

Framework of Land Value Capture as Financial Solution of Dhaka's Mass Transit

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Abstract : Land Value Capture (LVC) which is considered as financial mechanism for developed countries infrastructure projects could be a solution of financial burden of operating transit system of a developing city as well. The capital city of Bangladesh is already overburden to provide subsidy on existing public services. Thus, LVC here may be the best strategy for financial solution of operating mass transit and reduce subsidy burden from government. Hence, this study aims to formulate a model for adopting LVC strategy considering empirical investigation on policy and institutional context of Dhaka city. The study based on secondary information and data. Content analysis method has been used to evaluate the available policies and scope for land value capture. Existing institutional context has also been evaluated to come up with an effective LVC framework as the policy implementation and institutional capacity for development management are key underpinning forces for successful LVC. This study suggests joint development and betterment fees as mechanism of LVC. To implement the mechanism RAJUK, DTCA and DCC may be involved in development plan preparation, coordination, and managerial role respectively in one hand. In another hand, DMTCL may implement the plan with private developers. Concurrently, effective link among these institutions via clear guidelines and institutional capacity development may be driving factors of successful implementation of LVC for Dhaka's mass transit.

Keywords: Land Value Capture, Mass Transit, Policy and Institutional Environment, Development, and Implementation of Plan.

1. Introduction

Dhaka the capital city of Bangladesh, with an area of 1528 sq. K.M. (RAJUK Jurisdiction) accommodates a population of more than 20 million which is estimated to increase to 26 million in 2035 (Detail Area Plan, 2022-2035). These millions of people are producing millions of trips every day. However, these trips are not being managed effectively (RAJUK, 2016; Haque, 2019). It has been estimated that 30-60% trips are made by public bus (RSTP, 2015) via 194 routes and 137 bus companies that are operating haphazardly (DAP, 2022-2035). In addition, lack of integration of land use and public transport network underpinning the dependency on automobile. Subsequently, the rise in automobile and ineffective management of public transport underpinning air pollution, traffic jam, inaccessibility and after all unsustainable transport system in Dhaka city. To counter these urban devils, the city has introduced mass rapid transit through MRT line 6 from December 2022. Besides, more 6 lines will be added by 2035 (DAP,

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2022-2035). The average cost of mass rapid transit (Heavy Rail) construction in underdeveloped nations is \$ 87429209 per kilometer, whereas it is \$ 433660969 in affluent countries (Hook & Wright, 2017). In the meantime, average cost of operation and maintenance in a developing nation is USD 8.44 million per kilometer per year (Nurcahyo, et al., 2020). Regrettably, this increased expense hinders developing nations from smooth operation of transit system (Nakamura et al., 2016). Therefore, transit requires painless source of finance to be constructed, operated and managed. The increase in transit demand, population growth, and the increasing diversity and complexity of regional transportation needs render traditional funding sources incapable of covering the full financial costs of transit investments (Medda & Modelewska, 2009; Salon & Shewmake, 2011; Zhao et al., 2012). Herein, "Land Value Capture" can be an effective strategy for strategic solution of operation of mass transit (Gihring, 2009; Consultancy, 2013; Medda & Modelewska, 2009; Salon & Shewmake, 2011; Suzuki et al., 2015; Walters, 2012; MTR Corporation, 2015; Translink, 2014; Zhao et al., 2012) especially for developing countries.

However, while numerous practices of value capture strategy have been conducted in developed nations (Cervero & Murakami, 2009; Medda et al., 2009; Gihring, 2009; Suzuki et al., 2015; Consultancy, 2013), this practice is almost nonexistent in emerging or undeveloped countries. In the developing world, practice of value capture mechanisms is limited to the contexts of Indian cities and Jakarta; Indonesia (Kumar Jillella & Newman, 2016; Jillella et al., 2015; Li & Love, 2019; Berawi et al., 2020).

Moreover, Mohammad et al., (2013), discovered that this practice may be linked to contextual factors such as the local plans, institutions, the degree of public transportation maturation, and other socioeconomic settings. Furthermore, Haque (2019), claimed that success of transit system is context dependent. Thus, empirical suggestion is that implementation of value capture strategy will differ in Dhaka based on institutional and policy structure of the city. Additionally, it has been argued that ineffective value capture may cause serious financial burden on government. For instance, the annual loss of the Delhi Metro Rail Corporation (DMRC) exceeds Rs. 350 crore (Mamun, 2021). Hence, this study formulates research question to be satisfied "How land value capture strategy can be initiated under the institutional and policy framework of Dhaka city"? As Dhaka is novice in implementing mass transit and experiences of value capture in developing countries are limited, empirical research is needed for retrofitting land value capture strategy to finance Dhaka's mass transit system.

