ASSESSING SPECIAL ECONOMIC ZONES IN CHINA WITH THE MULTI-SIDED PLATFORM MODEL

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Abstract

Although many special economic zones (hereinafter SEZs) currently identified themselves as a "platform (often as physical constrictions for zone enterprises)," the academic support is inadequate. This paper offers an introduction to the burgeoning literature on two-sided (or multi-sided) markets and illustrates a feasible analysis on how to adopt this model in designing a well-operated system focusing on the land rentals within a apecial economic zone (SEZ), and provides some theoretical support in this research area. In many industries, platforms match relevant parties, e.g. customers to retailers, advertisers to readers, and facilitate interactions between them. Based on this, the paper tries to design a structure for analysing SEZs, which is considered as an efficient method for economic growth. Key characteristics of these markets, regarding network externalities, fee charging strategies and the relation between platform users are discussed first. Afterwards, the possibility of introducing this model into SEZs land use fee charging policies is examined. Finally, the paper provides some key economic insights on SEZs development under the suggested platform model.

Keywords: Platform Economy, Multi-Sided Platform (MSP), Special Economic Zones (SEZs), Land Policies, Pricing Strategies

1. INTRODUCTION

SEZs (special economic zones) have grown rapidly in the past decades across nations. They are identified as those delimited areas within an economy and administered by a single part, offering businesses physically located within the zone a range of incentives including tax reduction, duty-free exporting and streamlined customs procedures. Compared with areas outside SEZs of the domestic economy, administrative, regulatory and fiscal regimes within SEZs are often more liberal (FIAS 2008). The history of SEZs can be traced back to the late 1950s: the first one was established in Shannon, Ireland in 1959 and later a variety of different zones emerged, particularly since 1990 (Farole & Akinci 2011). In Farole's study (2011, p. 23), SEZs can be broadly identified as

"…demarcated geographic areas contained within a country's national boundaries where the rules of business are different from those that prevail in the national territory. These differential rules principally deal with investment conditions, international trade and customs, taxation, and the regulatory environment; whereby the zone is given a business environment that is intended to be more liberal from a policy perspective and more effective from an administrative perspective than that of the national territory."

SEZs in China and other developing countries, as scholars mentioned, are firstly considered as a helpful tool that supports an overall economic development strategy to improve industry competitiveness and to attract foreign direct investment (FDI). Secondly, SEZs can serve as "pressure valves" to alleviate unemployment and poverty. Additionally, the SEZ also plays a role as an

experimental laboratory for new policies and approaches application (Cater & Harding 2011; Farole & Akinci 2011). Therefore, the primary function of SEZS for the government, first, is to develop and diversify its exporting products but maintaining protective barriers and simultaneously to create employment, to experiment with new policies and approaches in customs, legal, labour, industrial or private partnership aspects. Additionally, they help promote the establishment of the governmental supervision system of enterprises (particularly to developing countries), to offer relevant experience to perfect the off-site infrastructure and to implement environmental control for the sustainable development of a nation's economy, for the other (FIAS 2008).

China, where SEZs are well developed, began to use SEZs as a key instrument to stimulate its regional economic growth since the 1990s. SEZs are categorised into several types: (national-level, province-level and municipal-level, and are mainly based on five different indexes including economic growth, technological innovation, intensive use of land, water and energy saving and conservation, ecological, environmental protection and corporate social responsibility (CSR). By 2013, there were 210 national-level SEZs with 103 of these located in the east of the country, 60 in the centre and 47 SEZs in the west (CIPA & MOFCOM 2013). By 2014, the number of national-level SEZs has increased to 219. Compared to the past decades, the number of SEZs in the centre and west of China has increased. In 2012, 171 SEZs under statistics created RMB5.4 trillion (approximately USD786.3 billion) at regional GDP level, RMB3.8 trillion (approximately USD553.3 billion) in the industrial added value, RMB1.2 trillion (approximately USD174.7 billion)in the tertiary industry added value, RMB1.1 trillion (approximately USD160.2 billion) in fiscal revenue, RMB933.9 billion (approximately USD136 brillion) in tax revenue, and USD741.1 billion in the total volume of imports and exports, accounting for 10.4%, 19.2%, 5.3%, 9%, 5.3% and 19.2% of the national total, with the year-on-year growth of 15.6%, 13.6%, 17.7%, 12.7%, 15.9% and 4.8% respectively. By 2013, the employment figures of national-level SEZs reached 16.83 million with 19.1% increase from a year earlier, roughly adding 2.7 million jobs (MCPRC 2015).

Manufacturing is the dominant industry in China's SEZs accounting for RMB11.9 trillion (approximately USD1.73 tillion) out of the total industrial output created by national SEZs (RMB12.64 trillion, approximately USD1.84 trillion) in 2012, which occupied a hefty 94.5% of the total. Mining and utilities such as electricity accounted for 2.8% (RMB357.6 billion, approximately USD52.1 billion) and 2.7% (RMB338.2 billion, approximately USD49.2 billion) respectively (CIPA & MOFCOM 2013). For manufacturing industries, the purchase or rental price of SEZ land is one of the key factors that enterprises consider when deciding whether to enter a SEZ or not. In China, zone enterprises cannot purchase but can rent zone land. Several factors can influence the zone rental price: the geographical location, physical facilities, amenities and services, transportation and zone preferential policies. The rental price is also differentiated according to the type of zone enterprises.

Many studies have discussed SEZs from a political, economic, and managerial perspective regarding policy analysis, data illustration, and case studies. However, most of them rarely discussed how effectively and efficiently use the zone land area and by what way. With more success SEZ stories nowadays, the number of zone enterprises or those tend to locate is rapidly increasing with years. To satisfy the increasing demand for zone land, the zone operators should firstly optimize the use of existing zone areas through a more applicable strategy, and secondly, try to expand the zone area to accommodate more coming enterprises. The zone land policies, in the process, plays a vital role. In some cases, the zone land is taken from the original landowner by a one-time transfer payment, but this is not common in some countries such as China. China's zone operators mainly rent the land to enterprises rather than selling.

