
The Relation Between Road Infrastructural Development and Land Value Increments in Dire Dawa City, Ethiopia

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Abstract: The dramatic increment in the need and expansion of road infrastructure requires a sustainable source of funding. The need to implement infrastructure funding by capturing the value uplift due to public action becomes an important issue in most developing countries and Ethiopia is not an exception. Road infrastructure has been identified as a major factor in the development of a nation and where is lacking or inadequate usually creates a memorable hardship for road users. Most previous research done was on the subject focuses on financing road infrastructure using traditional funding based on budgetary mechanism. However, the main objective of this research article focuses on the possibility to implement land value capture to finance to expand road infrastructure in the Dire Dawa City. The study applied both qualitative and quantitative approaches where primary and secondary data sources were used. Primary Data was gathered from 166 households and tenant respondents chosen using systematic random sampling techniques and simple random sampling techniques from 10 key informant interviews and 12 Focus Group Discussions that were selected purposively. Secondary data were gathered from different written and documented sources. Quantitative data were analyzed by using descriptive statistical tools like tables, bar graphs, and analytic tools by using Microsoft excel, and Strata software. The finding of this study showed that there was a higher need for sustainable fund sources to respond to an increase in road infrastructure expansion demand in the future. The positive relationship between road infrastructures and land value increment in the study area was observed and it indicates the implementation of appropriate land value capture mechanisms. The mechanisms must have devised to fit for each particular situation. Therefore, applying land value capturing is legitimate to solve the shortage of finance for future expansion of road infrastructure in Dire Dawa City.

Keywords: Road Infrastructure, Land Value Capture, Land Value, Sustainable Fund Source, Land Value Increment

1. Introduction

The dramatic increment in the need and expansion of road infrastructure requires a sustainable source of funding. The need to implement infrastructure funding by capturing the value uplift due to public action becomes an important issue in most developing countries and Ethiopia is not an exception. Road infrastructure is one of the fundamental components in the delivery of key public services in most countries. These services range from the traditional public-sector domains of defense, law enforcement, power generation, water, sanitation and transport to the social infrastructure, such as health care, social security, skills development, knowledge and innovation. Road infrastructure has been identified as a major factor in the development of a

nation and where is lacking or inadequate usually creates a memorable hardship for road users [46].

The road is important infrastructure to connect the area to another or from economic center to another economic. Infrastructure becomes an important factor in the development of the region as well as the increased economic activity of society. The availability of adequate road infrastructure will be the distribution of goods and services become faster and more efficient in terms of cost and time, making it easier for investors in the attempt. The longer and better quality of a road, it will facilitate the distribution of goods and services, which in turn attract investment and increase the per capita income of a region [57].

Several international studies, focusing on the impact of road transport infrastructure on land values, have found that

road infrastructure exerts a positive influence on land values, and there is a growing lobby for governments to use appropriate instruments to recoup land value created by road infrastructure investments to finance future road infrastructure project.

According to Andreas Hartmann [3] in modern society, road infrastructure has become an essential part of daily life. Individual road users, logistic firms, and public transportation agencies expect reliable and safe road infrastructure for traveling from one location to another and transporting goods and peoples. As well road infrastructure that provides access to communities and businesses for smart growth with increase property value and land use-value. In addition to this new constructed and well-maintained highways and side streets are good places for commercial and residential development.

Generally, road infrastructure plays a crucial role by providing mobility for the efficient movements of people, goods and services as well as providing accessibility to land and a wide variety of commercial and social [11].

According to Perera M T U. et al., [47] Land value capture is a policy approach that enables communities to recover and reinvest land value increases that result from public investment and other government actions. Also known as value sharing, it's rooted in the notion that public action should generate public benefit. In addition to that Land value capture refers to the process by which all or a portion of increment in land value (part of the financial benefit gained by landowners, developers and/ or occupiers) attributed to "community intervention", rather than landowner actions, are recouped by the government and used for public purposes.

This research article examines an important additional option for local road infrastructure finance: capturing land value increment gains from road transport infrastructure. Because of this land values capture are highly sensitive to different road infrastructure investment and urban economic growth. The various ways in which land values capture can be used to help pay for investment in urban infrastructure, in addition to their role as part of the property tax base.

Therefore, this research article is an attempt to establish the relationship between Road infrastructural development expansion and land value increment in Dire Dawa City, which is relatively not well exploited. A descriptive method based on empirical data and literature is pursued.

The research article uses the before-and-after case method to identify an increase in property values (rental and sales) as measured by the increase of land value before-and-after road infrastructure development expansion in the study area.

2. Literature Review

Empirical Review.

2.1. The Concept of Land

Land is not just physical; it also has cognitive aspects. Cognitive means how you think and reason about something.