2. Review of Literature

2.1 Concept of Land Value Capture

Empirical investigation evident that transit increases the land value around the transit stations via good accessibility, economic activities or private incentives (Hess & Almeida, 2007; Yeh et al., 2005). Individuals or transit agency may adore this value gain, or investors may capture it for public or private advantages, which is referred to as land value capture (LVC). Thus, the strategy of obtaining profits from the value generated for a specific investment by developing or selling real estate or collecting fees or taxes is known as land value capture (Suzuki et al., 2015). However, requires institutional set up,

supportive policies, proper instruments, effective use of actors of transit system and other supports from socioeconomic context of a city.

2.2 Instruments of Land Value Capture

Land Value Capture (LVC) is recognized by international groups (including international donors) as a financing source to encourage local improvements in public services and infrastructure. There are International practices of using LVC mechanism which may be divided under two types of LVC.

- Development Based Land Value Capture (DBLVC)
- Taxation Based Land Value Capture (TBLVC)

2.2.1 Development Base Land Value Capture

It's a scheme for LVC in which transportation investors participate in the development of the area around the transit station (Consultancy, 2013). Investors acquire additional land within 500-800 meters of transit stations than is required for station design, which is then utilised for future high-density development (Cervero & Murakami, 2008). Transit agencies or investors might recoup some of their investment by utilizing these extra land or air rights of stations (Suzuki et al., 2015). Herein, specific tools are direct property development, joint property development, air right sale, land sale, lease agreement, land readjustment and urban redevelopment.

2.2.2 Taxation Based Land Value Capture

A taxation base value capture system is one in which the transit agency imposes define tax or fee on prevailing development in the transit system catchment area (Medda & Modelewska, 2011). This device can catch 60% of the overall value increase (Suzuki et al., 2015).

2.3 Actors of Land Value Capture

To capture value from mass transit, The Transit Cooperative Research Program (TCRP), defined three actors: transit agencies, developers, and government's agency (Suzuki et al., 2015). Responsibilities of these actors are construction, operation and maintenance of transit system, station development and management, rental, leasing and management activities beyond the stations, commercial operations within stations, tax collection and land development in the TOD area.

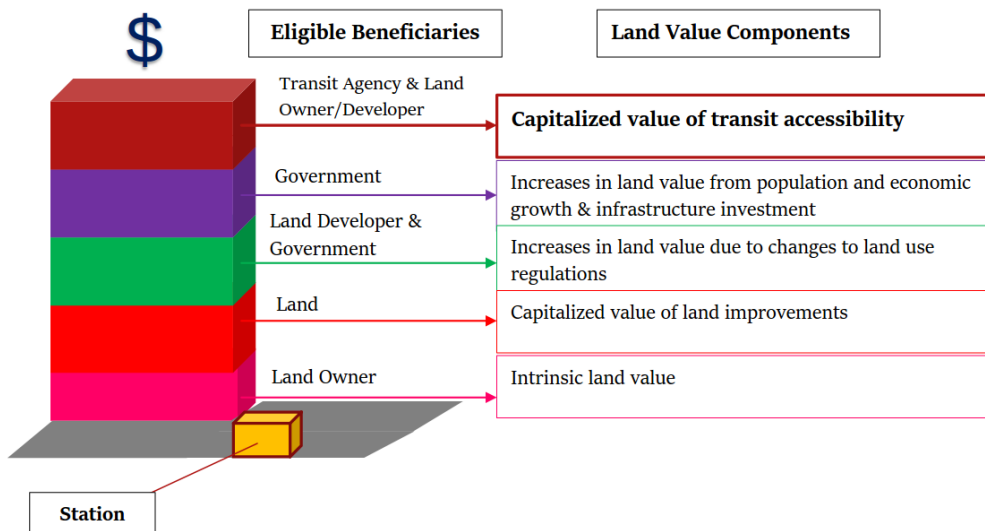
2.4 Land Value Uplift and Land Value Capture: Underpinning Factors and Forces

