A Risk – Based Toll Road and Property Business Model Analysis of Land Value Capture Implementation to Improve Investment Performance

Andreas Pranoto[1], Ayomi Dita Larasasti[1], Yusuf Latief[1], Remi Kurnia[1]
[1]*(Department of Civil Engineering, Faculty of Engineering, University of Indonesia, Depok, West Java, Indonesia)*

ABSTRACT: At present, the government is only able to contribute 28% of the total infrastructure development funds. It is therefore becoming increasingly evident that a novel source of funding is required to meet the demands of infrastructure development, operation and maintenance. A study conducted by the Asian Development Bank (ADB) indicates that land value capture (LVC) has the potential to be applied in Indonesia, particularly in the Trans Sumatra Toll Road (TSTR). Given the relatively modest internal rate of return (IRR), it is anticipated that LVC will prove an effective means of enhancing the investment performance of the TSTR project.. A nine-box business model canvas was identified through a literature review, with the following groupings: stakeholder variables (X1), government regulations and policies (X2), comprehensive zoning area development (X3), business model (X4), land value capture (X5). In order to ascertain the success of improving investment performance (Y1). The findings of this study are presented in the form of a toll road business model and property based on land value capture. The analysis of mitigation and strategy recommendations is based on six dominant risk factors, employing pareto analysis and pattern recognition.

KEYWORDS - Land Value Capture, Toll Road Assignment, Business model, Trans Sumatera Toll Road

I. INTRODUCTION

The fulfillment of basic infrastructure availability and minimum service standards, as outlined in the National Long-Term Development Plan 2005-2025 and the National Medium-Term Development Plan 2015-2019, is one of the indicators of achieving 100% toll road service. The completion of urban toll road service coverage in South Sumatra Province by the end of 2022 was only 64.09% [1]. In light of these circumstances, the government has proposed a collaboration with the Regional Land Value Capture Programme with the objective of accelerating the target of 100% toll road section services.

In order to achieve the target of infrastructure development in the period 2020-2024, Indonesia requires a total infrastructure investment requirement of IDR 6,445 trillion. However, the funds available to the government for this purpose are limited to IDR 2,385 trillion, comprising the state budget and regional revenue and expenditure budget. Indonesian government must identify alternative sources of funding, including those from state-owned enterprises (BUMN) and the private sector. The considerable requirement for investment to fulfil infrastructure needs places a significant financial burden on the state infrastructure budget, necessitating the government to seek alternative sources of financing. One such source is private investment, as evidenced by Anjani [2].

The impact is manifested in the form of a multiplier effect on numerous sectors and individuals. Such developments may also enhance the area's desirability, which could result in an increase in land value. The implementation of infrastructure projects by the government, which has the effect of increasing land values in the area, represents a potential source of financing for further infrastructure development through the use of the land value capture (LVC) method.

The development of infrastructure in the South Sumatra region, with the establishment of regional growth centres in Western Indonesia, is a necessity if the acceleration of economic growth, the improvement of community welfare, and the realisation of the availability of better public services are to be achieved. The involvement of the private sector as an innovation in infrastructure development will result in the provision of superior public services. In addition, the Indonesian government has introduced the Public Private Partnership (PPP) scheme in infrastructure provision, which allows for the government to cooperate with the private sector based on the principle of proportional risk allocation.

In terms of business, the objective of toll road activities is to increase revenue. Consequently, it is of paramount importance to consider the costs involved, including those associated with development and operational costs. One strategy for enhancing cost efficiency is the implementation of canvas business models and risk management. The current business model of toll roads is based solely on tariff revenue, which results in a lengthy payback period. Consequently, the implementation of a new alternative business model is necessary, involving the introduction of tax-based land value capture and development in order to obtain alternative financing. The implementation of land value capture necessitates the undertaking of a risk analysis, which must commence with an examination of the stakeholders, regulations and policies, regional zoning development, business models and land value capture. The objective of this implementation is to reduce risk in all activities, reduce expenses, increase efficiency and safety. Another objective is to enhance the professionalism of management and implementers, enhance services, and ultimately enhance the reputation of the business in the business world [2].

