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Enhancing the Efficiency of TDR Markets for Financing Large-scale Infrastructure Projects

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1. Introduction

India will require an investment of Rs. 50 trillion in the infrastructure sector by 2022 to cope with the rapid pace of urbanization (IBEF, 2022). Given the increasing demand for infrastructure projects and the limited supply of financing mechanisms, there is a growing need to develop a sustainable self-financing mechanism for financing large-scale infrastructure projects. Most urban development and infrastructure projects get stuck in long-drawn issues related to land acquisition, compensation payment, and land disposal to the respective land development agencies. As a result, the implementation of projects is significantly delayed, a significant hurdle faced by developers.

To mitigate these issues, development authorities and municipalities are shifting towards innovative land development and financing mechanisms to boost urban development and large-scale infrastructure projects. One of the land value capture mechanisms to finance large-scale infrastructure projects is the Transferable Development Right (TDR). The market of TDRs is characterized by a high transaction cost and information asymmetry. This article explores the inefficiencies in the processes of generation, transfer, and utilization of TDRs, and how blockchain technology (BCT) can reduce them.

2. Financing of infrastructure projects

The Indian government has prioritized investment in the infrastructure sector in recent years, especially in the budget of 2021 and 2022. These infrastructure projects are launched to boost economic growth and employment opportunities. In 2021, the government proposed to invest Rs. 13,750 crore to develop smart cities under the AMRUT and Smart City Mission (IBEF, 2021). Also, Prime Minister Gati Shakti's master plan having projects aggregating Rs. 100 lakh crore was launched in 2021 for holistic development of infrastructures like expanding national highways and related logistics. To expedite the process of urban development and large-scale infrastructure building, the government has shifted its focus from primitive land acquisition measures to innovative land development techniques, including land pooling, TDR, and accommodation reservation.

Financing of large-scale urban infrastructure in megacities has become a concern for the development authorities and municipalities, especially after the IL&FS crisis. The NBFC had financed large infrastructure projects in India, for example, Delhi-Noida Toll Bridge, Tripura power project, and Gujarat International Finance Tec-City. Amid land acquisition issues and delays in the approval and implementation of infrastructure projects, IL&FS defaulted on its short-term loans, long-term loans, and commercial papers. It has been reported that IL&FS group and its subsidiaries are under a debt of around Rs. 94,000 crores.[8] The vice-chairman of IL&FS, accused of causing creditors losses by granting loans to firms and infrastructure projects that were not creditworthy, was arrested in 2019.

Land value capture mechanisms like 'betterment levies' have been devised to augment infrastructure investments. The basic premise for charging betterment levies from the landowners for the provision of infrastructure and facilities is an increase in the future value of land. Various land value capture mechanisms are land pooling, land readjustment, impact fee, additional development rights, transferable development rights, accommodation reservation, etc. Land pooling and readjustment have been widely used in developed economies such as Japan, Germany, and Spain. It is also used in India in Gujarat and Maharashtra.

3. Land Value Capture mechanism

This section discusses various land value capture mechanisms for large-scale infrastructure project financing. Land value capture mechanisms have been generally used for plots unauthorized due to a lack of basic infrastructure, roads, and transport facilities. In such areas, the residents' living condition is usually very poor and land parcels are undervalued. To facilitate orderly and planned development of such areas, the development authorities motivate the land owners to participate in land pooling/re-adjustment mechanisms where the landowners along with the municipality prepare the plan for the designated area after demarcating enough space for facilities, roads, utilities, etc. After pooling/ readjustment and provision of necessary infrastructure, the value of such land parcels increase, benefitting the existing landowners. However, to carry out necessary improvements, the landowners must surrender a certain proportion (usually 40 percent) of their land parcels, free of any encumbrances, to the service-providing agency. Surrendering land parcels is accompanied by payment of betterment levies in some countries. With the enactment of the Land Acquisition Rehabilitation and Resettlement Act, 2013, land acquisitions have become a costly affair for development authorities and service-providing agencies. As a result, innovative land development and land value capture mechanisms like TDR can facilitate urban development and finance urban infrastructure projects.

[8] https://economictimes.indiatimes.com/news/economy/policy/ilfs-financial-services-exposure-to-group-companies-breaches-rbi-norms-in-fy16-18-board/articleshow/66473861.cms

a) TDR concept and use

TDR is a market-based instrument developed to address the issues of government-imposed 'socialization of development rights' such as the compulsory acquisition of land using police powers to provide for public goods, preserve environmentally vulnerable land parcels and heritage monuments, and redevelop slum projects. A TDR program has four basic components: sending areas, receiving areas, specifications of the development rights, and the process of transfer of the rights. There are three phases in the life cycle of TDR: creation, transfer, and utilization of the development rights (Chiodelli, & Moroni, 2016).