A strong transportation system necessitates some public-sector commitments, such as thorough authorized plans, TOD-friendly land use regulations, and capital investment. These attributes entice the private sector to invest in profitable enterprises and the housing sector, raising land rents and values in transit-affected areas (Sagar, 2010). Aside from that, convenient access to people and commodities attracts individuals to reside in an area and businesses to operate there (O'sullivan, 2007) and Transit is usually a fantastic accessibility (Gihring, 2009). This characteristic combines locational appeal for

site development and redevelopment along with economic development, resulting in additional land value increases (Hess & Almeida, 2007; Yeh et al., 2005). Thus, land owners are being benefited (shows in Figure 1). Then government agency or developers come in action. As accessibility increase in transit station precinct, the demand for housing or land increases.

Figure 1: Transit Induced Value Uplift and Associated Forces

Source: Author Adopted from Suzuki et al., 2015



As a result of the increased consumer demands for transit-proximate sites, transit infrastructure may lead to alterations to land uses and intensity of development in the close vicinity of stations (Cervero.&.Murakami, 2009;.Cervero.&.Kang 2011;.Salon, et. al, 2014;.Ma, et. al, 2013). Therefore, key variables of TOD density, land use diversity, station design along with pedestrian facilities effect on value uplift on land. Thus, these variables affect on land value uplift based on local forces in a city (Suzuki et al., 2015) which in turn effects on land value capturing.

Subsequently, zoning with effective land use regulation, local land market strength, policy implementing capacity of associated authority, strength of public private partnership in financial market and financial strategies are all factors that influence land value capture (Page, et. al, 2016). Wang, et. al (2019), developed suitable value capture mechanism for Chinese cities on the basis of socio spatial context of China. He claimed that lacking of integrated approach for transit system, spatial arrangement and land management are main reason to fail to gain value premium from public investment on transit and real estate development. Here, considerations are economic situations, land use characteristics, geographical arrangement, transportation patterns, planning regulations and policies for transportation (Mejia &.Lucas, 2014). For instance, infrastructure delivery is commonly linked to the acquisition of property rights in the interest of the public, which corresponds to the transfer of ownership rights from a legal or natural body to the larger social community's interest.

On the other hand, Sharon & Shewmake. (2012), claim that East Asian cities have a greater potential for value capture than urban areas in North America and Europe, due to their higher density, rapid growth, and reliance on public transport. However, insufficient policy support and an institutional framework may suffocate this opportunity (Suzuki et. al, 2015). Thus, an efficient value capturing strategy necessitates the right alignment of policy and institutional elements after the integration of spatial characteristics and market mechanisms underlying transit-induced land value increases.

2.5 Selection Criteria of Suitable Land Value Capture Mechanism

The research array of mass transit and its financing introduced a number of mechanisms for land value capture under different city context, shows in table 01.

Table 1: Selection of Best Fitted LVC Strategy

Instrument of LVC	Applicable Context	Unapplicable Context	Best Application
Direct Property Development	Strong financial Capability and has long term revenue vision	Weak and unflexible zoning regulation and high risky area for property acquisition	Tokyo, Nanchang, China and Delhi
Joint Property Development	Huge Incentives are available for PPP Potentiality of risk and Benefit Sharing	Weak and unflexible zoning regulation Unavilable partenship	Hong Kong,
Land Sales	Huge amount of Banked land, Higher value of land	Brownfiled, Spontaneous land market	Copenhagen
Sale of Air Rights	Low financial risk, Strong maintenece of policy, higher scope of vertical development	Strict zoning, uncontrolled private sector	Hong Kong, Copenhagen
Lease Agreements	Zero corruption, good management of public agency	Lacking of institutional framework	Hong Kong, Copenhagen
Land Readjustment	Brown field, negotiation among public agency and landowners, supportive policy, strong institutionalframework	Lack of local planning, fragmented local government	Tokyo, Ahmedabad
Urban Redevelopment	Brown field,strong capacity of public agency, low political risk	Lack of cohesion between public and private land owners	Ahmedabad, Tokyo
Tax Based Land Value Capture	Strong and controlled real estate market, low financial risk, recurrence of revenues, high land value uplift.	Low uplift of land value, lack of policy and insitutional capacity, political constraints.	London, Portland, Washington,

Source: Author adopted from Mathur & Smith, 2013; George Hazel Consultancy, 2013; Medda & Modelewska, 2009; Gihring, 2009; Kitchen & Lindsey, 2013; Ingram & Hong, 2011; Salon & Shewmake, 2011; Smolka & Furtado, 2002.