In order to ascertain the viability of investment in toll road construction projects based on land value capture, it is essential to conduct a thorough analysis of the business model canvas, with a view to identifying and mitigating the risks that may arise. The business model canvas comprises nine core elements that collectively form the foundation of the business. These elements describe in detail how an organisation creates and delivers value to customers and generates benefits for them. The business model canvas comprises a number of key components, including key partners, key activities, value propositions, customer relationships, customer segments, key resources, channels, cost structure, and revenue streams [3].

II. MATERIAL AND METHODS

The research methodology employed in this study comprises a literature review, a questionnaire survey and expert interviews. A literature review was conducted to identify the form of the toll road and property canvas business model and the risks in the toll road and property business model in the Trans Sumatra Toll Road assignment project. The list was then validated by five experts in the field of toll roads and property, financing and infrastructure investment who have a minimum of a Bachelor's degree and more than 10 years of experience.

The validated canvas business model form is divided into five variables, and the risk factor is processed into 23 questionnaires, which become independent and dependent variables. These are then validated using an expert judgement questionnaire. The questionnaire was then distributed to 135 respondents engaged in toll road construction with the objective of providing risk scores and measuring the relationship between toll road business models and investment performance as quantitative data.

The road and property business model indicators are as follows: X1 - Stakeholders (7 factors), X2 - Government regulations and policies (6 factors), X3 - Comprehensive zoning area development (3 factors), X4 - Business model (5 factors), X5 - Land value capture (2 factors). In order to participate in the study, respondents must have more than five years of work experience and a minimum education level of Diplomat III. Following the completion of the questionnaire, a series of tests were conducted using SPSS software to assess the homogeneity, data sufficiency, validity and reliability of the data. The identified risks were then analysed through risk analysis, with the aim of determining which risks are the most dominant. This was achieved through the use of Pareto analysis and pattern recognition analysis.

The outcomes of risk analysis using Pareto analysis and pattern recognition analysis on variables related to toll road and property business models were discussed with experts to identify the causes, impacts, and preventive and corrective actions associated with each existing risk. This information was then used to inform the development of toll road and property business models, taking into account existing risks.

III. RESULT AND DISCUSSIONS

3.1 A Business Model for the Toll Road and Property Sector in the Trans Sumatra Toll Road Assignment Project

A literature study, data collection and validation with experts were carried out with the aim of obtaining an understanding of the business model and identifying variables related to the implementation of land value capture in the infrastructure development of the Trans Sumatra Toll Road (TSTR) assignment project:

Table 1. Schematic of Toll Road and Property Business Model Based on Land Value Capture

<table>
<tr>
<td rowspan="2">Key partner

The Central Goverment

Local Government

Private Developers

Banks and Investors

Contractors

Public services (police, fire department, hospital)

Public are all stakeholder in the project</td>
<td>Key Activities

Security and comfort services

Operator services

Maintenance Facilities

The central government and local government are responsible for formulating regulations pertaining to LVC policy, regional zoning development, and the appointment of LVC holder institutions*

Development of supporting infrastructure area/property*

Management of supporting infrastructure area/property*</td>
<td rowspan="2">Value Propositions

Security

Service quality is measured in timeliness

Best access to jobs, school and entertainment*

Premium accessibility*</td>
<td>Customer Relationships

Customer Operation center (Call Center Customer Service)

Standby Operational support 24/7

One stop infrastructure*</td>
<td rowspan="2">Customer Segmen

Users to access work

User to non-work locations (shopping, healthcare, family trips))

User of industrial and logistics companies

User to access education

User who want to have a place to live close to work education etc*</td>
</tr>
<tr>
<td>Key Resource

Resources for the design and construction of the aforementioned project are as follows:

Physical: Production, materials and equipment

Human resources: the project must have the input of competent staff at each stakeholder involved in the project

Information and communication technology (ICT) services: the project must have access ICT</td>
<td>Channels

Website

Application

Social media

Newspaper

Advertisement

Travel Agent</td>
</tr>
<tr>
<td colspan="2">Cost Structure

Capital expenditure (Capex) encompasses construction costs, toll equipment and the necessary supporting information and communication technology (ICT) infrastructure.