The purpose of this paper, first, is to provide some new theoretical support when explaining the reason for naming a SEZ as a "platform" nowadays and second, to examine whether the pricing strategy – differences in fee charging to enterprises - can be utilised in SEZ land rental policies. The next section will review both traditional theories on SEZ research and MSP theory; we found that the traditional theories are mainly based on the industrial cluster to analyse SEZs and MSP theory related studies has rarely discussed n SEZ topics, so the later section will discuss whether SEZs can be analysed by using MSP theory. First, we discussed whether SEZs can be identified as "platforms" and then tried to examine whether SEZs have the three top futures of MSP: a pricing system, cross-group network externalities, and interaction between different groups or parties. In the last section, a possible land use policy strategy linking to the MSP theory will be discussed later. When deciding the rental price for different zone enterprises, SEZ operators should analyse their types, core competence, externalities, and interaction, to enact a flexible strategy for the sustainable development of both zone operator and zone enterprises.

2. LITERATURE REVIEW

Theories on SEZs are mainly developed based on the industrial clusters and agglomeration economy since the 1900s, and most of them were based on the cluster theory. Marshall's theoretical principles of localization economies are often used to explain the functioning of industrial clusters as he introduced the notion of the industrial district (ID) in 1919 (Marshall 1890/1920). Weber, as the first social scientist who used the term of "agglomeration", acknowledged the existence of industrial clustering, formulated his Industrial Complex Theory and introduced a spatial analytical system into the industrial clustering studies. He described that "locational factors", meaning "the forces which operate as economic causes of location," can strongly and significantly influence firms' costs and benefits (1909/1929, pp. 17-20). Later François Perroux firstly introduced the concept of "growth pole" in his article "Economic Space: Theory and Applications." This unbalanced development theory was developed based on the modern system science and modern natural science – physics and

mathematics in particular. He pointed that "a banal sense of space location creates the illusion of the coincidence of political space with economic and human space (1950, p. 90)", and this pathological doctrine obscured the exploration of differences between a "geonomic space" and an "economic space". In modern mathematics, "spaces", when being identified, mean various types of structures of abstract relations, and as Perroux indicated, "there exist therefore and many spaces as there are structures of abstract relations which define an object," and "these abstract spaces…are sets of relations which respond to questions without involving directly the location of a point or a shape by two or three coordinates (1950, p. 91)." Weber focused that the industrial location and designed the weight-losing case and weight-gaining case (Weber 1929). Porter's Industrial Cluster Theory (ICT) provides a framework for SEZ development and regional economic growth and based on his Diamond Factor Model (DFM) (Porter 1990), it is suggested that the government should realize that they cannot influence the regional economic growth positively and efficiently, but need to participate in the regional economic development. However, in the past studies, The term "cluster" is often indiscriminately used in different ways, and its meaning is somewhat ambiguous. As Ismalina (2011) states that there is not one systematic framework which is conceptual and analytical to explore the functioning of industrial clusters. The term industrial district is also quite often used in literature and in this study, the term industrial district and the industrial cluster can be interchangeably used. The ambiguity of definition results in the conceptual and empirical confusion. Several common conceptualizations of the cluster are listed in some studies (Martin & Sunley 2003, p. 12; Wolman & Hincapie 2010, p. 3): some of them focused on inter-firm relationships and some discussed from another perspective which concentrates on the broader links. The situation in the cluster literature, as Martin and Sunley (2003, p. 10) point out, is that "we know what they're called, but defining precisely what they are is much more difficult." They argue that the concept of the cluster, "…has acquired such a variety of users, connotations, and meanings that it has, in many respects, become a 'chaotic concept' (Martin & Sunley 2003, p. 16)."

With the widespread construction of SEZs across borders, some scholars notice that more theoretical studies are required to analyse the SEZ further. Xu (2004) analysed differences between industrial agglomeration and industrial cluster in his study. Zeng indicated while SEZs are usually constructed through a "top-down" approach by government policies, most clusters are formed in an organic way through a "bottom-up" process (2010, p. 6)." Most of the current SEZ studies, when linking to the theory part, are often discussed from a broader and macro perspective, and while analysing problems occurring in different SEZ cases, management theories are introduced including Hofstede's' Culture Dimensions, cultural variables, innovation, and entrepreneurship. The land use and relevant policies, however, are less discussed.

Over the past decade, many SEZ operators tend to identify the SEZ as a "platform" but lack of theoretical evidence, although the topic of platform economy has been discussed by many researchers. Platforms, in these studies, are often identified as a system on which two or more parties interact in multi-sided (or two-sided) market (Amstrong 2004; Hagiu & Wright 2011; Rochet & Tirole 2006). The platform deal with the interaction and competitions between these different groups. Rochet and Tirole have provided a formal definition in 2006 (pp. 664-5):

"A market is two-sided if the platform can affect the volume of transactions by charging more to one side of the market and reducing the price paid by the other side by an equal amount; in other words, the price structure matters, and platforms must design it so as to bring both sides on board."

A surge of interest in two-sided markets can be seen from recent studies, especially after the seminal papers presented by Armstrong (2004), Caillaud and Jullien (2003), and Rochet and Tirole (2004). In the past decade, many research works have discussed different issues linked to multi-sided markets and have given consideration on variants of assumptions about timing, price instruments, and externalities. Some other papers have tried to put some order in this fast growing field, by providing a general introduction, overview, and discussion of "lessons" to be drawn (Evans, 2003), or general theoretical and definitional frameworks (Rochet & Tirole 2004). Also, a literature survey of the recent two-sided markets literature has been offered by Roson (2005).

For example, shopping malls provide a physical platform for both consumers and retailers: retailers pay certain fees (mainly rentals) while consumers pay no charge for entrance, each side care about the number of the other, although retailers would prefer fewer competing shops in the same mall. Another relevant example is supermarkets, which also link suppliers and consumers. Consumers of both shopping malls and supermarkets show more concern on the number of retailers or suppliers to choose which one to visit, retailers and suppliers also focus on the number of consumers. Besides, they also tend to locate in a platform with fewer competitors. The main difference between these two platforms is that a shopping mall itself is the owners and the prices of products are not controlled by the platform but by the participants (retailers) on one side, whereas a supermarket prices its products. Based on the definition and examples, why a SEZ can be identified as a platform? If it is, whether MSP model can be considered to help develop some methodologies to control the land price for zone enterprises in China?