Besides, Table 02 shows success of LVC and how different institutional and socio-spatial factors supported in practicing LVC model from international context. The Table 02 reveals that effective land use regulations with design factors underpin the success of LVC. In the meantime, ineffective land use regulations with weak institutional capacity

delays the recover of project cost and applying LVC model. Hence, this research array of mass transit and its financing introduced a number of mechanisms along with institutional and legal context.

Table 2: Review of International Context of Practicing LVC

Case Study	LVC of Total Project Cost	Duration	Supportive Factors of LVC
Jubilee Line London (George Hazel, 2013)	10%	1992-2000	Strong institutional capacity and effective design of TOD.
Copenhagen M1 line (Suzuki et al., 2015)	20%	2002-2007	Strong institutional capacity, effective transport, and land use integration
Washington Silver Line (Gihring, 2009)	16.8%	2008-2014	Strong economy and institutional capacity.
Hong Kong MTR South Island East Line (Suzuki et al., 2015)	79.6%	2007-2016	Effective use of PPP, higher density and dedicated institution and policy.
Delhi Metro (MTR Corporation, 2015)	4.9%	1995-2016	Ineffective land use regulations with weak institutional capacity.

Source: Author Adopted from Mentioned Source

3. Methodology of the Study

The study has adopted a qualitative approach to answer the research question. Existing policies are reviewed to identify the scope of land value capture. Content analysis method has been used for evaluating the available policies, like

- i. Town Improvement Act 1953
- ii. Acquisition and Requisition of Immovable Property Act 2017
- iii. Private Residential Land Development Rule 2004
- iv. Mega City Building Construction Rules 2008
- v. Detail Area Plan 2016-2035
- vi. Dhaka Structure Plan 2016-2035 and
- vii. Revised Strategic Transport Plan 2015-2035

Institutional structures and their roles have been evaluated to understand the current context and craft the future role in LVC model. KII method is used to collect the information. 15 KII from different public authorities has been conducted to identify the institutional issues and practices to craft the future LVC model implementation process.

4. Land Value Capture Model under the policy and institutional Context of Dhaka City

4.1 Legal Support for LVC in Dhaka City

There is no direct policy in Bangladesh regarding LVC. However, some sections may empower institutions to capture land value. Table 3 illustrates the state of strength of policy for LVC. The Table 3 reveals that there is few policy scope for LVC in Dhaka city. The mother act of urban planning of Dhaka city The Town Improvement Act, (1953) directly encouraged betterment fees from investment. It may be helpful for development or directly tax base land value capturing. In redevelopment project, project cost may be mitigated by betterment fees. On the other hand, some crucial issues like land acquisition, zone management, density management, coordination among institutions have been encouraged in those policies that underpins the success of LVC. Additionally, for executing land readjustment, “betterment fee” has been suggested to introduce in DAP (2022-2035). Landowners, who are getting benefit from the value uplift would be responsible for paying this fee and that would be used for further development projects like land redevelopment, readjustment etc. Besides, Dhaka Structure Plan (2016-2035) recommends the block-based development. The effective use of these measures may ease the path of LVC in Dhaka before formulation of any detail legal support regarding LVC.

Table 3: LVC Supportive Policies for Dhaka City

Policies	Relatable Cluse for LVC	Way of Helping for LVC
The Town Improvement Act, 1953	73: Preparation of Master Plan by the kartipakkha for new development.	Preparing LVC policy regarding DBLVC
	74 (3): Approval power Govt., & Govt.: at any time can amend or alter any portion of Master Plan	Policy flexibility
	78: Acquisition by Agreement	Land acquisition for DBLVC
	79 (2): Compulsory Acquisition	Easy land acquisition for DBLVC
	94: Payment of Betterment Fee 94 (1): Any land in the area comprised in the scheme which is not required for the execution thereof will be increased in value & declared that a betterment fee shall be payable by the owner 94 (2): Betterment fee shall be an amount equal to one-half of the increase in value of the land resulting from the execution of the scheme	Supportive for TBLVC and supportive redevelopment
	101: Power to Dispose of Land 101 (1): The Kartripakkha may retain, or may let on hire, lease, sell, exchange or otherwise dispose of any land vested in under this Act. 101 (2): Disposal rate will be fixed by Kartripakkha.	Supportive for air right sell, leasehold, direct property sells base land value capture mechanism
DAP (2022-2035)	3.3.1 Guided Mixed Land use	Conserving Land use diversity