Operating expenditure (Opex) includes employee salaries, general and administrative costs (utilities, rent, insurance, etc.), as well as operating and repair costs.</td>
<td colspan="3">Revenue Streams</td>
</tr>
<tr>
<td colspan="2"></td>
<td colspan="2">Toll fee revenue

Specialised cargo service charge

Advertising fee</td>
<td>Utility fee

CommercialProperty*

Tax*</td>
</tr>
</table>

Table 2 Toll Road and Property Business Model Variables

No.	Toll road and property business model variables	Description of business model related variables
X1	Stakeholders	The implementation of a toll road and property business model based on land value capture in the assignment toll road project necessitates the involvement of the government and the developer, as the role and function of each stakeholder plays a pivotal role in determining the project's success, including that of the partner, the customer segment, and the customer relationship.
X2	Government regulations and policies	The implementation of a toll road and property business model based on land value capture in toll road projects necessitates the creation of regulatory invitations and government policies to facilitate the expeditious running of a project, including key activities.
X3	Development of comprehensive zoning district	The implementation of a toll road and property business model based on land value capture in toll road projects necessitates the development of areas that can increase value in order to accelerate the project timeline, including key activities and value propositions.
X4	Business model	The implementation of a toll road and property business model based on land value capture in toll road projects necessitates the availability of adequate resources to support the business model in order to facilitate the expeditious completion of a project. These resources include, but are not limited to, key resources, channels, and cost structures.
X5	Land value capture	The implementation of a toll road and property business model based on land value capture on toll road projects necessitates the generation of a swift return on capital through the application of LVC instruments to accelerate the progression of a project, including the revenue stream.

The form of the toll road and property business model, which has been validated by experts, has been found to be consistent with the previously identified toll roadbusiness model variables. The following section presents the evaluation results:

Stake holders

The successful implementation of land value capture is contingent upon the support of beneficiary stakeholders, who are the beneficiaries generated by infrastructure investment. It is imperative that stakeholders work in concert, as there are divergent interests among them that frequently impede collaboration. It is anticipated that the establishment of a collaborative environment between stakeholders will facilitate more effective cooperation and coordination, thereby enhancing the implementation of the land value capture programme. In the absence of stakeholder collaboration, the development of infrastructure and the surrounding area may proceed independently, potentially impeding the optimal implementation of the land value capture programme [4].

Government regulations and policy

The implementation of land value capture is contingent upon the existence of regulatory frameworks. The absence of regulatory support precludes local governments from implementing land value capture. Consequently, there is a pressing need for regulatory certainty to facilitate the participation of the private sector in the implementation of land value capture. [6]

The majority of experts have indicated that the current regulatory framework is limited to the toll road business and does not extend to the surrounding area. However, the substantial potential of Trans Sumatra Toll Road (TSTR) could facilitate the development of the area in proximity to the toll road.

Development of comprehensive zoning district

The role of supporting strategic objectives and long-term plans in the successful implementation of LVCs in Hong Kong is exemplified by the Hong Kong Government's implementation of a Comprehensive Development Area (CDA) around the Hong Kong Mass Transit Railway (MTR) area. This initiative enhances development integration through mixed-use development. The implementation of this mixed-use development plan serves to enhance the value of the areas developed by the Hong Kong MTR concession company, thereby supporting its financial viability. [5].

Business model

The significance of business models in attracting investors and implementing LVCs as a source of revenue to recover capital investment in transport infrastructure. The property business contributed 30% of the revenue of Delhi Metro, India, between 2004 and 2011, and 38% of the revenue of Hong Kong MTR between 2000 and 2012 [5].

Land Value Capture

It is imperative that transparency be maintained in the management of LVC assets and properties. It is of the utmost importance that the management and allocation of levy funds be conducted in an open and transparent manner in order to ensure the successful implementation of tax-based LVCs. [7].

The success of LVCs is largely contingent upon the government's development plan. It is essential that the strategic objectives of regional and national development are aligned in order to ensure that regional development is aligned with national development. The Trans Sumatra Toll Road (TSTR) is in a position to implement development initiatives that align with these strategic plans and objectives. This will facilitate the implementation of LVCs on TSTR, which will in turn receive support from the central and local governments.