It includes how you come to understand it and form beliefs and attitudes about it. The physical may be the ground, buildings and resources — what some people first associate with land when they think about it — whereas the cognitive may involve deeper emotional, spiritual, communal ties to land. Think about what it means when someone says, "This is my land!" Or "We want our land back!" Or "I belong to this land!" At a certain level, they are referring to soil and dust, but at a deeper level they are finding identity in the land.

Some people say that there is a difference between the idea of a person or people belonging to land as opposed to land belonging to a person or persons. This reflects a shift that occurs from land being regarded as an aspect of social identity and status to land regarded primarily as a commodity, though these elements may be present to some degree in both. Where land is a commodity, it means it becomes a consumption good, or capital for investment. Some nations see land as a deity - the giver and sustainer of life [56].

You see, 'land' has multiple meanings depending on the context in which it is used. It doesn't have to refer only to dry earth. Associate Professor Jenny Whittal captured some of these different meanings. Land is identified only as fixed earth, or terra firma. Whereas, on the right, it carries multiple meanings, including a consumption good, investment capital, property, and physical space.

In summary:

- a. Land has physical elements and is the basis of the environmental sphere of the universe.
- b. Land has connotations of spirituality to some.
- c. Land has different values according to use, users and concepts of value and systems of production.
- d. Land is involved in chains of economic activity.
- e. Land is involved in how social groups form social bonds and maintain kinship networks.
- f. Land is a major element of property, whether or not it is viewed as a commodity that can be freely bought and sold.
- g. the distribution of land and land uses is a major indicator of wealth and poverty.

2.2. Land Value

There are many variables that affect the value of a particular site, including distance from services and amenities (e.g. schools, transport, hospitals), distance from job generators (such as CBD's), availability of trunk urban infrastructure (e.g. water, electricity, gas, telecommunications), its aspect, slope, elevation, views, size, shape, soil fertility, whether it is polluted, whether it is subject to air and noise pollution, the passing trade, whether it is affected by traffic congestion and the perceived quality of the neighborhoods.

Land values have many advantages as a tax base, as noted by economists back to Ricardo and popularized in the writings of Henry George and his followers. The appreciation in value of a particular piece of urban land is not due to the actions of the landowner, but due to its location in the city and thence the

collective activity of the city including provision of urban infrastructure. The equilibrium response of land prices to a transport investment will generally mean that user-benefits end up being passed from transport users to landowners. For example, a new subway station makes nearby houses more desirable, so rents will increase. In the simplest cases (either a perfectly elastic demand curve for housing or a perfectly inelastic supply of housing in each place) all of the user-benefit of the improvement is bid away by higher rents, which are in turn capitalized in higher land values [32].

Land values can change where these items are variable (although changes to intrinsic physical characteristics, such as slope, are unlikely), and they may change because of private or public action. For example, the closure of the BHP steel works in Newcastle, NSW, resulted in a reduction in air pollution around the suburb of Mayfield and, thus, increased property values in the area. As the unimproved value of this land grew, the local council received a windfall increase in rates revenue, despite council not providing any increased services or public infrastructure [59].

According to Urban Development Institute of Australia (UDIA) [59] stated that zoning and regulations affect the value of sites by reducing the availability of land for particular uses and operation of that use. In this way planning can radically affect the value of land through limiting its' uses. However, the "value" that is available to be "captured" is complex and, if not well understood and implemented correctly, could result in poorer outcomes than if the infrastructure were financed through traditional means. Effectively, "value capture" is the concept of the government taking some of the "windfall" gain that accrues to property owners, through an increase in value, as a result of government investment in an area.

In principle, UDIA agrees that there should be a way for some of these "windfall" gains to be "captured" by the government to fund major land transport infrastructure. The value of property in Sydney and Melbourne has risen exponentially in recent years because of increased demand and a lagging supply response – very little to do with infrastructure improvements. As demand has risen, excess capacity in infrastructure has been eaten away to the point where investment in new infrastructure is necessary to restore the previous level of amenity. Where infrastructure is to be built, this may further increase the value of property, but determining the exact effect of the infrastructure as opposed to other factors that increase the value of land is problematic.

Increases (or decreases) in land price are difficult to calculate, especially as prices tend to become inflated by speculation in anticipation of a scheme. Also, the value of land may increase for reasons that are not due to the scheme: it could be due to private investment (sometimes a new entertainment venue or new supermarket can lift values) and/or because of broad increases in land values across the city as a result of scarcity or population increases. Ultimately, any "value capture" scheme requires the determination of a pre-scheme "base value" which is itself a function of some or all of those items listed above, and which is already likely to

be affected by price expectations.