Policies	Relatable Cluse for LVC	Way of Helping for LVC
	3.4.1 Land Use Zone Management	Good management of land use diversity
	3.4.2 Overlay Zone Management	Direct TOD supportive planning
	3.5.3.1 Zone wise building use Guidelines	Ensuring proper integration of transport and land use
	Section 7.3 has stated about transfer of development rights. Section 7.4. 2: Redevelopment	Feasible for joint development
PRLDR 2004	8: Rules regarding project area and population ➤ Min 5 acre inside Dhaka City Corporation. ➤ Min 10 acre outside Dhaka City Corporation. ➤ Gross density 350 person/acre.	Ensuring threshold density and benefits
	9: Conditions for saleable land, land use and interest of the buyers of the project area	Secure land sell and land value uplift
	10: Implementation of layout plan of the project area	Conserving community facilities, road hierarchy
RSTP (2015-2035)	The policy frames the transport network for Dhaka city	TOD planning, Road Management and Pedestrian facilities
Dhaka Structure Plan (2016-2035)	The plan policy measures for overall development of Dhaka city.	Sharing responsibility between RAJUK and Local Governments Height flexibility for TOD area
Acquisition and Requisition of Immovable Property Act, 2017	This explores the detail process regarding land acquisition in Bangladesh. Main goal is to create a legal basis of acquiring lands for public interest. This act explores the procedure of land acquisition and requisition along with all necessary formalities for acquisition and requisition. What types of land can be acquired for what purpose, compensation provisions (i.e., for what type of property, how compensation will be provided, who will provided etc.), land owners rights, and resettlement provisions have been stated here detailly	

Source: Review of Respective Policy

4.2 Alignment of Development Practice and Policy of Dhaka City

Numerous studies show that land management in developing countries is becoming more complicated. Urban land administration and management in the Global South, in the words of Kruijt & Koonings (2009), has been hampered by confusing regulation, plural control (where the same land has been sold repeatedly to different people using forged documents), and incompatible or absent urban land regulations. Similarly, the allocation of plots, plan approval for land development, and land registration all currently experience delays and administrative red tape in Dhaka. Due to the massive development of its peripheral and lack of commitment to rules, Dhaka has experienced highly unplanned growth (Rahman et al., 2008). In the DMA (Savar Area), residential development has, as per Amin (2009), encroached upon 41 percent of the primary flood

flow, 5.85 percent of the sub-flood flow, and 43.50 percent of the high value agricultural land.

Additionally, an empirical study found that in the Dhaka Metropolitan Area (DMA), 67% of commercial and 51% of industrial facilities do not adhere to the land use zoning set by the Detailed Area Plan (DAP) (Rahman et al., 2021). In conservation zones (such as open space, flood-prone areas, water bodies, and potential places for future road extensions), 10% of commercial buildings, 9% of industrial buildings, and 6% of residential buildings have encroached (Rahman et al., 2021). Furthermore, RAJUK's urban planning objectives for the development of the capital of Dhaka have fallen short due to convoluted management and an expanding bureaucracy (Kalam, 2009). Kamruzzaman & Ogura, (2007) claimed that the region under study had few land use zoning restrictions. Land use zoning violations in Bangladesh are brought on by rigorous planning procedures, even if the efficiency of master plan implementation depends on the plan's quality, enforcement measures, and institutional capacity (Baumgart et al. 2011). The main reason is that the Building Construction Rules (2008) govern Dhaka's growth activities, despite the fact that the current FAR method is ineffective at regulating population density in residential areas as well as scattered development (RAJUK, 2016).

Therefore, Dhaka's earlier development practices did not adhere to policy criteria because of ineffective policy environment.