3.2 Risk Factors of Toll Road Business Model Variables and Property in the Construction of Trans Sumatra Toll Road Assignment Project

Following expert validation and the acquisition of 23 risk events, the pilot survey stage was initiated by 10 respondents. The results of the pilot survey, which comprised 23 risk events from five variables of the toll road and property business model on the implementation of land value capture on the Trans Sumatra Toll Road (TSTR) Bakauheni - TerbanggiBesar section, were readily comprehensible to respondents..

Following the pilot survey, the questionnaire was distributed to a total of 135 respondents. The results of the questionnaire were subjected to statistical

analysis, which included the homogeneity test, data sufficiency test, validation test and reliability test. Subsequently, a qualitative risk analysis was employed to assess each risk event. A Kruskal-Wallis test was employed to conduct the homogeneity test, utilising the SPSS application. A data adequacy test was conducted using the KMO (Kaiser-Meyer-Olkin) and Barlett methods with the help of the SPSS application. The validity test employs the product moment correlation. The reliability test was conducted using the Cronbach's Alpha method with the help of the SPSS application. A qualitative risk analysis was conducted using a probability and impact matrix..

The index assessment and level determination of each risk yielded 23 high-level risks. The results indicate that the discrepancy in the perception of time and urgency among stakeholders represents a significant risk. This finding aligns with the findings of a previous literature review on the implementation of land value capture in the toll road and property business model. Furthermore, the absence of regulations governing the interactions between stakeholders represents a high-level risk. It is evident that transparency in the management and allocation of levy funds is a crucial aspect in the implementation of tax-based LVC. The lack of consistency in regulations and the absence of a clear legal basis have impeded the implementation of LVCs in transit infrastructure in Delhi, India. [5].

It can therefore be concluded that the risks associated with each variable of the toll road and property business model in the implementation of land value capture in the construction of the Trans Sumatra Toll Road (TSTR) Bakauheni - TerbanggiBesar section are presented in the following table:

Table 3. Risk Events in Toll Road and Property Business Models on the Implementation of Land Value Capture for TSTR Development

Code	Risk factor indicator	Risk factor statement	Risk Value	Risk Rating	Risk Level
X1	Stakeholders				
X1.1	Communication breakdown between stakeholders	A failure of communication can impede the successful implementation of land value capture.	0,356	7	High Risk
X1.2	Lack of transparency among stakeholders	It is imperative that stakeholders engage in transparent communication in order to resolve existing issues.	0,362	6	High Risk
X1.3	Lack of awareness of stakeholder duties and responsibilities	A lack of awareness of the respective responsibilities of the various stakeholders can impede the application of land value capture in the toll road business model	0,376	3	High Risk
X1.4	Different time/urgency factors between stakeholders	The synchronisation of implementation coordination schedules between stakeholders is an important factor in the successful completion of a project.	0,391	1	High Risk
X1.5	Lack of commitment among stakeholders	A lack of commitment on the part of stakeholders has an impact on the application of land value capture.	0,365	5	High Risk
X1.6	Incomplete involvement plan for each stakeholder	The delineation of the roles and responsibilities of each stakeholder will facilitate the coordination necessary for the successful implementation of LVC.	0,369	4	High Risk
X1.7	differences in cultural factors between stakeholders	The culture between stakeholders that becomes the habitual culture of the stakeholder organisation.	0,320	15	High Risk
X2	Government Regulations and Policy				
X2.1	The absence of regulations governing stakeholders	The regulatory framework that governs the stakeholders involved in the implementation of a business model based on land value capture.	0,391	2	High Risk
X2.2	the lack of legal power between institutions	The legal framework that governs the formation of agreements between stakeholders.	0,323	14	High Risk