Land value is the measure of how much a plot of land is worth, not counting any buildings but including improvements [16]. Land value can be thought of as the relationship between the desired location and a potential user. The ingredients that constitute land value are utility, scarcity, and desirability. These factors must all be present for land to have value [17]. Land value in Asian cities has significant implications for the progress of economic growth. Land values indicate the market value that people ascribe to specific places. These values are affected by demand factors, such as views, amenities, and proximity to employment opportunities and transport infrastructure. Modern studies of the impacts of agglomeration in urban centers and of the value of the provision of new infrastructure use land values to estimate the benefits of a particular infrastructure project and additional benefits resulting from proximity to other firms, markets, and workers [27].

2.3. Land Value Increment

The study report in the city of Vancouver, and other studies indicated that the factors that drive land value increments due to the national, provincial, and local contexts create an overall market for urban land in a city or region, driving demand for housing and employment space and determining the available supply of land for development. Within this context, a second complex set of factors determines the market value of individual parcels of land.

These factors include:

- a. Zoning, which determines the allowable uses, height, and density of development?
- b. Accessibility, mainly by road and transit for residential and commercial uses but also including rail for some industrial uses.
- c. Services and utilities, which provide the water, sewer, drainage, electricity, natural gas, and communications networks that development requires.
- d. Nearby amenities such as shopping, parks, cultural facilities, recreation, and schools.
- e. Soil conditions and topography.
- f. Special site features such as view or waterfront.
- g. Character of the immediate surroundings. Note that investment in improvements on land would cause the total value of the property (land plus improvements) to rise, but this would not change the value of the land City of Vancouver, 2019 [9].

Abelson, P. [1] developed the land theory forming the theoretical underpinnings of property value uplifts resulting from improved accessibility. In essence, land rents are higher with improved accessibility because it provides greater accessibility opportunities to land holders in terms of destination. Though this theory is related to unimproved land [67, 68], it gives the basis for the general notion that public capital investments in accessibility related transportation infrastructures, such as road and rail, will lead to a positive increase in property values within the area of the project.

According to McAllister, P. [40], a specific tax is not always required in practice for value uplift to be captured for income generation purposes, rather governments across the globe have some forms of land taxation in place that provides for indirect benefits from an increase in the property value. Despite this indirect benefit, governments are increasingly seeking for additional revenue generation sources to fund public capital investments and property value uplift capture due to the improved accessibility project that is one of the sources through which additional revenue can be generated by governments to help fund public capital investments.

Most transportation infrastructure is geared towards the achievement of a certain policy of interest given its capital intensiveness. It is an instrument of value capture policies [28].

The Hong Kong's Metro Rail (MTR) and the London cross rail projects are examples where value capture has been successfully implemented [38, 34].

Experience from across the globe shows that its impact on the economy and its participants, have been varied and interesting. Unlike other economic processes, asset bubbles add to the incomes of the owners with them not having contributed anything to it. It is a simple case of being at the right place at the right time [43]. Economists call it a "free-rider problem", where in the beneficiaries partake of a windfall from an event, at no cost to them. In the instant case, the positive externality generated by specific developments in an area causes all land values to rise. Ricardo's Law of Rent assumes that a substantial portion of the wealth generated through any economic activity ends up in increased land values, which benefits only the landowners.

According to Natarajan, G. [43], unlike other endowments, land and natural resources confer benefits on the owner by the mere fact of being owned, without the need for any value addition to be done by the owner. Further, the rise in value of land or of any natural resource is generally independent of the amount of effort or value addition done by the owner, and is dependent on various exogenous variables. However, only the landowner captures the value increment without paying share of the value uplift for the service provider. Land values increment due to public activity like new roads, transport links, commercial developments etc.

According to Mulugeta Tenaw et al., [42] the increment of land value due to public action, such as investment in infrastructure, the provision of public service, and planning and land use regulation, can also affect the value of the land and property. In fact, all these activities, called public goods, generate large amount of positive externalities, most of which are captured by the landowners in terms of increases in land value.

2.4. Land Value Capture Concept

Land value capture (LVC) refers to giving communities the opportunity to recover and reinvest land value increases as a result of public investment and other government actions [18]. Land value capture refers to a broad range of approaches to obtaining public sector revenues or benefits derived from the value of land. Land value capture is used by

governments to fund infrastructure such as transit, to fund affordable housing, to suppress growth in land value when affordability is a concern, or to redistribute wealth.

The main argument in favor of using land value capture to raise government revenue is that increases in land value are almost entirely due to public sector actions pertaining to development approval (particularly zoning), infrastructure investment, and community building, so the public sector should benefit from these actions rather than have all of the benefit accrue to private owners of land [9, 40].