4.3 Institutional context in Dhaka City

In Dhaka city, there numbers of public institutions engaged in numbers of responsibilities. In terms transit Dhaka city corporation, RAJUK, DTCA, DMTCL are mainly responsible. Their assigned responsibilities are shown in Table 3. The Table 3 reveals that responsibilities are overlapped again it is frequently said that they are uncoordinated. The fragmented institutional set up causing the problems of plan implementation, long waiting time for services, budget problems, complexity of jurisdiction and public suffering during maintenance of utilities (Suzuki et al., 2013). On the other hand, smooth operation of LVC requires clear responsibilities and strong policy implementation capacity from institutional side (Suzuki et al., 2015). Therefore, the uncoordinated and fragmented institutional environment of Dhaka city may impede LVC. However, it is a matter of hope that existing policies create the scope of coordination among government institutions.

Table 3: Key Responsibilities of Key Actors for Transit in Dhaka

Public Authorities	Key Responsibilities
Dhaka City Corporation (North and South)	Urban Governance and planning and holding tax collection
Rajdhani Unnayan Katripakkha (RAJUK)	Land use planning and control, coordinate with DTCA for transport planning, responsible for all short- and long-term development plan or master plan of Dhaka, enforce spatial policies and development projects.
Dhaka Transport Coordination Authority (DTCA)	Crafting transportation planning and policy, coordinate with public and private agencies for implementing infrastructure project.
Dhaka Mass Transit Corporation Limited (DMTCL)	Operation of MRT

Source: (KII from Respective Office, 2022)

4.4 Scope of Co-Ordination among the Actors of Transit

The Table 3 illustrates that there are some overlapping functions among different organizations like both RAJUK and City Corporations are developing plans for their respective areas. DCC is empowered to formulate a master plan, including provisions to develop land and regulate building construction in the city. On the other hand, RAJUK is responsible for the formal physical planning and development activities for housing, commercial and industrial use in Dhaka. Whereas RAJUK has developed the structure Plan and is responsible for its implementation, the transportation and traffic planning functions are divided among BRTA, DTCA, DCC and the DMP. According to section 65 of Town Improvement Act 1953, DTCA or RAJUK may plan, implement the development activities and after completion of development, these will be handed over to DCC for maintenance. DTCA now is the central coordinating agency for all other agencies working in the city relating to urban transportation, be it public, private or PPP.

RSTP mandates that DTCA has to play the key role of coordinating the transport system of Dhaka city to unify the transport sector. This is the apex body responsible for long term planning and policies. All other executing and implementing agencies are required to make effective coordination with DTCA before entering into any sort of intervention in the transport sector. For instance, DTCA needs closer coordination with RAJUK regarding the construction of buildings at the intersections and also the land use plan in the RAJUK area. Such construction often results in increased traffic congestion and traffic management problem in the streets.

In chapter seven subsection 15 of section 49 of Local Government (City Corporation) Act 2009, mandates that taking any service or facility activities by Dhaka city corporation should include representative from RAJUK, DTCA, BRTA, DWASA or any concern government authority. The officials will be present in the meeting, will be well known about the activities and will be able to advise but they will not have any voting power in decision making. In Section 13.6 of Dhaka Structure Plan 2016-2035 Creating a multi stakeholder institutional setup with required power to function democratically in a coordinated manner that can manage/handle the challenges and issues of future Dhaka City. maintain high level coordination with Planning and local authorities. Especially, DTCA, while planning transportation systems of the city must coordinate with planning authority and the local authorities, so that land use and transportation system can be balanced and harmonized. In section 13.5 of structure plan reveals Sharing responsibility between RAJUK and Local Governments. The City Corporations and Pourashavas within DMR may prepare Action Area Plan under the framework and guidelines provided by RAJUK upper level plans. If the City Corporations and Pourashavas have no capacity, RAJUK will undertake the responsibility to prepare plans for those areas. Therefore, there is scope of good policy environment for initiating LVC in Dhaka city. Based on these context and application criteria (mentioned in section 2.5) suitable LVC mechanism for Dhaka city can be proposed.

4.5 Best Suited LVC Strategy under the Context of Dhaka City

Land value capture mechanism may be two types either development base or tax base (Section 2.2). Among these, joint property development, in terms of station and nearby property development, this agreement ensures collaboration between public transit agencies and private agencies (Suzuki et al., 2015; Gihring, 2009). This non-government sector is heavily involved in the development and financing of station infrastructure (Medda, 2012), and there are numerous revenue sharing agreements in place. Here, transit agencies have a direct role in extra-acquired land development (real estate or other forms of infrastructure development) around transit stops, which generates significant money (Consultancy, 2013). As there are huge number of real estate developers in Dhaka city (Kamruzzaman & Ogura, 2007) and their contribution is increasing day by day, this mechanism may be best suited either for new development or redevelopment. Again, huge potentiality of risk and benefit sharing context is suitable for this mechanism (section 2.5). Therefore, it may be the best suited mechanism for development base land value capturing.