Code	Risk factor indicator	Risk factor statement	Risk Value	Risk Rating	Risk Level
X2.3	the potential for policy and political changes	The potential for changes in the political atmosphere to result in the implementation of LVCs.	0,352	8	High Risk
X2.4	the necessity of local government requirements	The necessity for local government to facilitate regional development.	0,303	19	High Risk
X2.5	the need to plan for the development of a new road networ	The planning of new road networks connecting cities.	0,348	9	High Risk
X2.6	the necessity to consider the development of other transport modes.	The development of alternative modes of transportation, in addition to toll roads, is a crucial aspect of the transportation infrastructure.	0,314	17	High Risk
X3	Development of comprehensive zoning district				
X3.1	The absence of local government support in regulating the zoning of the area presents a significant obstacle to the development of the area.	The provision of local government support for the regulation of zoning can have a beneficial impact on the implementation of land value capture.	0,338	10	High Risk
X3.2	The lack of a comprehensive long-term development vision and mission has resulted in a suboptimal land value capture strategy.	In order to achieve optimal outcomes, the vision and mission underlying the implementation of land value capture must be viewed as a long-term endeavour.	0,336	11	High Risk
X3.3	The absence of economic restructuring in the region renders the land value capture programme an unattractive proposition.	Regional economic restructuring has the potential to positively impact the inflow of investors and residents to an area.	0,293	20	High Risk
X4	Business Model				
X4.1	The socialisation of toll roads and properties and the implementation of the LVC take time.	The time required for socialisation and the long-term implementation of the LVC programme.	0,292	21	High Risk
X4.2	The rejection of increased tax payments by the general public.	A potential increase in taxation resulting from the implementation of the Local Value Capture (LVC) instrument may encounter resistance from neighbouring communities.	0,283	23	High Risk

Code	Risk factor indicator	Risk factor statement	Risk Value	Risk Rating	Risk Level
X4.3	It is of paramount importance to investors that they are assured of profit throughout the entirety of the project cycle.	The guarantee of investor benefits is intended to attract investors to participate in the land value capture programme.	0,287	22	High Risk
X4.4	Land ownership in the surrounding area is not fully owned by the government	The non-governmental ownership of land may present challenges in the process of land acquisition.	0,328	13	High Risk
X4.5	Few potential investors are interested	It is challenging to secure investment due to the lack of clarity regarding the potential returns on capital.	0,334	12	High Risk
X5	Land Value Capture				
X5.1	The land value capture instrument is not functioning as intended.	A land value capture instrument is a financial instrument designed to capture the increase in land value resulting from urban development.	0,428	18	High Risk
X5.2	The financial consequences of a lack of property interest.	There is no property interest in the area.	0,448	16	High Risk

The implementation of land value capture in the construction of the Bakauheni-TerbanggiBesar section of the TSTR poses the greatest risk to the stakeholder variable. According to experts, stakeholders are the primary factor supporting the viability of the toll road and property business model based on land value capture. Therefore, resolving this issue would facilitate the mitigation of other risks..

Recommendation of Risk Mitigation Strategies to Improve Investment Performance in Toll Road and Property Business Models in the Implementation of Land Value Capture in the Construction of the Trans Sumatera Toll Road Assignment Project

The results of the analysis of the dominant risk events from each variable of the toll road and property business model of six risks were validated by five experts who have a minimum of ten years of experience in toll road infrastructure development and a minimum education level of Bachelor's degree Civil Engineering. The validation results indicated that the experts concurred on the six dominant risk events in the toll road and property business model. Additionally, the experts provided responses to the causes, impacts, preventive actions, and corrective actions of the dominant risks in the toll road and property business model in the construction of the Trans Sumatra Toll Road (TSTR) Bakauheni - TerbanggiBesar section. Once the most significant risks inherent to the toll road and property business model have been identified, a management strategy is devised to address these risks. This strategy is informed by discussions with experts and is based on the identified risks.

