



Institutional determinants of brownfield formation in Chinese cities and urban villages



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ARTICLE INFO

Article history:

Available online 27 May 2014

Keywords:

Brownfield
Formation mechanism
Deindustrialization
Urban villages

ABSTRACT

Brownfields are spatial manifestations of previous economic activities, and their redevelopment may contribute to a more sustainable urban land-use in the rapidly urbanising environment of post-reform China. Owing to China's unique institutional background, two types of brownfields can be distinguished in China, namely of brownfields in urban areas and brownfields in urban villages. Based on this twofold classification, a stage model consisting of three stages (industrialization, suburbanization, and deindustrialization) is introduced to conceptualize the formation process of brownfields in both types of locations in Chinese cities. Deindustrialization of economic activity in the urban core is considered as the main cause of brownfield creation. Differing characteristics of brownfields in urban areas and brownfields in urban villages are interpreted in detail, consisting of land ownership, size of the site, spatial distribution, the mechanisms by which the sites are created, and the stakeholders involved. This article concludes that future research on brownfield redeveloping strategies in China needs to pay particular attention to different institutional settings of urban areas and urban villages.

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Introduction

The steady increase in urbanisation that is underway worldwide (UNFPA, 2007) is often accompanied by the conversion of large tracts of agricultural land into non-agriculture land. Paradoxically, in many fast growing cities, while urban land is expanding into rural areas in an uncontrolled fashion, many distressed inner-city sites are left unused. This has prompted a discussion on using urban land in a more sustainable and intensive way, and large-scale urban expansion is no longer encouraged. Brownfield redevelopment has therefore been recognised as an important means of pursuing sustainable urban development (Alberini, Longo, Tonin, Trombetta, & Turvani, 2005; De Sousa, 2008; Dixon, 2006; Hula, Reese, & Jackson-Elmoore, 2012).

Brownfield redevelopment has only recently begun to attract the attention of Chinese academics (Cao & Guan, 2007). Large-scale industrialisation has left a legacy of industrial districts in Chinese cities. After decades of continuous development, many urban industrial areas have become or have the potential to become

brownfields. According to the World Bank (2005), there are at least 5000 brownfield sites in China. In the time since the publication of the World Bank report, this number has certainly increased significantly. Having recognised the magnitude of the problem, in March 2013 the Chinese government released the Special Plan for the Revitalisation of Old Industrial-Base Cities (2013–2022), one of the central focuses of which is the redevelopment of problematic, formerly industrial urban areas. The implementation of this plan is expected to lead to the development of policies and the allocation of considerable funds.

However, there is a lack of understanding of the formation mechanism of brownfields which is crucial for more successful practices of their redevelopment. The majority of the existing literature is based upon brownfields in the Western context, paying little attention to the specific Chinese context. The characteristics of brownfields in Chinese cities differ from those in western countries. Due to China's unique institutional settings such as the dual land system, two types of brownfields exist in Chinese cities, namely, brownfields in urban areas and brownfields in urban villages. They possess different attributes in terms of land ownership, size of the site, spatial distribution, the mechanisms by which the sites are created, and the stakeholders involved. These differences impose constraints on and produce challenges for redevelopment strategies. Based on the classification of these two types of

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brownfields, this article presents a conceptual stage model for dealing with the emergence of brownfield sites in Chinese cities.

The remainder of this paper is organised as follows. Section 2 reviews the literature on brownfields, and focus is placed on the driving forces of brownfield emergence. Section 3 explores the formation of two different types of brownfield redevelopment trajectories in China, namely of brownfields in urban areas and brownfields in urban villages. Section 4 elaborates on the differing characteristics of the two types of brownfields in China. Section 5 presents our conclusions as well as avenues for future research.

Literature review

Despite a burgeoning literature on brownfields, a universally accepted definition of these sites remains elusive (Meyer & Estrin, 2001). In the US, brownfields are defined as ‘abandoned, idled, or under-used industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination’ (USEPA, 1997). Contamination is a central aspect of this definition, which is consistent with the condition of most brownfield sites in the US. The situation differs in many European countries. In Austria, for example, 85% of brownfields are not contaminated (Oliver, Ferber, Grimski, Millar, & Nathanail, 2005). Alker, Joy, Roberts, and Smith (2000) proposed a more robust definition of a brownfield that we will adopt in our study: ‘A brownfield site is any land or premises which has previously been used or developed and is not currently fully in use, although it may be partially occupied or utilized. It may also be vacant, derelict or contaminated. Therefore a brownfield site is not available for immediate use without intervention’. In China, there is no formally accepted definition of a brownfield.