Since, Dhaka city has some sort of policy support for redevelopment and land readjustment, joint development may be take place for this development. Again, for executing land readjustment, “betterment fee” has been suggested to in DAP. Landowners, who are getting benefit from the value uplift would be responsible for paying this fee and that would be used for further development projects like land redevelopment, readjustment etc. Thus, LVC would be implied upon in Dhaka with greater benefit. Furthermore, few solutions for encouraging private developers as subsidies can be provided such as FAR incentive, smooth building permit or construction approval procedure etc. have been suggested in DAP (2016-205). On the other hand, in tax increment financing approach taxes rise in proportion to the expected gain in property value as a result of transit investment (Gihring, 2009). Although it has low financial risk, recurrence of revenues and high land value uplift, it requires very strong institutional set up.

4.6 Proposed Institutional Framework for LVC in Dhaka City

For land value capturing, transit agencies, developers, and local governments are the actors (Section 2.3) who are directly engaged in LVC. Generally, local government body are engaged in regulatory and advisory role, transit agency and developers are engaged in implementing and management role in the most of developed countries (Suzuki et. al, 2015). In Dhaka city, the role of local government body is divided into DTCA, RAJUK and DCC. On the other hand, DMTCL is transit agency and there are many private Developers. Various department of these agencies are responsible for various activities related to LVC.

DTCA served and area of 7400 Sq. km that includes districts of Dhaka, Narayanganj, Munshigonj, Mankgonj, Gazipur and Narsingdi district including Dhaka North City Corporation, Dhaka South City Corporation, Gazipur City Corporation and Narayanganj City Corporation. This institution aims to provide a planned modernized transportation system for greater Dhaka area. Thus, the responsibilities of these institutions are to develop and construct mass transit system as part of an integrated public transport

network, plan, coordinate and approve recommended transport projects of other agencies (<http://www.dtca.gov.bd/>).

Besides, RAJUK served an area of 528 sq. km or 590 sq. miles which covers Gazipur Pourashava to the North, Dhaleshawri River to the south, Bangshi and Dhaleshawri River to the west, Shitalakkhya and Meghna River to the East. The responsibilities of this institution are planning, development and development control within its jurisdiction (<http://www.rajuk.gov.bd/>).

DCC is Local Government Body that served an area of 302 sq.km (It is divided into two jurisdiction south and north). Its functions included public health, water supply and drainage, matters related to food and drink, animals, construction and maintenance of roads, street lighting, street watering, public safety, maintenance of parks and gardens and forests, education, culture, social welfare and general development of the city. Additionally, the roads of Dhaka are still technically owned by the two DCCs and its traffic planning and signalization is one of its functions (<http://dsc.gov.bd/>).

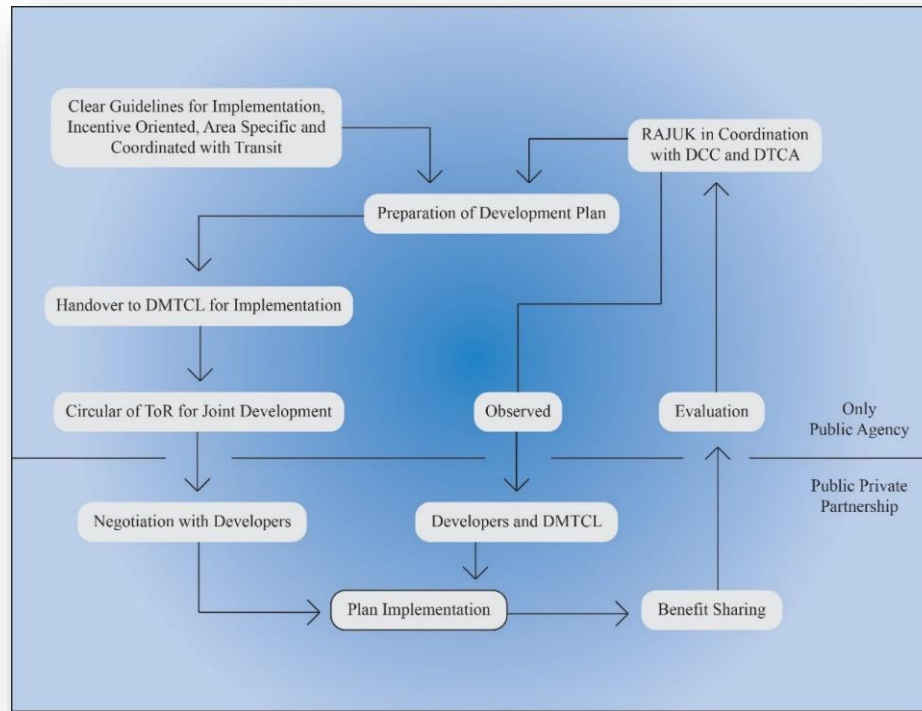
DMTCL served an area of BRT and MRT line and TOD precinct area. Its main responsibility is management of BRT and MRT (<http://dmtcl.gov.bd/>).