Table 4. Evaluation of the Most Dominant Risk Based on Discussion with Expert

Code	Risk factor indicator	Risk Factor Statement	Cause	Impact	Preventive Action	Corrective Action
X1	Stakeholders					
X1.4	Differences in time / urgency factors between stakeholders	It is of significant importance to synchronise the implementation coordination schedule between stakeholders in the context of a project.	It is evident that each stakeholder's activities and projects are of interest.	The construction and operation of the assignment toll road project has been delayed.	It is recommended that a more detailed timeline planning process be implemented, which should involve all relevant project stakeholders.	It is recommended that more intense coordination be conducted among all stakeholders involved in the project, with the establishment of special institutions for the implementation of LVCs.
X1.3	Lack of awareness of the duties and responsibilities of stakeholders	A lack of awareness of the respective responsibilities of stakeholders can impede the implementation of land value capture in the toll road business model.	It is evident that each stakeholder's activities and projects are of interest.	The construction and operation of the toll road project has been delayed.	The establishment of transparent regulations governing the relationship between stakeholders.	A series of joint discussions were held between representatives of the government and related private entities with the objective of formulating and ratifying policies that would govern the implementation of LVC in Indonesia.
X2	Government Regulations and Policy					
X2.1	The absence of regulations governing stakeholders	The regulations that govern the stakeholders involved in the implementation of the business model based on land value capture.	LVC is a relatively new phenomenon in Indonesia, and as a consequence , there are currently no regulations in place governing the conduct of stakeholders.	The failure of the application of land value capture as a project.	The formulation of regulations and policies that delineate the obligations and responsibilities of stakeholders engaged in the implementation of LVC.	It is recommended that there be a more concerted effort to coordinate the activities of the relevant institutions in accordance with their respective duties and responsibilities, with the objective of formulating and ratifying policies that will govern the implementation of LVC in Indonesia.
X3	Development of comprehensive zoning district					

Code	Risk factor indicator	Risk Factor Statement	Cause	Impact	Preventive Action	Corrective Action
X3.1	The absence of local government support in regulating zoning represents a significant obstacle to the development of the area in question.	The provision of local government support for the regulation of zoning can have a beneficial impact on the implementation of land value capture.	There is a discrepancy between the regional long-term development plan and the centre's approach.	The implementation of land value capture is not optimal and does not align with the intended target.	It is essential that there is a synchronised coordination between the central and local government on the implementation of the LVC, as outlined in the Regional Long-Term Development Plan	The mapping and formulation of joint development plans between central and local governments in accordance with regional zoning plans is a crucial aspect of LVC implementation. One such example is the development of areas connected to the Bakauheni-TerbanggiBesar Toll Road access, which is being facilitated by the establishment of industrial estates.
X4	Business Model					
X4.5	A limited number of potential investors have expressed interest.	It is challenging to attract investors due to the lack of clarity regarding the potential return on investment.	The absence of specific regulations has led to a reluctance among investors to participate.	The failure of the application of land value capture as a project.	It is recommended that regulations be formulated in a clear and unambiguous manner, with a view to avoiding any overlap with existing regulations.	It is of the utmost importance to ensure the sustainable development of the programme, as well as the ease of licensing and the government's support of the programme.
X5	Land Value Capture					
X5.2	The financial consequences of a lack of property interest.	There is no property interest in the area.	The absence of regional economic restructuring	The potential for project losses resulting from the failure to implement land value capture.	The existence of specific policies at the central and local government levels that facilitate the economic restructuring of the area is a crucial aspect of the implementation of LVC.	The objective is to foster social interaction and collaboration between the government and the private sector with regard to investment in the implementation of LVC. This is to be achieved through the promotion of regional development. One such example is the development of the Way Banana industrial estate.

The implementation of land value capture (LVC) is contingent upon the efficacy of government regulations and policies. These variables represent the most significant risk factors that can impede the successful implementation of LVC. The clarity of regulations and agreements between stakeholders can facilitate the formation of long-term commitments between the government and concession companies in the process of value creation and value capture during the implementation of LVC. [5].

The significance of business models in attracting investors and implementing LVCs as a source of revenue to recover capital investment in transport infrastructure is evident. For instance, the property business contributed 30% to the revenue of Delhi Metro, India in 2004-2011, and 38% to the revenue of Hong Kong MTR in 2000-2012. [5].

It is recommended that LVC-based properties be integrated with toll road infrastructure to enhance their value through toll road accessibility. The implementation of regulatory measures and the integration of regional development with transport infrastructure will enhance accessibility, thereby increasing revenue. This will occur through the application of development-based LVCs and from tariff payments. [5]. Consequently, an assessment and development of toll road and property business models in the construction of the Trans Sumatra Toll Road (TSTR) Bakauheni - TerbanggiBesar section is conducted with the objective of enhancing investment performance and expediting the return on investment capital for TSTR development.