To define whether a market is multi-sided, researchers are quite often based on three concepts: network externalities, pricing structure and interaction between different groups or parties. Roson (2005) indicates a market can be identified as two-sided when the platform serves two agent groups, such that the participation of at least one group raises the value of involvement in the other group. Rochet and Tirole (2004) proposed a more restrictive definition: "two-sidedness" only exists when "prices faced by agents on each side (possibly zero or negative)" can directly influence market participation for their side, so that the transactions volume not merely depends on "a comparison

between total expected benefits and total transaction costs (a feature that has been defined as "failure of the Coase theorem")." Rochet and Tirole (2006) illustrated a detailed process to define two-sidedness: considering a platform charges a^B to the buyer side and a^s to the seller sides per-interaction, the market is one-sided if the transactions volume realized on the platform is only dependent on the aggregate price level, which can be presented as $a = a^B + a^S$; if V varies with a^B while a is kept constant by contrast, the market is said to be two-sided. Hagiu and Eright (2011) partly share such opinion but argue charging fees should not be the only core concept to prove whether a market is with two-sidedness. They point out regardless of whether networks are mature or not; MSPs necessarily involve the interactions of two or more sides, and so one cannot simply ignore one side when doing a competition analysis. For MSPs, markets should be defined starting from the platforms' interaction service, with the relative price of this interaction service being the joint price to both parties (e.g. cardholder and retailer in a card payment network, or buyer and seller in an online auction). Also, Rochet and Tirole (2004) made a critical distinction between usage charges and membership charges, and between usage externalities and membership externalities: gains from trade between end-users almost always arise from usage and usage externalities arise from usage decisions.

As can be observed from the cited literature, for a market to be identified as multi-sided, it should possess at least three characteristics. First, there must be a platform, and both buyers and sellers have mutual demand; second, cross-network externalities should be identified in the market, and third, fees must be charged on one or both sides. However, while narrowing down to SEZ studies, only Wang and Zhu (2013) examined the role of the China's government in SEZ operation and indicate a possible SEZ model by introducing MSP theory, saying that a third party (agency) can be hired to operate and manage the SEZs and the governments' function, in this case, is suggested being limited to providing public products.

3. ANALYSIS ON SEZ BY INTRODUCING MSP MODEL

For the most common SEZ construction processes, the first step should always be that the SEZ operator encloses a certain area for a future SEZ. In China, some departments of the government are directly involved in this stage. The area is always located in or next to transport centres, key port cities, or places with abundant resources. Once planning the geographical location, thereupon infrastructures will be constructed within the zone area. Because of completed infrastructural facilities and preferential policies such as tax reduction, different enterprises are invited or attracted by these incentives. The SEZ, which can be identified as a "physical platform" geographically here, means the zone operator provides a certain area with matching facilities and services to attract, encourage, and invite different types of enterprises to produce, manufacture, trade, or be engaged in other economic activities. However, this physical platform does not equal to the "platform" as we discussed in this paper. To

examine whether a SEZ can be called as a multisided platform, the three primary and fundamental features of MSP should be first analysed.

3.1 Whether Main Features of MSP Can Be Identified Within a SEZ

According to the literature of platform economy and two-sided markets, a pricing structure, cross-group network externalities, and interaction between different groups or parties are three main features of MSP. Fee charge should be the first and must-have characteristic to examine linking to SEZ studies.

Although in many other platform types, scholars prefer to use the basic formula $P = P^s + P^b$ to represent a platform charges per-interaction charges to the seller and buyer sides, while analysing SEZs under this model, we extend the formula to:

$$P = P^u + P^d + P \qquad (1)$$

Where u, d and s present three different types of zone enterprises respectively: upstream, downstream and service enterprises (Figure 1). When the volume of transactions realised on the platform is dependent on the aggregate price level, the platform should be identified as "one-sided". If V varies with P^u, P^d, and P^s while P is kept constant, then the SEZ platform is considered to be "multi-sided (or two-sided)". Therefore, the price structure of the SEZ platform is non-neutral, which means price structure is likely to influence profits and economic efficiency of SEZ operations.

Based on the empirical research (Wang & Zhu 2013), SEZ operators provide different fee-charging standards depending on enterprises, which means the amount of fee charge may vary via SEZ operators' leveraging strategy. For upstream businesses, in their studies, zone operators are likely to rent lands at a very low price or even for free. After upstream enterprises locate in the zone area, relatively higher land rental prices will be charged for the incoming downstream enterprises. Reducing fees that, in principle, should be charged from upstream enterprises, and transferring the payment amount to downstream enterprises, is predicted to exert influence upon the transaction volume of SEZs. Meanwhile, a competitive lower zone land rental price is a direct and strong incentive for service enterprises. Increasing the number of relevant and qualified service enterprises within the area helps attract more upstream and downstream enterprises to locate in the zone, and this can result in increased volumes of transactions. Although policies of charging fees – whether charging access, membership, or usage fees – vary in different zones, non-neutrality still can be observed as the price structure affects V when changing or adjusting (increasing, reducing or charging no fees) any fee standard to three enterprise types. Still taking a SEZ which focuses on automotive manufacturing as an example but with more details, as can be seen in Figure 1, we exclude the traditional upstream enterprises relating to steel, mining, metals (primary and fabricated), fuel, plastic, rubber, glass, and electronics in the value chain of the automobile industry. When it comes to the SEZ system, the upstream enterprises that we identified include two main categories. The first category is

OEMs (original equipment manufacturers), which includes passenger vehicles, commercial vehicles, two-wheelers, and three-wheelers; while the second category is component (mostly sub-component) manufacturers including wheels, tyres, pedals, screens, and wipers. Car dealers, 3PLs (third party logistics), the used car market, assemblers, and producers are categorised into downstream enterprise. Finally, the service enterprises would comprise customer service centres, exhibition areas, maintenance centres, petrol stations, canteens, car-cleaning centres, and automobile test lines. The SEZ operators assess fees to the enterprises differentiating by type while promoting interactions between enterprises and the SEZ itself, which is in accordance with the assumed model that we previously discussed.