The issues of brownfields as well as their redevelopment have received substantial attention in Western countries ever since 1970s (Adams, De Sousa, & Tiesdell, 2010; Bjelland, 2004). Research concerned with this topic has been conducted through various perspectives, including assessment and identification of brownfield sites (Bacot & O’Dell, 2006; Cao & Guan, 2007; Cheng, Geertman, Kuffer, & Zhan, 2011; Thomas, 2002), monitoring or evaluation of brownfield redevelopment projects (De Sousa, Wu, & Westphal, 2009; Mak, 2010; Wedding & Crawford-Brown, 2007), and barriers and incentives of brownfield redevelopment (Bartsch, 2002; Cao & Guan, 2007). Most existing literature on brownfields, as pointed out by Hula and Bromley (2010), focused largely on ‘issues surrounding redevelopment efforts’, whereas the main causes of this phenomenon have received little academic interest. Although it is widely recognised that the emergence of brownfields is closely related to the migration of industry (De Sousa, 2000; De Sousa, 2006; Hayek, Novak, Arku, & Gilliland, 2010), only few scholars have shed light on this relationship.

After WWII, owing to technological change as well as global competition (Bjelland, 2004), the process of deindustrialization has taken place in most western countries. According to Bluestone (1984), deindustrialization is a ‘widespread, systematic disinvestment in basic industrial capacity’, and it is often defined in terms of the share of manufacturing in total employment (Saeger, 1997). Owing to rising labour costs and more and more stringent environmental regulations (Marcus, 1985), many manufacturing plants in developed nations were shut down or moved abroad seeking cheaper production costs. Geographically, industrial migration processes occur on different scales: intra-regionally from urban to suburban, inter-regionally from one region to another, and internationally from one country to another (Rodwin & Sazanami, 1989). For many developed countries, deindustrialization occurred on an international scale. Taking the US for example, its manufacturing’s share of total employment was 24% in the mid-1960s, while this number had fallen to 10.5% by 2003 (McKinnon, 2004). Bjelland

(2004) tested the linkages between the formation of brownfields and the process of deindustrialization in Minneapolis–St. Paul metropolitan, and concluded that ‘spatial restructuring of industrial activity over the past half century is at the root of the brownfield problem’. Li (2011) elaborated on the deindustrialization process in the US, and pointed out that brownfields were a consequence of deindustrialization. Recognising brownfields as an inevitable outcome of deindustrialization, Poindexter (1996) also took one step further to test statistically their different effects on cities and suburbs in the US.

Existing literature on brownfields in China is mostly confined to introducing western experiences or discussing specific brownfield redeveloping practices. No attention is paid to the different typologies of brownfields and the unique formation mechanisms, caused by specific institutional factors. In the period following the country’s economic reforms, especially during the late 1980s and 1990s, Chinese cities (especially coastal cities) experienced rapid urban expansion (Deng, Huang, Rozelle, & Uchida, 2010; Lin, 2007). During this process, due to China’s unique institutional characteristics such as the dual land system and residential registration system, the government faced a variety of new challenges. Of these challenges, urban villages (or ‘villages in the city’) have been among the most widely debated. There is a longstanding literature on the mechanisms by which urban villages function (Bach, 2010; Wang, Wang, & Wu, 2009), their unique social (especially residential) functions in urban areas (Liu, He, Wu, & Webster, 2010), and approaches to their redevelopment (Gao, 2011; Hao, Sliuzas, & Geertman, 2011; Lin & De Meulder, 2012). However, industrial activities in urban villages remain poorly studied, and few scholars have attempted to shed light on this issue. Wang et al. (2009) examined informal commercial and industrial developments in urban villages in Shenzhen and found that ‘industry is a very important economic sector in urban villages’. Xia, Zhao, Ouyang, and Liu (2012) investigated manufacturing firms in one of Guangzhou’s urban villages. They found that most industrial enterprises in urban villages are small-scale firms and exhibit a scattered spatial distribution. Lai, Peng, Li, and Lin (2014) investigated the institutional constraints on industrial land development in urban villages. These results lead to the hypotheses that research on brownfields in China must account for to the differences between brownfields in urban areas and those in urban villages, as their characteristics differ in terms of land ownership, size of the site, spatial distribution, the mechanisms by which the sites are created, and the stakeholders involved.

The formation mechanism of brownfields in China

Regardless of their particular historical and institutional backgrounds, brownfields emerge as a result of the on-going interaction between industrialisation and urbanisation. The initial phase of industrialisation resulted in the emergence of industrial enterprises and simultaneously spurred the urbanisation process. Urban functions expanded to the suburbs, causing the decentralization of population and economic activities. Economies evolve as a result of technological innovation, and industries relocate in pursuit of lower costs. Fig. 1 presents a stage model to conceptualize the process that produces brownfield sites in Chinese cities, consisting of three stages: industrialization, suburbanization, and deindustrialization. We discuss these three stages in more detail.

First stage: state-mandated urban industrialization and bottom-up rural industrialization

Generally, Chinese development can be divided into two stages: the Maoist Development Strategy and the Post-Mao Development

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