The discussion with five experts yielded the conclusion that for the stakeholder variable, the most important development strategy is to ensure that the vision and mission of each stakeholder involved in the application of the toll road and property business models are aligned. Furthermore, it was recommended that intense communication be carried out transparently regarding problems, challenges and funding. With regard to the most significant development strategy in the context of government regulations and policies, it is recommended that regulations and laws be enacted to govern the application of land value capture. This should extend to both regional development regulations and the regulation of land value capture instruments, as well as funding and profit regulations. The most crucial strategy for the advancement of a comprehensive zoning area is the alignment of development objectives between the central government and local governments, accompanied by a restructuring of the local economy to facilitate the implementation of long-term development visions and missions. This will ensure the optimal utilisation of land value capture techniques, leveraging the full range of available instruments. The most crucial aspect of the business model is to guarantee that all land value capture instruments are optimised, thereby ensuring that investors are guaranteed a profit throughout the entirety of the project cycle. This, in turn, facilitates the development of the surrounding area and the achievement of land value capture in accordance with the desired outcome. The primary strategy for land value capture is to ensure the feasibility study is successful. Additionally, it is crucial to socialise the land value capture instrument to investors and the community. This enables the community to recognise the benefits of land value capture and to participate in the application process. By increasing the economy of the surrounding area, for instance, through the development of the banana industrial area, the integrity of toll road access, the airport and Bakauheniharbour, as well as tourism areas and other properties, the community can benefit from the programme. Based on expert discussions, the following land Value capture schemes can be applied in this area:

Table 5. Appropriate Land Value Capture Scheme in the Construction of the Trans – Sumatra Toll Road (TSTR)

Scheme	Form of Instrument	Pros of the Scheme	Challenges
Tax	Adjustment of tax rates Prepayments at lower tax rates (payments in lieu of taxes) Adjustment of premium rates for income tax and land and building tax. Adjustment of zoning (re-zoning)	The concept is well-known to all parties The aforementioned policy is founded upon a robust legal foundation. It encourages the creation of novel tax instruments and derivative products	It is necessary to make adjustments to the form of instruments or to the applicable tax regulations. A business tendency to avoid high taxes is evident.
Retribution	Licence levies Development levies Parking levies Fuel oil levies	A concept that is widely recognized and understood. The aforementioned policy is founded upon a robust legal foundation. The programme encourages innovation in the field of retribution instruments and their derivative products.	It is necessary to implement an adjustment in the form of an instrument or in the prevailing retribution regulation. It is evident that socialisation is a key factor in reducing public resistance to the imposition of additional levies.
Utilisationofgovernmentassets	Utilisation by the central and/or regional government: central-regional cooperation, inter – regional cooperation, state-owned enterprises. Utilisation by other parties: Lease, borrow and use, co-operation in utilisation, build and transfer.	There are government assets that are currently idle Can have a direct impact on TSTR.	The capacity and capability of regional owned enterprises that represent local governments in contracting with partners is still limited

Scheme	Form of Instrument	Pros of the Scheme	Challenges
Third party contribution	Corprate Social Responsibility (CSR) Private funds from companies that utilise strategic areas around TSTR - CSR funds are already commonly used by companies in many sectors including the infrastructure sector.	Endowment funds can be managed by professional investment management institutions that are selected openly through a tender process There is no certainty of continuity because it is relatively incidental and cannot be obligated.	It is not possible to guarantee the continuity of this process as it is relatively unimportant and therefore not obligatory Need to assure stakeholders of professional management and a structure that ensures continuity.

IV. Conclusion

The findings of this study indicate that the form of the toll road and property business model should be considered as an alternative source of funding. It is also important to pay attention to the existing risks and to implement effective risk mitigation strategies to improve investment performance in the construction of TSTR. The results of this study can be used as a reference for alternative financing of toll road construction and risk-based property on the implementation of land value capture.

Acknowledgements

The author would like to express their gratitude to all members of the toll road and property business model research group who have assisted, provided advice and feedback during the preparation and completion of this research. The author would also like to thank the toll road infrastructure development and investment experts who have assisted the author in validating this research process.