Figure 1. Theoretical Platform Operation System under MSP Model
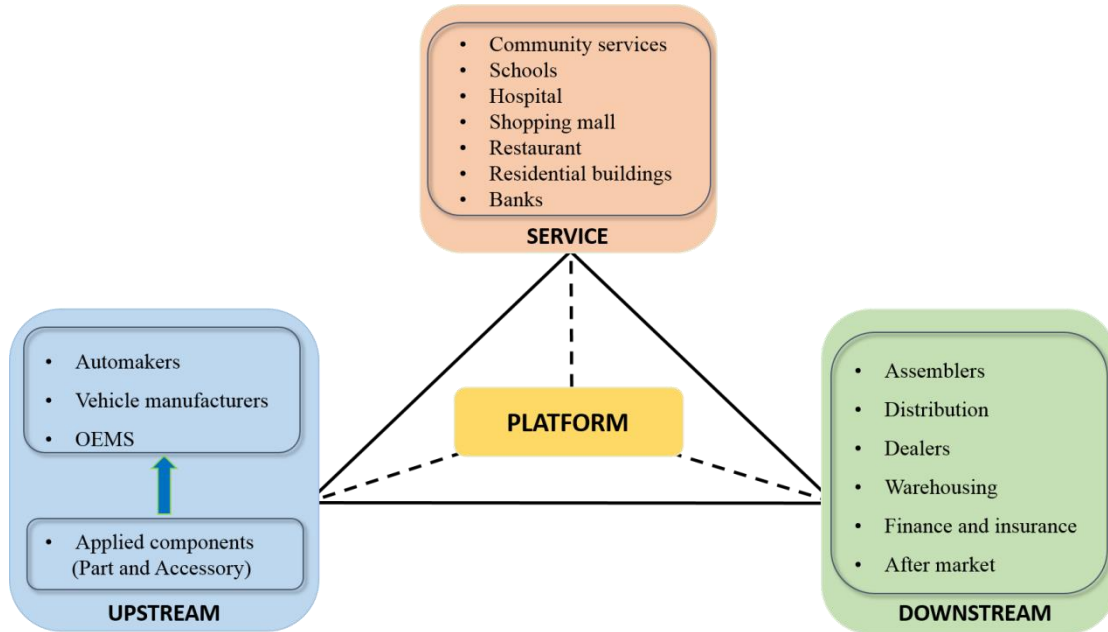
Network externalities, as mentioned in Roson's study (2004), "exist when consumer utility in a certain market depends (usually in a positive way)on the total number of consumers of the same good or service…but on the number of different, but 'compatible', agents on an opposite market side." For example, the number of eBay customers depends not only on the sellers' number but also on how many other consumers are using the system; this is because with more customers using the system, it is easier to attract more potential clients. A SEZ platform should contain at least two types of enterprises interacting with each other or with SEZ agencies, where one type enterprise such as upstream, downstream, or service enterprises, benefit from joining a SEZ. This depends not only on the number of same type enterprises and services provided by the platform but also on the number of the other zone enterprises. It also means that, using Hagiu's explanation (2009), the higher the value of a SEZ platform's access to the group, the more members are present on the other side of the SEZ. One point should be noted here, which is both upstream and downstream enterprises or service enterprises can exert strong externalities in SEZ cases and thus attract other types of enterprises.

The nature of MSP network externalities, according to Roson's paper (2004), is determined by the characteristics of interaction process, and he listed two main mechanisms, which are not mutually exclusive: single interaction markets and multiple interaction markets. The former means a simple matching between two parties that acts on two market sides, such as real estate agencies and employment agencies. The latter means a benefit for the participants can (potentially) be obtained from per interaction, and with possible interactions, more partners are available: for example, telephone directories and Internet search engines. For SEZs, increasing the number of upstream enterprises could, for one, influence the demand of the same enterprise group; it also affects the demand of both downstream and service enterprises. In other words, entries of upstream enterprises can exert direct influence on the number of the opposite platform sides. Similarly, entries of downstream enterprises can also attract the other types of enterprises. With more service enterprises locating in the zone, the service requirements of both upstream and downstream can be met. The three types of firms are inevitably and mutually interdependent on the SEZ platform, and the pricing strategies, which mean optimally balancing the charging fees among them, have a great influence on the total volume of transactions as well as on the platform market equilibrium.

The third main feature of the MSP model is an interaction between different groups or parties. SEZs, for one, are courting different enterprises and are attempting to make profits, or to preserve the lowest balance for another. Interactions between groups not only exist among enterprises, which are common sell-and-buy activities, but can be also observed between platforms and enterprises. Although the theory states interactions between end-users are enabled to get multiple sides "on

boards" by appropriately charging each side, the SEZ platform and enterprises have already interacted at the early stage of zone planning (Rochet & Tirole 2004). Interaction, at this point, is manifested as the mutual demand for both zone operators and potential zone enterprises. For zones, they aim to attract or invite more enterprises that can meet their target planning; for businesses, being benefited from incentives offered by zones can help maximize their profits. SEZs' usage or other types of charges can affect the three sides' willingness to trade and their net surpluses from the potential interaction. Again, interdependency between SEZs and enterprises is an expression of interactions. It can be found that interactions have already been indirectly analysed when discussing fee charge and cross-group network externalities of SEZs. These three essential characteristics exert a combined effect on SEZ operation systems and help us to provide a theoretical model to make some suggestions for SEZ's governance model particularly for the land use policies.

3.2 Why SEZs Can Be Identified as "Platforms"

After confirming the existence of three key features (cross-group network externalities, pricing structure, and direct interaction between different groups or parties) within a SEZ, a multi-sided SEZ platform can be further discussed. A zone platform is multi-sided under the condition of transactions between at least two different types of enterprises; if not, then all enterprises within the SEZ can be identified as "consumers (buyers)." SEZ operators (governments or third agents), who provides the land for SEZs, are defined as "the suppliers (sellers)." This is a typical way to identify the relation between the landowner or renter (often the government or other personal proprietors) and the zone enterprises. Transactions only occur between operators and enterprises, which means enterprises pay land usage fees (rentals) to the operator for production, manufacturing, exporting, and importing. However, enterprises tend to pay the fees under the condition of being attracted by certain advantages of the SEZ. In this case, SEZs are categorised into "one-sided market" under MSP theory, as transactions can only be observed between the seller (landowner or renter) and buyers (zone enterprises) instead of being found between enterprises, which means between the platform participants. Besides this, according to Rochet and Tirole (2004), considering the SEZ platform charges pre-interaction charges P^s and P^b to the buyer and seller sides, the interaction between the buyer and seller sides is one-sided if the transactions volume realised on the platform can depend only on the aggregate price level ($P = P^s + P^b$). This argument, however, should be proved if the platform operator is not the government, which will be discussed in the following section. Conversely, if transactions occur between at least two types of end users (zone enterprises) within a SEZ, the SEZ operator should not only play the role of "land leaser", but should also be responsible for promoting transactions between zone enterprises. In such circumstances, the SEZ platform should be multi-sided. Also, Rochet and Tirole (2004) identified that if volume varies with P^b while P is kept constant, the SEZ platform is with multi-sidedness.