TDR is a quantity-based approach and an alternative to the price-based approach of development charges/ development levies (Janssen-Jansen et al., 2008). TDR generates property rights from sending areas. The approach separates the 'right to use' and the 'right to develop' from a land parcel. This separation incentivizes development in receiving areas and discourages development in sending areas meant for low-intensity development (Buitelaar and Needham, 2007; Geuting, 2007). In the case of land acquisition, separation of rights is not done; instead, monetary compensation is provided to land owners in lieu of the acquisition of the right to use and the right to develop. It is possible to separate these two rights because real estate titles are not monolithic/unitary rights but a system of rights. Essentially, TDRs are a bundle of rights traded between parties (Woodbury, 1975).

To ensure a pareto-optimal solution, the land parcels located in environmentally sensitive zones are identified as 'sending areas', from where development rights of the landowners awarded as 'TDR certificates' are sent to 'receiving areas'. Pizor (1986) defined the extent of development rights transferred is the difference between the 'potential' use and the 'actual' use as permitted by law. Development authorities identify 'receiving areas' as those where extensive development is allowed (Kaplowitz, Machemer, & Pruetz, 2008).

TDRs are development rights that can be used, unused, or transferred by landowners. The sellers also have an option to sell/trade the development rights to an intermediary who can further find an appropriate buyer (Mills 1989; Wright, 1993). Thus, TDRs can potentially impact settlement patterns and reduce inequity in the planning process currently directed by zoning (Clinch, O'Neill and Russell, 2008). TDRs are market-based instruments because a trading mechanism exists and the prices of development rights are negotiated between the sellers and the buyers.

By contrast, the valuation of the land acquired by development authorities is neither in accordance with the market rates nor negotiated. As a result, the landowners feel deceived because any rise in land value after development accrues to the private developers. Hence, an efficient market for TDR can potentially solve land acquisition problems.

The procedure for carrying out TDR transactions requires clarity on land ownership rights. The land markets in India are characterized by information asymmetry and uncertainty. The information asymmetry problem

exists at many levels such as inadequacy of cadastral information (Mintah, Baako, Kavaarpuo, & Otchere, 2020), issues of anonymity and pseudo-anonymity (Harris, 2018), and non-documentation of land records. [9] Maintenance and updation of land records suffer from inadequate transparency at many levels because land transactions involve the participation of a large number of stakeholders like the landowners, brokers, title companies, government organizations, development authorities, municipalities, inspectors, attorneys, appraisers and notaries (Graglia & Mellon, 2018).

As a result, the market of TDR is also characterized by high transaction costs. Shahab, Clinch, and O'Neill (2019) analyzed Turkey's TDR market and identified the prominence of transaction costs in TDR market with respect to transaction characteristics, transactor characteristics and policy characteristics. These transaction costs are rooted in uncertainty of property rights, information asymmetry problems in property records/titles/easements, prominence of middlemen, lack of marketplace, uncertainty of demand, lack of transparency in procedural aspects, lack of accountability of government officials/ stakeholders, and lack of reliability of the information available with different government departments/ sellers/ buyers of TDRs. High transaction cost reduces the efficiency of the TDR market especially in developing economies.

Operationalization of TDR market is also highly procedural as it involves carrying out surveys, searching for property titles, negotiation of prices with prospective buyers, negotiation of densities (if the increase in Floor Space Index in receiving area is not fixed), issue of TDR and utilization certificates, verification of ownership titles/deeds/transfers, verification of rights of different service providing agencies, verification of the land use regulations and development control norms applicable in the sending as well as receiving area, verification of mutation certificate etc. The literature on the transaction cost of TDR claims that the low asset specificity characteristic of TDRs makes the procedures predictable and easily implementable. However, compared to developed economies, developing ones like India have high transaction costs due to land markets being characterized by unclear property rights, information asymmetry, coordination issues between various departments, prominence of the informal sector, and involvement of middlemen.

After processes, let us discuss the issue of prices. It has been found that the prices of TDR are highly uncertain due to a high likelihood of a mismatch between demand and supply (Kumara and Gopiprasad, 2017; Shahab, Clinch and O'Neill, 2019). For example, sometimes there is a surge in the real estate market followed by an increase in demand for TDRs, and then there is a slump. As compared to the buyer, the seller faces higher uncertainty due to a mismatch between demand and supply. The seller might end up waiting longer to find an appropriate buyer. Lack of information and land market ambiguity adds to uncertainty. Since buyers generally belong to a small group of developers, they have prior information and experience on the procedural aspects

[9] A cadastre contains official, legal documentation of individual parcels of land concerning the dimensions, location, tenure, and ownership

of trading, setting prices, and previous TDR sellers. The efficiency of TDR markets also depends on the frequency with which the rights are traded. Higher frequency of transaction increases the predictability of TDR prices and increases the liquidity of the instrument (Rørstad et al. 2007).