Finally, Real Estate Developers are private entity who may serve any area. Functions of this entity includes land development and assist public agency through technical, financial and manpower support (KII from Key Personale of a Developer Company).

On the basis of functions and institution types and interview of expert's specific responsibilities can be assigned for LVC in Dhaka city that has been illustrated in Figure 2. In this Figure DTCA will play the role of advisory and supervisory during the TOD plan preparation, plan implementation and operational and management phase. They will ensure that respective organization is completing their responsibility. For this purpose, DTCA need legal power which will be provided the plan formulation. This plan formulation will be completed by the RAJUK. RAJUK will regulate the whole process regarding TOD/LVC. According to the regulation of RAJUK, DMTCL will implement the plan. DMTCL may go for joint development with private developers for implementing the plan. This process will also follow the regulation of RAJUK. Thus, private company will come in government control. Benefit sharing or responsibility sharing between DMTCL and private developers will be independent but regulated. After implementation some management issues like pedestrian road management, traffic management, waste management will be done by the DCC. They will also follow the regulation provided by RAJUK. By this way, all public agency will be regulated and coordinated to formulate land value capturing strategy. In action level, development plan will be clear for implementation, incentives oriented, area specific and coordinated with transit. Then, this plan will be handed over to DMTCL to implement the plan. Since plan is focusing joint development, selection of private developer will be based on negotiation, competition and specific term of reference (TOR). Then, private developers and DMTCL will implement development plan jointly. Private agency may help DMTCL through man power, technically or financially. In time of implementation, other public agency will observe the activities of public private partnership. After implementation of development plan, benefits of the project will be shared between public and private agency according to their negotiation. Finally, whole process will be evaluated by RAJUK, DTCA and

DCC. On the basis of this evaluation, they will again reform or prepare the development plan for next phase. Thus, this model will be executed and all agencies will be engaged in LVC activities.

Figure 2: Model of LVC for Dhaka's Mass Transit



Source: Author

5. Conclusion and Discussion

LVC is an institutional system that enables the government, transit operators, developers, and other land market participants to efficiently coordinate their efforts in reshaping the urban built environment. Land Value Capture systems offer a number of distinct advantages over taxation and development. Throughout this process, transit agencies, local governments, and government institutions invest in transit infrastructure and extract revenue from areas where transportation has increased value. This accumulated wealth is distributed across institutions and the transit system in order to facilitate ongoing development. However, land value capturing from Dhaka's mass transit is challenging from institutional and policy environment of Dhaka city. Considering the policy constraints, function of existing institutions, joint development and betterment fees may be the best mechanism of LVC. However, it details joint development and betterment fees collection may face several challenges that creates further research scope. On the contrary, to implement the LVC mechanism RAJUK, DTCA and DCC may be involved in development plan preparation, coordination, and managerial role respectively along with DMTCL may implement the plan with private developers. Herein, institutional capacity of respective institutions, reaction of DMTCL and developers interactions may

be the success factors implementing LVC in Dhaka city. In addition, non-alignment of policy and land development practice, spontaneous land market, private land ownership pattern and traditional socio-cultural pattern of Dhaka city may underpin new challenge to the model of LVC.

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