References

[1] Kementerian PekerjaanUmum dan Perumahan Rakyat. 2020. RencanaStrategis Kementerian PekerjaanUmum dan Perumahan Rakyat Tahun 2020 – 2024.

[2] Anjani, ZalfaFadilla. 2022. "StudiPotensiImplementasi Skema Land Value Capture (LVC) DalamPembiayaanInfrastruktur Jalan Yang Berkelanjutan (Case Study: Pembangunan Jalan Tol Trans-Sumatra)." ProsidingKonferensi Regional Teknik Jalan 15[CrossRef] [Google Scholar] [Publisher Link]

[3] Osterwalder, Y Pigneur., "Business Model Generation: A handbook for visionaries, game changers and challengers. 2010

[4] Li, Xinjian, and Peter E. D. Love. 2022. "Procuring Urban Rail Transit Infrastructure by Integrating Land Value Capture and Public-Private Partnerships: Learning from the Cities of Delhi and Hong Kong." Cities 122. doi: 10.1016/j.cities.2021.103545.[CrossRef] [Google Scholar] [Publisher Link]

[5] Suzuki, Hiroaki, Jin Murakami, Yu-Hung Hong, and Beth Tamayose. 2015. "Financing Transit-Oriented Development with Land Values: Adapting Land Value Capture in Developing Countries." Financing Transit-Oriented Development with Land Values: Adapting Land Value Capture in Developing Countries. doi: 10.1596/978-1-4648-0149-5.[CrossRef] [Google Scholar] [Publisher Link]

[6] Mabrurotunnisa, and Doddy Aditya Iskandar. 2021. "Land Value Capture as Financial Resource for Infrastructure Development in Palembang City." The Journal of Indonesia Sustainable Development Planning 2(1):74–85. doi: 10.46456/jisdep.v2i1.96R. E. Sorace, V. S. Reinhardt, and S. A. Vaughn, "High-Speed Digital-to-RF Converter," U.S. Patent 5668842, vol. 20, no. 2, pp. 300-325, 1997. [CrossRef] [Google Scholar] [Publisher Link]

[7] Dentiala, Billi, and Ario Koesalamwardi. 2020. "IdentifikasiFaktor-FaktorPenentuKeberhasilan Skema Pendanaan Land Value Capture Pada ProyekInfrastrukturTransportasi Nasional: StudiPendahuluan." JurnalKonferensi Nasional Rekayasa Dan Desain 1.[CrossRef] [Google Scholar] [Publisher Link]

[8] Hair, Joseph F., Jeffrey J. Risher, Marko Sarstedt, and Christian M. Ringle. 2019. "When to Use and How to Report the Results of PLS-SEM." European Business Review 31(1):2–24. doi: 10.1108/EBR-11-2018-0203.[CrossRef] [Google Scholar] [Publisher Link]

[9] Li, Xinjian, Peter E. D. Love, Hanbin Luo, and Weili Fang. 2022. "A Systemic Model for Implementing Land Value Capture to Support Urban Rail Transit Infrastructure Projects." Transportation Research Part A: Policy and Practice 156:90–112. doi: 10.1016/j.tra.2021.12.010[CrossRef] [Google Scholar] [Publisher Link]

[10] Koesalamwardi, Ario Bintang, Susy FatenaRostiyanti, and RavliThaufiqReksapernata. 2020. "Value Capture Instruments as An Infrastructure Project Financing Alternative For Rail-Based Mass Transportation: Qualitative Study from The Government Perspective." CSID Journal of Infrastructure Development 3(2):214. doi: 10.32783/csid-jid.v3i2.151.[CrossRef] [Google Scholar] [Publisher Link]

[11] F. Medda, "Land value capture finance for transport accessibility: a review", Journal of Transport Geography, Vol. 25, pp. 154-161, 2012[CrossRef] [Google Scholar] [Publisher Link]

[12] C. Connolly, T. Wall, "Value capture: a valid means of funding PPPs?," Financial Accountability & Management, vol. 32, no. 2, pp 157-178, 2016[CrossRef] [Google Scholar] [Publisher Link