At the very beginning or planning period of SEZ construction, enterprises are attracted to set up branches or relocate within the zone area mainly because of the preferential policies or the matching infrastructures and services. Traditionally, most zone enterprises across nations are labour-intensive and assembly-oriented, and mainly manufacture apparel, textiles, and electrical and electronic products. There is no obvious industrial linkage between enterprises within a traditional SEZ, especially in developing countries. This is partly because the degree of product specialisation varies depending on the level of industrial development of the host country (FIAS 2008). A tendency can be observed in recent decades, which is that the traditional SEZ model has been transforming into a new one, focusing more on building physical, strategic, and financial links as well as cooperation between zone enterprises, different zones in a certain area, and the "outside world (local economies)", while also endowing SEZs' multiple functions. For example, Jurong Industrial Estate (Singapore) is an EPZ in which 932 enterprises are located, and it is a transit zone with ten large berths that is capable of accommodating ten massive ships. It is also known as a tourist area simultaneously with the famous Jurong Bird Park, which is a group of Chinese and Japanese style gardens that also contains a lake that occupies, as a whole, 80 hectares (JTC 2013). This means the SEZ's function is not restricted to trade supporting and export manufacturing but has expanded to other business activities. Besides, value-added services, including education facilities (schools and training centres), sporting and entertainment facilities, "one-stop" service, and security, are expected to be provided within the zone, which would be a recent incentive for enterprises (Farole & Akinci 2011). An overall industrial chain is encouraged to form, including both upstream and downstream enterprises in SEZs, for sustainable industrial development. Also, if there is an overall industry, several relevant industrial chains can form an industrial cluster covering dominated enterprises.

For China, establishing SEZs is not only a policy incubator and an infrastructure rationale, but also an accelerator of economic growth. Most SEZs that were built after 2000 realised their competitiveness is not a result of preferential zone policies; additionally, the advantages of these policies are not as attractive as before because every SEZ operator can introduce similar policies into their areas. The macroeconomic environment forces SEZs to transform from the first function design to the following geographical location selection, and finally to the following stage of identifying potential target zone enterprises. This can be seen in many new SEZs: for one, a complete industrial chain links different enterprises within the same industry including both upstream and downstream ones; for the other, in some comprehensive SEZs, an industrial cluster is often composed of several industrial chains with strong and tight linkages. Besides, relevant matching service enterprises participate in various related business activities. Such trends can also correspond to the development of industrial specialization because first, SEZs have the features of spatial location, which include location of industries, economies of agglomeration (also known

as "linkages"), transportation, and international trade, etc.; and second, via introducing or constructing facilities and services (e.g. child care facilities, medical clinics, conference centres, product exhibition areas, and training facilities), the industrial chain within SEZs are regularly extended and become more systematic. Beyond the government's proper planning at the early stage, logically linking relevant enterprises to form an industrial chain and later agglomerating several chains to an industrial cluster could be a successful endeavour.

Therefore, far from moving away from the traditional but universally utilised model, SEZs have been trying to develop linkages to the macroeconomic environment. Based on the analysis above, there are at least three types of end-users on the zone platform: upstream enterprises, downstream enterprises, and service providing enterprises. Within the platform system, downstream enterprises are categorised into a buyers group as they need to purchase or outsource necessary complementary products to meet the business target, as well as need to pay for related services. Thereby, upstream enterprises, for the downstream ones, are suppliers (sellers); but to service providing enterprises, are consumers (buyers), as upstream enterprises also need consistent service support. Service providing enterprises, for both upstream and downstream enterprises, are suppliers. For instance, assuming a mature and well-established SEZ focusing on manufacturing automobiles, as raw material suppliers seem unlikely to locate within a SEZ, we identify upstream enterprises are those who produce subcomponents including tires, windshields, and airbags, and those that manufacture major components for the OEMs; downstream ones are those assembling the components and producing the automobiles; and finally, service providing enterprises should be maintenance centres, product exhibition areas, or other facilities. SEZs, which provide a physical platform for both SEZ operators and at least three different types of enterprises, meet the primary theoretical needs under MSP model. This strategy is theoretically reasonable but when coming into real practice, car assemblers and dealers, although they are in the downstream, their externalities are much stronger than the upstream one (Figure 2).

Figure 2. Pricing strategy under a platform
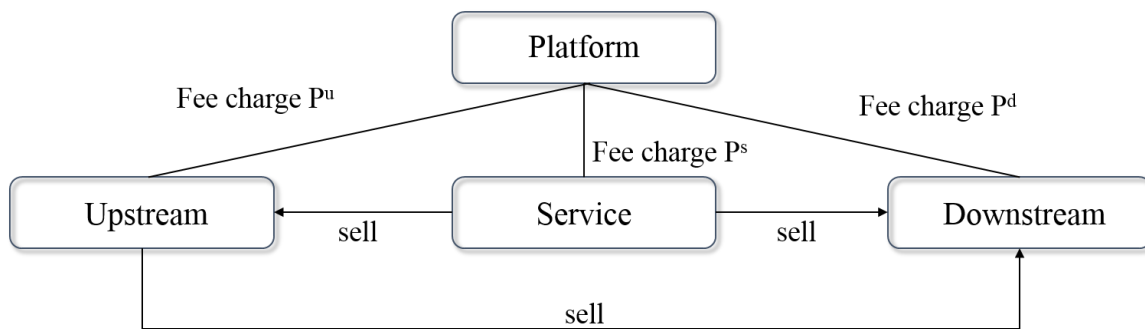
4. POSSIBLE LAND USES POLICY STRUCTURE OF SEZS UNDER MSP THEORY

After examining whether the three key features can be detected in SEZ operation, we try to develop a potential pricing strategy of SEZs by using MSP theory. Although some strategies under such a proposed model are being utilised in many of China's SEZs, a more analytical model closely linking to MSP and focusing on the zone land policies is discussed here. The role that SEZ operators and the government are supposed to play in the platform system and the method of implementing the pricing strategy (fee-charging policies) to expand externalities are core arguments when introducing an MSP model to SEZs. One thing should be clarified, which is a SEZ operator is supposed to be a company that is professional in SEZ operation and development, this company could be the direct investor of the SEZ, or could be hired as an "agency" by the government to undertake the responsibility for operating the SEZ.