The concept of Land value capturing has a long history and the idea was coming from David Ricardo and Henry George. Accordingly, land value capture refers to a set of mechanisms used to measure the increasing land values that are arisen in the catchment area of public infrastructure development. Further [52], Published by the Royal Institution of Chartered Surveyors (RICS) claimed that the concept of LVC as unearned income by generating the public action (bridges, roads, rail) to private landowners.

The local governments are severely facing fiscal constraints, such as weak bond markets and heavy debt, which restrict them from funding infrastructure development [38, 61] and depend on the state budget to fund such development. Thus, they need to seek alternative sources to fund infrastructure development [29, 38]. The local government uses Land Value Capture (LVC) as an alternative financial scheme for urban rail transit projects [54]. By considering the concept of value capture, where the government can capture land value increment around transit nodes [39] the municipal government can fund infrastructure development in Palembang through LVC scheme. Even though LVC instruments, such as tax, planning gain, betterment levy, and development impact fee, have been implemented in Indonesia, it has not fully fulfilled the value capture principles [60]. Moreover, an absence in the legal system prevents the local government from explicitly implementing LVC in Indonesia.

Studies about LVC can be discussed quantitatively or qualitatively. In quantitative research, researchers generally evaluated the LVC implementation throughout the world, such as London [62, 33]. Some went on to calculate and forecasting value that governments could capture from land value increments [6, 14, 23, 54, 64]. Qualitative research primarily evaluated the LVC implementation through document reviews [7, 38] and specifically, based on the general principle of public finance [1, 18].

Nevertheless, very few researchers conducted LVC through in-depth interviews and focused group discussion [19] because they are more time-consuming and challenging to draw a consensus. Moreover, few studies discuss the opportunity for LVC implementation in Indonesia [19, 60] numerous studies have explored LVC implementation worldwide. The following studies provide an understanding of preconditions for the success of LVC implementation: institutional and regulatory readiness and public acceptance. In implementing LVC tax-based instruments, it is necessary to establish supportive regulation, such as a clear mechanism

in a jurisdiction and strong government institutions at the state-level and city-level. Moreover, tax-based instruments require a robust real estate market, updated and accurate cadastral data, strong coordination among stakeholders, and support from property owners [1].

In the same way, studies found that in implementing LVC development-based instruments, it is important to have adequate institutional and regulatory support [18]. Government officials should have high technical knowledge and management skills [2]. The local government also needs to establish effective and efficient land development control such as cadastral data [18] and provide a stronger incentive mechanism by creating well-functioning financial institutions [26].

Some scholars also highlight the importance of achieving stakeholder's consensus and coordination by conducting public forums creating a transparent project scheme and a clear division of stakeholders' roles and providing knowledge to landowners and developers. Furthermore, a significant land value increase and a robust real estate market [2, 18, 27] are also essential for the successful implementation of development-based instrument.

2.5. The Impact of Road Infrastructure Development on Land Value Increment

Transport infrastructure investment and land prices are closely related because of the effect of transport infrastructure on land use. Much empirical work has been devoted to studying the effect of transport infrastructure on land value. Land value here refers to "improved" land value which includes the value of buildings, improvements as well as utilities and other services. Most of this work focuses on developed countries in North America and Europe, but some research has also been done in Colombia, Brazil, Indonesia and South Korea. Although the majority of the studies have been concerned with the impact of rail transport on land value, a few have also studied the effect of road transport, the bus rapid transport (BRT) system, in particular on land value. Several studies have found that transport infrastructure exerted a positive impact on land values; this is especially true for properties in close proximity to stations [68, 4].

As shown above, the evidence on the role of road infrastructure development in economic growth is indecisive. However, historical development of road infrastructure indicated that countries that are more affluent generally have better road infrastructure, thus promoting agriculture, trade, industry and commerce, thereby helping these countries to sustain higher economic growth. In contrast, impoverished countries generally lack of road infrastructure and agriculture is the main economic source of income for most of the population, thus, their economic growth is limited. An efficient road infrastructure or a good road network created a competitive edge in moving goods economically. Conversely, lack of road infrastructure or poor road network systems are barriers to agriculture, industry and trade, and may hinder the process of urbanization and socioeconomic development [15].

In view of this, this study intended to investigate the role

of road infrastructure development on economic growth by utilizing a larger sample size with longer time period. Apart from this, empirical research also demonstrated that the positive effect of road infrastructure development on economic growth declines if the development of roads is increased in isolation from other socioeconomic development factors such as physical capital, human capital, health and education [15].

