happening between them. This then has implications on the value of land and villages' ability for resilient development. The long-term resilience of the villages also depends on their ability to accommodate different ways of life and economic activity. This relates to De Certeau's (1984) description of 'ways of using and operating' of everyday life spaces, as a practice to appropriate and make do with the spaces imposed upon people. The local villagers in the Huangyan-Taizhou have been living agricultural lives or with small workshops for generations, without receiving the education of urbanites. Many of them are thus struggling to establish a new income base and rely on the adaptability of their surroundings, often informally expanding or subdividing property to create a business or rent out space. While the buildings around them change, many villagers' rural ways of operating and economic survival tactics remain.

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