4.1 Interdependent Roles of SEZ Operator and the Government

The SEZ economy has main features of platform economics - SEZ operators are independent of the government system and can be firms hired by the government. The government can participate in the planning stage but not dominate the construction and operation of SEZs. SEZ operators complete the land construction and development instead of the government-dominated model in many developing countries. Unlike other general trading platforms, SEZ operators should not only establish a platform for transactions between the three types of enterprises but also are obliged to facilitate production and manufacturing within the zone areas. The agency, firstly, acquires original lands by expropriation (sometimes this stage is taken by the government); then, the agency invests in the infrastructure within the zone to make the zone land transferrable; finally, the well-established land can be rented or sold to the potential entry enterprises to recoup the previous expenses of the operator.

SEZs' cost of platform construction mainly includes expenses on land expropriation and investment on infrastructure. If the SEZ locates near

the urban area or the transport centres, in general, the land expropriation expense tends to be higher as the surrounding established infrastructure and facilities can reduce their early investment; conversely, if the location is far from urban areas, the land fees are relatively smaller but the infrastructure construction investment can end up larger. In the early period of SEZ construction, the high investment and long recovery cycles set barriers for the single SEZ operator and thus it is difficult for one company or organisation to undertake all investment. For the operators, besides cooperating with other enterprises or looking for alternative financing channels to develop the SEZ project, government support should also be an option. The government can consider providing monetary funds as an equity investment to take a stake in the SEZ operating company. However, the government is not directly involved in the SEZ construction and operation. Meanwhile, the platform operator should be motivated to optimise the hard environment and soft environment for investment to attract more potential zone enterprises and to form and extend network externalities.

Optimising investment environment directly links to maintained orders and rules of transactions within zones, to create an equal and well-developed SEZ platform for participating enterprises. The platform operator has the responsibility for supervising the quality of services and products within the zone and creating possible convenience for transactions between zone enterprises and thus reducing the transaction cost as well as increasing the transaction frequency. Additionally, to create profits for the operator itself, the best strategy is to augment the total transaction volume on the platform and encourage positive competition. Accordingly, the functions of the platform agency under the MSP model have been transformed: from the traditional role of assisting government to a more market-oriented one. The operator is regularly substituting for some government functions, greatly offering flexibility to operate the zone. When optimising both the hard and soft environment, the platform model is endowed with more functions in SEZ operation.

First, the platform operator should create a safe environment for potential investors. Most of the zone enterprises are international companies or firms, which used to be outside the zone area; therefore, safety and security within the zone should be confirmed to boost investors' confidence. Although the government could fund more police to maintain safety and security during the early stages, it is suggested that the SEZ operator develops its security system for two reasons: one, to alleviate government funding pressure; also, to create more job positions. Additionally, a highly efficient service environment should be provided. SEZ service, in some developing countries with high corruption and bribery index, is interpreted as "bureaucracy" and this hinders SEZs' development. If a third party agency is hired or a private professional SEZ operation consulting company (or the operator itself) undertakes the service providing role instead of the government department, the SEZ platform is predicted to be more hospitable to all enterprises and to be less captive to bureaucracy and procedure. Another function is preserving the ecological

equilibrium between the enterprise and the zone environment. Under the MSP model, the functions of the government are weakened, and the platform operator is authorized to promote the concept of CSR (corporate social responsibility) within the SEZ including implementing green projects and reducing emissions.

Although these functions can also be undertaken by the government at an early stage, for the long-term developmental strategy the operator can regularly replace the government's dominating role by improving the SEZ platform construction and optimizing the business environment. The motivational incentive for updating and improving the management and service of the SEZ platform is based on the symbiosis between the operator and all platform enterprises. The continuous update and optimization, however, requires substantial capital for maximizing social benefits; and the number of management objects is too many and complicated. For these reasons, a single platform operator, which aims to maximise its profits, may not be qualified to observe or identify every deficiency or cursoriness of the management, and needs government support. Under these circumstances, the government is responsible for providing public commodities – some at the beginning stages and some for a long-term period, e.g. public security, fire alarm system, education and relevant facilities, and grid and water – to clarify its role: assisting SEZ development at a macro level and concentrating on improving social welfare, optimizing macro market environment, and boosting the efficiency of administrative examination and approval.

Combining the practical experience of SEZ operation and Rochet and Tirole's study focusing on MSP theory (2004), SEZ operators should also be responsible for regulating interactions between zone enterprises. This means the operator should perform a balancing act on their prices structure and policy dimension. Positive externalities should be encouraged, and the negative ones should be discouraged by constraining one type of enterprises to the benefit of the other. Some points in their study are overlapped with our research: first, the platform operator should be a licensing authority and second it is a competition authority (Roson 2005). For the former, platform enterprises focus on not only the fee charge but also the quality of the interaction, which means they require the platform operator to create an efficient and effective environment to avoid potential external threats. For example, the operator can limit the number of homogeneous firms entering the zone to prevent unfair competitions, or can refuse the application of discharging polluters to protect the zone environment. For the latter, the operator should ensure that competitions on the platform should be under a safe and equal condition.

4.2 Pricing Strategies of Land Use

China SEZ operators or SEZ administration committee that is a government department responsible for managing the zone operation charge a certain amount of fees from zone enterprises based on the different zone situations. Some charge water and electricity supply fees, some charge fees on the security system, accommodation fees are also

included in some zones. These fees differentiate in zones, but the land use fees (or rentals) is an indispensable charge in every Chinese SEZ. How to optimise the pricing tools on SEZ land use fees depends on whether a clear and efficient pricing system that zone operators can consider and later effectively use in practice. The pricing strategies can be influenced by several elements. For zone enterprises, their elasticity of demand price, the intensity of cross-group network externalities, and the profit creating ability can affect their rental prices; for SEZ operators, competition between different zones, their locations, their zone facilities, services, and amenities and their marketing strategies also influence the land price.

Rental prices can be adjusted, firstly, based on the types of enterprises and their entry time to set up the land transfer price and preferential taxation policies, and secondly, the potential benefits brought by the enterprise. For SEZ operators, the most effective way to intensively and economically utilise the land is to attract potential enterprises. The trading volume under the SEZ platform is mainly dependent on the zone enterprises' production capacity and their operation. Charging land rentals, for SEZ platform operators, can help promote the land utilization efficiency and increase the trading volume within the zone. Additionally, these rentals can subsidy the operators' early stage investment in land exploration and infrastructure construction. Types of enterprises, network externalities and interaction promoted by enterprises are two key factors when using the pricing strategies.