Road infrastructure is central to the activities of households by providing smooth access to housing, work, recreation center, market, hospital, school and aids mobility from one point to another and as well enhances economic production. This reality becomes hampered when natural disaster or civil disturbances destroy roads, culverts, bridges, electricity lines, traffic light and signage sign. In such situations, communities' quality of life and productivity become drastically reduced [44, 46].

The construction of road ways is a major factor in making life easier in any area, particularly areas farther away from the urban center. For this reason, road construction can be a major boon for property values, both residential and commercial. At the same time, if road construction leaves areas excluded at the benefit of others, it can lead to lower property values [24]. Moreover, the effect of highway infrastructure upon property values vary according to the type of construction that is already in place or currently being proposed.

Roads that provide access to communities and business for 'smart' growth will increase property values. Roads that serve as barriers, or redirect traffic away from particular areas, will cause property values to fall. Secondary Route; for example, which provide access into an area by signed traffic lights increase property values. Newly constructed and well-maintained highways and side streets are good places for commercial and residential development. Principal Route; the impact upon property values related to principal routes, such as express ways and multilane highways are mixed. Interstates have been tied to both economically vibrant corridors and urban blight. Highway Exit; businesses often cluster around highway exits that carry traffic off and onto a major freeway.

The highway inter change provides convenient access to the area, which promote growth. Home builder typically advertise close proximity to major highway exits as selling points. Barrier; large highways can serve as barriers to divide regions, economically. The author of "The Power Broker"-Robert Caro, cites Robert Moses' design of the Cross Bronx Expressway as the direct cause for uprooting stable communities and isolating the South Bronx as a notorious inner-city ghetto from the rest of New York City [36].

According to Porter, M. E., & Kramer, M. R., [50], value capture means the identification and documentation of the increase in property values due to certain public capital investment in a limited benefit area. These increased property values result in boosting the real estate sector of the economy due to an increase in real estate investment returns [25].

As a means of alternative source of road infrastructure

funding, value added property taxes on increased property values can be partially or totally used for the funding of public capital investments [45, 22]. In a nutshell, value capture is all about the increase in value of nearby properties that seems to have benefited from better accessibility that accompanies public capital investments.

Though, literature has revealed various case study areas and demonstrated the results of infrastructure depended property value uplift, some governments still appreciate the importance of value capture due to value uplift. Government of New South Wales is an example that changed the name 'value capture' to 'value sharing' [67], this means that the government will share from the value uplift to be able to raise additional funds to finance public projects.

Again, though there is a variety of studies on the impact of transportation infrastructure on property values and mostly on rails/road versus residential properties [63, 53, 65, 5, 30], there is lack of research on the land value capture as a financing sources of the provision of additional road infrastructure and enhancing urban revenue.

According to Prus, P.; Sikora, [48] In South Sumatera, the study was indicated that the road is important infrastructure to connect the area to another or from economic center to another economic. Infrastructure becomes an important factor in the development of the region as well as the increased economic activity of society. The availability of adequate road infrastructure will be the distribution of goods and services become faster and more efficient in terms of cost and time, making it easier for investors in the attempt. The longer and better quality of a road, it will facilitate the distribution of goods and services, which in turn attract investment and increase the per capita income of a region. The roads length available in each district/city of South Sumatera is still not evenly distributed.

However, the longest of road length is owned by Muara Enim district. The shortest of road length is occupied by Prabumulih city of 50.35 km. Prabumulih district also damaged roads evenly connecting cities in South Sumatera. This indicates that the development of road infrastructure in South Sumatera has not been evenly distributed in each district/city. So it can affect economic activity land value increment, and productivity among the districts/cities.

In Bali, Indonesia road infrastructure improvements provided as part of land readjustment projects, increased land values by 32%, or US \$7 per square meter [8, 41, 48] study of the impact of road infrastructure investment on the value of commercial properties showed that offices within a half kilometer of a freeway interchange rented for approximately US \$1.35 more per square meter per month than offices located more than 2.5 km away from an interchange. However, in order to maximize accessibility benefits, good transport infrastructure needs to be supported by strategic and efficient planning.

Several studies have found that transport infrastructure exerted a positive impact on land values; this is especially true for properties in close proximity to stations [10]. However, in some instances, urban transit projects could

also produce negative impacts on land value usually as a result of factors such as noise, pollution or a rise in incidence of crime [21]. Analysts interested in the interaction between transport infrastructure and land value argue that areas serviced by transport infrastructure have a competitive advantage over other areas because of greater accessibility.

According to Prus, P.; Sikora, M [48], stated that the importance of accessibility improvements gained through transport infrastructure changes, for both residents and businesses, is a key element in the determination of land value". Reliable transport infrastructure therefore lends a "scarcity" value to property located in these areas and stimulates economic growth by bringing goods and human resources into areas of economic activity.