In the next section, I discuss the procedural aspects of TDR transactions in Mumbai to elaborate the issue of monopoly power vested in the government officials. Centralized processes are a source of market failure in TDR.

b) TDR transactions

In Mumbai, Development Rights Certificates (DRCs) specifying the quantum of floor space are issued on a bond paper by the Municipal Chief Officer with due approvals from the Assistant Director of the concerned Town Planning Department. The Officer maintains a register of all the TDR transactions (grant and utilization) in prescribed formats. For transferring the DRC to a third party, the owner must apply to the Officer in a prescribed form along with the relevant documents. After scrutiny, the Officer certifies the name of the new holder on the certificate. The Municipal Officer endorses the amount of DRs used in utilization certificate before issuing the Occupation Certificate to the owner.

The summary of the process of transfer of land by owner and generation of TDR is as follows: First, the owners of the land parcels demarcated for public purpose surrender the land free from all encumbrances to the Municipal Council/State Government/Appropriate Authority. The surrendered land is transferred to the appropriate authority in the survey records and revenue records. After that, the Municipal Chief Officer grants TDR to the land owner (the owner who has surrendered his land parcels to the Authority), takes possession of the land, and transfers it to the appropriate authority after the authority has deposited the cost of the land as per Annual Statement of Rates by Registration Department.

In Mumbai, instead of identifying sending and receiving areas, the conditions under which a land parcel is eligible for TDR are mentioned in the Town Planning Act. Similarly, the conditions under which land parcels are not eligible for TDR are also mentioned in the plan document. The cities of Mumbai and Hyderabad have a huge market for TDRs. By paying cash, developers can purchase TDR certificates to increase the permissible development rights. TDRs are traded like stocks and prices are determined in the market based on the demand-supply mechanism. The Karnataka government has worked towards the digitalization of TDR certificates. It was proposed that the TDRs will be treated as equities and shares in a market with more transparency and lesser information asymmetry (Khan, 2019).

4. Intervention of Blockchain Technology (BCT) in transaction of TDR

The use of BCT in land and property management can facilitate the efficient unbundling of property rights and create a market for easements and small property developers (Graglia & Mellon, 2018). BCT and

distributed ledger have been widely used in land registration and transfer of titles in Kenya, Telangana/Andhra Pradesh (Nandi et.al, 2021) and Honduras (Kshetri, 2017; Lemieux, 2016). Distributed ledger system establishes trust as it guarantees that a single person holds property title/rights.

Transfer of immovable properties follows *causae traditionis* model of transfer of property rights in India.[10] Hence, a third-party guarantee in the form of a public gate is required in case of any conflict. Nogueroles and Martinez García (2017) proposed a private/permissioned blockchain ledger for resolving conflicts and incorporating court decisions in the blockchain where the control of the private ledger remains with land registrars and notaries. Private keys are to be kept with the notaries who were responsible for granting public access to the information in the blockchain. A permissioned blockchain controlled by public authorities in title transfer and deed registration was found to be more efficient in the above-mentioned studies. In a permissioned blockchain, public authorities administer the consensus between parties. Proof of authority is required to validate any change in the chain. Validation is done after the legal requirements and legality of contracts are met. In the TDR market, the Municipal Commissioner or the scrutiny committee can have control of the private ledger and other processes can remain the same as title registration.

With the application of BCT in the TDR market, prospective buyers and sellers can have direct access to information about the vibrancy of the market, prices, ownership rights, etc. Thus, using BCT can potentially reduce information asymmetry problems and transaction costs in the TDR market. The issues of centralization, monopoly power, and asset specificity are also resolved.

Some of the limitations of implementing BCT in the TDR market is the lack of adequate skill sets among the existing stakeholders. Also, the success of BCT in the TDR market is contingent on its interlinkage with an efficient land market. Without implementing the technology in the land registration system, we cannot expect a well-functioning TDR market. The Government of Karnataka introduced BCT in the land registration system. But, the lack of technology adaption by the landowners in Karnataka has hindered its success. Hence, much work needs to be done not only to develop a platform for TDR transactions using BCT but also to ensure the adoption of technology by different stakeholders.

Conclusion

The use of BCT in the TDR market can improve the efficiency of land markets in India. TDR as a value capture mechanism has been given due emphasis for financing large-scale infrastructure projects. Given the increasing burden of urbanization, attaining self-sufficiency in financing the development of large-scale infrastructure is the need of the hour. The land and TDR markets in India suffer from the problems of

[10] *Causae traditionis* means formulation of contract to initiate the process of transfer of property rights between the parties involved.

information asymmetry, a multiplicity of authorities, and centralization of power. The use of BCT will address these issues by providing information about ownership rights of the land parcels and prices of TDRs. Similarly, the issues of centralization/ monopoly power will be resolved once the processes are shifted to an architecture that uses BCT.

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