Upstream enterprises, downstream enterprises and service enterprises compose an essential ecosystem on the SEZ platform. Theoretically, it is recommended that lower land rentals be charged from upstream enterprises as these zone enterprises – or some core enterprises among the upstream parties – are the core ones for a zone. These enterprises are often with high and core technologies in a certain industry, or with prodigious financial resources, or with a great reputation in their industry, or both. For example, as can be seen from Figure 1, there are two categories of the upstream enterprises item, one is OEMs, and the other is component manufacturers. The OEMs are more important than the second category enterprises, as these enterprises, for one, control the dominant technologies and skills in the automobile industry, and their core competence is hard to imitate for the other. Service enterprises and the downstream ones, under MSP model, are suggested to charge higher than upstream ones. Therefore, if the total amount of land use fees that a SEZ operator tends to charge is T, the zone operator should charge

$$T=P(U+S+D) \qquad (2)$$

in total for rental, where *U*, *S* and *D* indicate the number of upstream, service, and downstream enterprises respectively and P indicate rental price. This is based on the common method but not the optimal way.

Network externalities brought and interaction promoted by enterprises are other two key elements that can influence the zone operator's pricing

decision. Jumping out of the three enterprise types, the pricing strategy tends to be beneficial to enterprises that are capable of bringing strong cross-group network externalities. This first means zone enterprises can attract qualified related enterprises to join and exert a continuous influence on the sustainability of a SEZ. Secondly, strong externalities can help develop a complete industrial chain or agglomerate a particular industrial cluster within zone area, which can enhance the competitiveness of the SEZ. As mentioned, both upstream and downstream enterprises can bring strong externalities and promote interactions between zone enterprises. Service enterprises that closely link to both upstream and downstream enterprises can also exert strong externalities. Still using the automobile manufacturing park example, exhibition areas, canteens, car-cleaning centres, and automobile test lines provide service to both manufacturers and dealers and these enterprises are the units that linked the whole zone industrial chain. The car test line, as its size and high technological barrier, is identified as one of the core zone enterprises as it can attract both upstream and downstream enterprises to locate in. Also, the car assemblers and dealers, as they are downstream enterprises, based the equation above, the zone operator should charge higher rental to them but under this condition, the influence of their externalities are ignored.

We assume the there are two types of enterprises located within the zone, and we use *C* to denote the total zone area rented by enterprises. Type a is with externalities and can promote interactions between zone enterprises, type b is without externalities. If zone operator does not consider using the pricing strategy and MSP model to operate a SEZ, the externality is ignored. Then the pricing strategy can be expressed as

$$TR_1=AP+BP \qquad (3)$$

where TR_1 means the total revenue of zone operator by charging rentals, *A* and *B* denote the zone area rented by enterprise type a and b respectively ($A+B=C$), *P* is the land rental price (often charged by per square metre). Under this pricing system, the zone operator does not consider both externalities and potential interaction between zone enterprises and thus the zone platform is a one-sided market.

If the zone operator makes the pricing strategy under the MSP model, the enterprises then can be divided into two groups: with or without externalities. We assume the rented zone areas remain the same, so the equation is

$$TR_2=AP_a+BP_b+R \qquad (4)$$

where TR_2 is the total revenue of zone operator, P_a and P_b denote land rental price for enterprises type a and b separately and because type a has externalities and is capable of promoting the interaction between zone enterprises, $P_a < P_b$. *R* is the revenue brought by the interaction and transaction between zone enterprises regarding tax income, employment, and talents. Based on these equations, we conclude
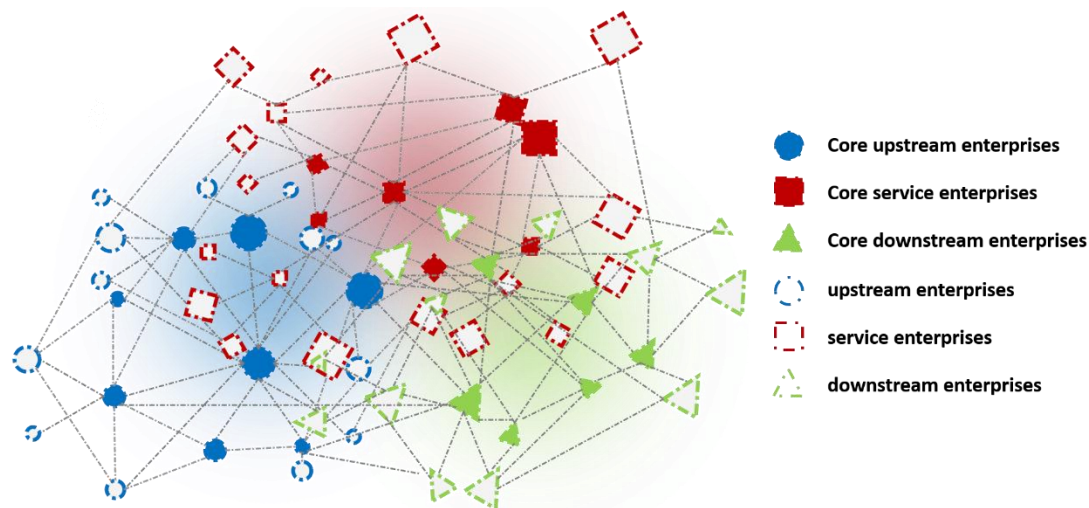
$$R \gt A(P\text{-}P_a)+B(P\text{-}P_b) \qquad (5)$$

Which indicates that under the MSP model, revenue created by the externalities and transactions between zone enterprises is greater than total land rental charged from both enterprise type *a* and *b*. Land rental price for enterprise type *a* is reduced while for type *b* is increased or remains unchanged. It may be argued that type *b* not be willing to pay higher rentals than ever; however, they can benefit from the externalities and zone enterprises transaction as there are strong linkages between these enterprises. The difference between P and P_a, P and P_b, in the real zone practice in China, can be adjusted using preferential policies of land usage and often manifests as the land subsidies. Hence, enterprises with strong externalities and frequent active interaction with both zone enterprises and outside companies should be the first considered to promote the pricing strategy. This strategy can explain why in current China's SEZs, SEZ operators tend to charge rentals based on the quality but not the number of enterprises. First, there is a land appreciation of the zone areas inherently under the condition of well-constructed infrastructure, facilities, services, and mutually industrially linked enterprises locating. Second, the platform externalities can bring more space of land value increase because of strong linkages and increased transactions between zone enterprises. Back to what has been discussed, the flexibility of the zone land rental pricing strategy, in comparison with the traditional land rental approach, can help both zone operators and enterprises to maximize their profits. This can also explain the reason that zone operator tends to rent the zone land instead of selling the land in China, although, in some other countries, the zone land transfer is based on the one-time charge policy.