Studies conducted in Philadelphia and Southern New Jersey, which compared houses served by a rail line to those not served by a rail line found, in the case of Philadelphia, that the value of those houses served by the rail line were 3.8% higher than those not served by the rail line.

According to Eva Ivanova, and Jana Masarova et al., [13] stated that the road infrastructure comprises all types of roads in a given area, including various structures and serves to transport passengers and goods. The road infrastructure includes all road categories, facilities, structures, signage and markings, electrical systems, and so on needed to provide for safe, trouble-free and efficient traffic. Extensive network of roads of high quality is essential for trouble-free road transport, which is the most widely-used mode of transport in Slovakia. The advantages/role of road transport infrastructure includes transporting passengers and carrying goods regardless of distance directly to a destination, the relatively high speed and no time restrictions. Road transport and its infrastructure enable to carry people as well as materials, raw materials, semi-finished and finished products intended for sale.

Several international studies, focusing on the impact of road transport infrastructure on land values, have found that road infrastructure exerts a positive influence on land values, and there is a growing lobby for governments to use appropriate instruments to recoup land value created by road infrastructure investments to finance future road infrastructure project.

According to P L Hadi, T Wasanta and W Santosa et al., [51] stated that the impact of road infrastructure accessibility is a key determinant in understanding land use and shaping the form of cities. These are strong connection between the available road infrastructure and land use, which in turn impact on land value. The factor in determining land value are diverse and include the overall planning context, yet numerous studies examined reveal the close correlation between road transport facilities and increase land value.

Incentive zoning is a tool used in many US cities to obtain certain benefits for the community, e.g. affordable housing, from a specific development. Developers are offered zoning incentives such as a density bonus, for example, which would allow more residential units "or a greater building floor area than is otherwise permitted under the zoning ordinance".

The density bonus creates a win-win situation for both the developer and the local authority. The variability of impacts of transport infrastructure on land values, as illustrated by the abovementioned studies, suggest that any programed or intervention aimed at recouping some of the increases in land value need to be targeted and based on solid cost-benefit analysis. The above discussion has attempted to show that transport infrastructure does impact on land value, and in most cases, the impact is a positive one. This is especially true for values of property located in close proximity to transport interchanges, railway and bus stations.

The paper therefore argues that considering this positive impact on land values, governments should introduce instruments, like betterment taxes for example, to capture surplus land value in order to finance future infrastructure projects, especially in poorer areas of the city. This argument is explored next through case studies of countries where the betterment tax has been introduced and the lessons for South Africa are highlighted.

3. Research Methodology

3.1. The Study Area (Dire Dawa)

Dire Dawa was founded in 1902 when the railroad from Djibouti reached the area, and its growth has resulted largely from trade brought by railroad. The Dire Dawa administrative council consists of the city of Dire Dawa and the surrounding rural areas. The council has no administrative zones but one woreda – Gurgura woreda. There are 4 Keftegnas, 24 urban kebeles and 28 rural peasants associations. Dire Dawa is the capital city of the administrative council. It is located in the eastern part of the country enclosed by the State of Somalia and the State of Oromia. It is the second largest city in Ethiopia.

Dire Dawa city is the Centre of the Dire Dawa Administrative Council (DDAC). It is located in the eastern part of Ethiopia within the eastern margin of Awash River Basin. About 69% of the total DDAC population (287,000) lives in the city. The railway from Djibouti to Addis passes through the city and its origin was as railway city. The city lies 515 km east of Addis Ababa and journey time is about eight to ten hours by road or 45 minutes in air. The Dire Dawa Administrative Council (DDAC) covers 1,333km². It is bounded by Oromia Regional State to the south and by Somali Regional State to the north, east and west.

Based on the 2007 census conducted by the central statistics agency of Ethiopia (CSA), Dire Dawa has a population of 341,834 of whom 171,461 are men and 170,461 women; 233,224 or 68.23% of population are urban inhabitants. For all of Dire Dawa 76,815 households were counted living in 72,937 housing units, which result in an average of 4.5 persons to a household, with urban households having on average 4.2 and rural households 4.9 people. Ethnic groups in the region include the Oromo (45%), Somali (35%), Amhara (13%), Gurage (3%), and Harari (1%). The region with the most believers in dire dawa is Muslim with

70.8%, 25.71% are orthodox, 2.81% protestant, and 0.43% catholic.

The major of the Dire Dawa population derive their livelihood from trade activity mainly contraband trade. And also the city has a commercial industrial center and Manufactures. National cement used to be Dire's only cement produced, in the last five year though, Dire two more cement factories; pioneer cement and tour cement. There are also railroad workshops in the city. Now days Dire Dawa engaging in small and medium businesses, making huge investments or many more others are hired in these businesses created by their own fellow Dire Dawans or other from elsewhere.

3.2. Research Methodology

This research article has employed qualitative and quantitative methods in its investigation of the problem. Hence for the primary and secondary data was collected through the following methodologies:

3.2.1. Primary Data

Primary data were collected through structured questionnaires; key informant interviews and focus group discussions (FGD). There were three types of questionnaires used for collecting the data-one for 137 local house hold respondent, another 8 key informants interview with municipality case team leaders, road authority service providers 'manager and kebeles higher official and local officials. This municipality case team leaders, road infrastructure service provider and local and higher kebele officials working in the area of land administration and information agency, road and transport authority office have different levels of information related to land value increment and related issues. Lastly, 6 FGD held with the community members from the study area.

3.2.2. Secondary Data

Literature review of different materials was collected from relevant sources of different published & unpublished documents of books, research papers, journals, articles, thesis works and different internet websites on measuring the relation between Road infrastructural development and land value increment has been explored. An attempt has been made to include literary materials that represent developed, developing countries and Ethiopian materials. The Ethiopian materials mainly focus on the city of Dire Dawa Administration. Like that, reports and archives, other official researchers, quarterly and annual reports, e.t.c. were used to investigate land value increment.

3.3. Data Analysis and Discussions

For this research article, raw data were collected through questionnaires, interviews, and focus group discussions that was carefully matched, arranged and prepared manually. Both quantitative and qualitative approaches of data analysis were used.

3.3.1. Qualitative Methods

were used to describe the findings qualitatively which were gathered through participatory assessment involving; key informant interviews, focus group discussion, and secondary data obtained from various data sources.

3.3.2. Quantitative Data

Were analyzed the quantitative data by using descriptive statistical tools like tables, bar graphs, and analytic tools by using Microsoft excel.