However, because of the existence of cross network externalities, the platform operator, as the license authoriser, must evaluate the past performance of potential participative enterprises and their externalities. Either positive or negative externalities of any one type of the enterprises could exert heavy influence on the demand and the total transaction volume of other types of enterprises. The SEZ operator, hence, has an incentive to invite high-qualified enterprise from a certain industry, to establish evaluation mechanism for identifying potential enterprises, and to develop different pricing strategies for zone enterprises. When inviting enterprises, the first option for the platform operators should be large scale upstream enterprises with strong driving effect and high-quality service enterprises with strong network externalities; then downstream enterprises can be attracted to enter. These upstream enterprises, because of the strong attraction they exert on related industries, can contribute to SEZ economic growth far beyond their own industry. While combining the SEZ platform and three types of enterprises together, the industrial attraction has been shifting the traditional SEZ to an optimised model. Some SEZs are over dependent on governmental preferential policies, and the government plays a more important role in each stage – from planning to developing SEZs, to later inviting enterprises – and thus several issues occur

such as long administrative process, corruption and bribery, arbitrary charges. Industrial attraction strategy here is not reliant on the government when introducing investment but based on some core products in the industry to attract three types of enterprises to enter. The role of the government will be transformed from a controller to an assistant under this strategy. This means the government's role is to clarify the industry orientation of the zone at the planning stage, but it is not recommended that they participate in the investment attraction practice section.

SEZ operators can employ a third agency to undertake the role of attracting investment for several reasons. First, compared to the government department, SEZ operators have a deeper understanding of the SEZ as they participate the whole SEZ construction process and have a clearer scheme of the zone development when selecting an agency, they are more experienced to make a better decision with less consideration of the government's opinions. Professional consulting agencies can promote investment projects to the international market and then can select ideal supportive partners for SEZs through an open and impartial evaluation process. The investment institutions thus being transformed from the original government administrative department to a third party agency. Second, the essence of investment attraction is the objective requirement of regional economic growth and enterprises development. The government, while denominating the investment attraction, often places emphasis on those most common applied preferential policies (e.g. taxation reduction or low labour cost.) but cannot illustrate why the zone is "special" and how. If each zone identifies their comparative advantages in the same way, there would be no advantage. Therefore, a third agency could concentrate on the sustainability of the SEZ, and while inviting related investment, they could consider whether the entering enterprises are interdependent in a certain industry or whether they can form an industrial cluster. It should be mentioned here that the potential industrial chain formed under the industrial attraction strategy does not simply characterised by a sole liner structure but an interconnected network system. Under MSP model, there are some core enterprises in each of the three types, and they are surrounded by other enterprises (see Figure 3). Industrial clusters can at this moment be predictive if applying the industrial attraction strategy. In other words, when considering the potential zone enterprises, the operator (or the third-party agency) should identify some key enterprises in different types and design a possible framework like spinning the web to promote an industrial chain formation and later forming an industrial cluster. Under this model, economic and technological linkages of input and output between zone enterprises and the industry can be established, and industrial resources can be fully integrated and efficiently utilised. The overall transaction costs of the zone industry can also be minimised. Once there can be seen an industrial chain in the zone, more associated industry enterprises will be attracted.

Figure 3. Illustrative diagram of ideal network structure of industrial cluster in SEZs

● Core upstream enterprises

■ Core service enterprises

▲ Core downstream enterprises

◌ upstream enterprises

⬜ service enterprises

◿ downstream enterprises

5. CONCLUSION

This paper was motivated firstly by exploring the possibility of utilising MSP model to identify some main features of SEZ platform, and then provide a possible pricing strategy of zone land usage for China's SEZs. First, we found that SEZ economy has the main characteristics of MSP and can be identified as a "platform". We went on to provide some possible pricing strategies for zone land usage. Different conditions based on whether MSP model is adopted are discussed afterwards. The role of the government in the SEZ construction and development is also analysed in the paper. An agency can substitute the government as a SEZ developer/operator (platform operator), which is responsible for designing, developing and optimise the SEZ. The SEZ operator can decide the land (rental) price based on different types of enterprises, the degree of their externalities, for making appropriate investment attraction strategies; meanwhile, the zone operator should also supervise the quality of enterprises' products and services, and promote the healthy competition between zone enterprises. A market-oriented SEZ operation platform is suggested as it can improve both productive and administrative efficiency. For enhancing the overall interaction volume, the operator should consider screening potential zone enterprises according to their record, commercial influence, industrial relevance, and quality of their products and services.

The role of the government should transform as well in China. It can provide some support at the early SEZ construction stage regarding confirming ratio of fiscal subsidies from the government, enhancing the efficiency of the administrative approval process and improving social management and maintaining social stability in zone area. Also, the government should assist zone operator to design a cognitive mechanism of fiscal subsidies according to the number of zone enterprises and their taxation. This mechanism is used to cover the high costs of land development and can help SEZ platform operator establish a stable pricing system. Last, the government is not suggested to participate in the process of SEZ construction and operation but provide those public goods and facilities with strong externalities such as schools, and hospitals.

A flexible land rental pricing strategy can help zone operator establish a pricing system for zone enterprises and can create benefits for both zone operator and enterprises. It is proved that the pricing strategies of zone land usage vary with whether a SEZ can be identified as a platform under MSP model. If enterprises can be observed with strong externalities, which means they can create strong industrial linkages and attract more highly relevant potential zone enterprises, the land rentals will be lower. For those zone enterprises with less or without externalities, which indicates they can hardly help the zone develop an industrial chain or form an industrial cluster, the land rentals could be higher. Additionally, some factors should be considered including the types of enterprises, their entry time, and their profitability. The zone operator and the government, however, should exert efforts to create a safe and sustainable business environment for zone enterprises. When making preferential policies, the government is suggested to give authorisation to the zone operator, to avoid meddling in the zone operation.

In China, the government used to charge rentals by areas a zone enterprise occupy with little or no consideration of the externalities. With the rapid development of SEZs in the past decade, increasing zone operators, and the government realised the zone platform could create more profits by introducing the MSP model, and they began to plan a more sustainable pricing strategy of land use. This strategy is not suggested in zones where a planned industrial chain with clarified industry orientation and professional consulting agencies for coming enterprises cannot be observed. The traditional land rental policies, which means rentals are charged by areas and period can be considered to cover the early zone construction cost in a short-term but are not recommended for a SEZ's long-term and sustainable development.

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