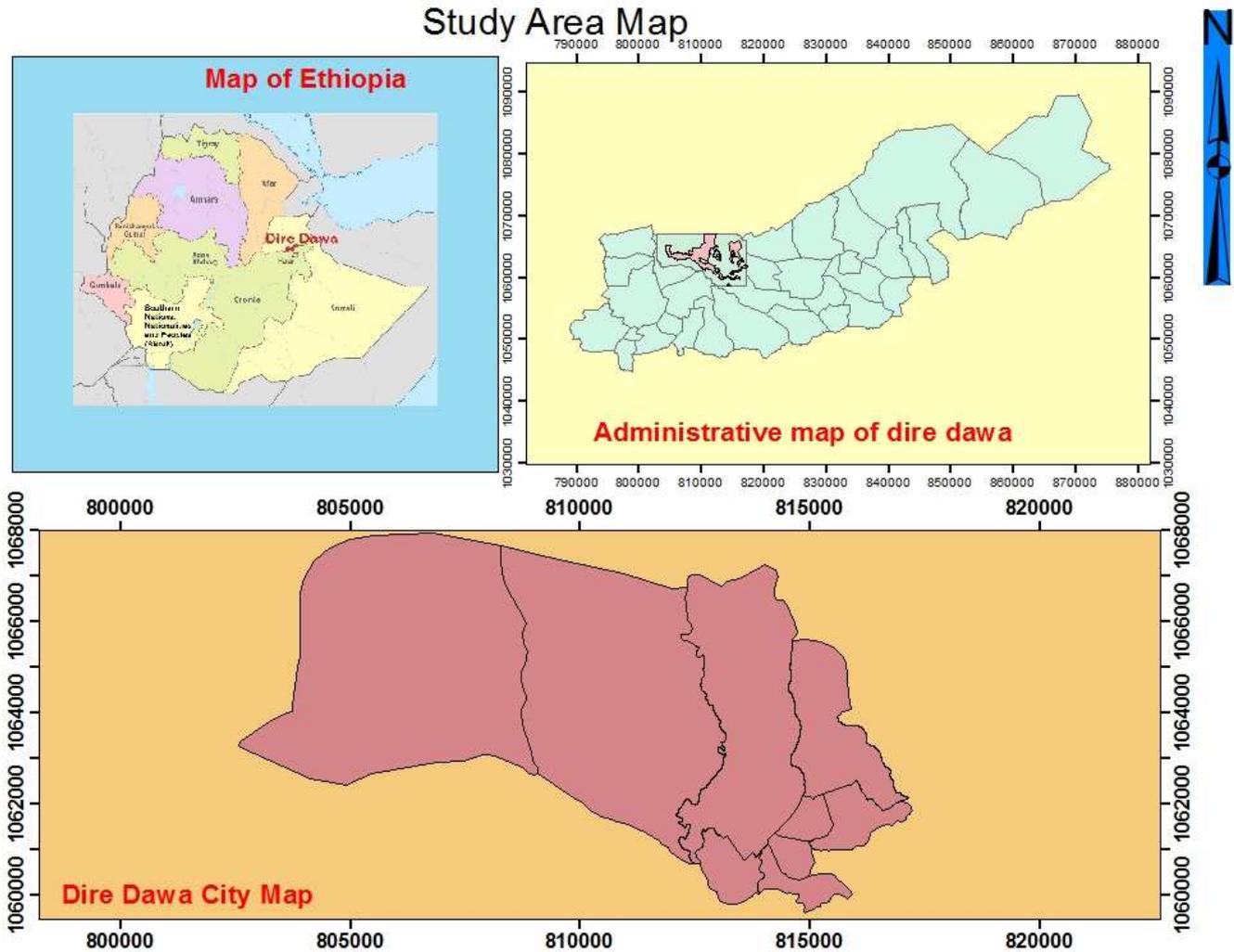


Figure 1. Location map of the study area.

4. Result and Discussions

4.1. Existing Land Use Type in the Study Area

4.1.1. Residential Land Use

Land use activity has evolved to its present form primarily following human development of the landscape. According to the spatial analysis made by the researcher using GIS software's, as well as information obtained from the interviews, questionnaires and observation made in the study area; the findings show that due to the 2002's Addis Ababa Master Plan provisions for the city expansion area, the construction of internal access roads in the study area, and housing demand by the growing populations attracted people started to live in the area, resulted in the increment of land value in the different urban uses.

According to data collected from households and different other groups Addis Ababa existing land use pattern remains primarily urban in nature, with large areas of residential and commercial land uses. Residential land use development consists mainly of single-family homes; few multi-family homes, apartments and other rentals; mobile homes; and other structures intended for human occupancy. Recreational, seasonal and occasional housing units are also classified as residential and make up a small percent of the total. Residential land use makes up a relatively large portion of developed land use in the whole County. It is the dominant developed land use. Residential density is significantly higher within the incorporate areas and within the county's unincorporated rural cross road hamlets/settlements this was tested by [12].

A standard generalized land use classification system was used to assign different land use areas into different

categories. A description of the land use classification system used in developing countries is represented below.

4.1.2. Agriculture

It includes parcels used partially or wholly for agricultural operations, with or without buildings. It might be a vacant parcel, a wooded parcel, a parcel with agricultural buildings such as dairy farming, raising livestock, tree farming, crop cultivation etc.

4.1.3. Commercial

Retail sales establishments, restaurants, hotels/motels, and service stations, including gravel and sand pits. It also includes parcels that are used for commercial purposes, whether wholesale, retail, or service, with or without buildings. Structures that were built for residential use but now used as commercial, office, or retail spaces, are included in this category.

4.1.4. Forest

Forest lands under private or industrial ownership. Mixed residential activity may also occur within this area.

4.1.5. Residential

Lands with structures designed for human habitation including: permanent, seasonal, and mobile housing units and recreational cabins and cottages. The parcels with or without buildings, condominium apartments which are used for or probably will be used for residential purposes; e.g. apartment buildings (multifamily), single story housing units, multi-story housing units, condominium buildings etc. are classified as a residential real property.

4.1.6. Industrial

Manufacturing and industrial processing, wholesaling, warehousing and distribution, and similar activities. In addition to this, it includes parcels used for manufacturing and processing purposes, with/without buildings. Also comprises removal or processing of gravel, stone quarries, or mineral, warehouses and storage areas are also classified in industrial real properties.

4.1.7. Open Space

Private and public owned non-wooded undeveloped lands, fallow fields.

4.1.8. Government/Institutional

Lands used for government-owned administration buildings and offices; fire stations; public hospitals and health care facilities; public schools, colleges, and educational research land; and lands of fraternal organizations. Cemeteries, churches, and other religious facilities are included in this land use category. The data collected from the households below show the existing land use types and its coverage capacity in the study area.

The table 1 has given the answer that which land use type highly or regularly occupied in the study area. Accordingly, 72% of the respondents believed that residential land use types are to the highest degree experienced in the city than

other group of land use types. In addition to this 21% of the respondents also conceded that commercial land use types were exists in the area. While, 7% of respondents infer that mixed land use types that somewhere includes both residential and commercial were involved in the area. However, from the data as discussed on above table 1 majority of respondents (72 percent) were responded that residential land use types accounts the highest degree in the city than other group of land use types in the study area, this was tested by [12].

Table 1. Land use type of the households.

Items	Frequency	Percentage
Residential	98	72
Commercial	29	21
Agriculture	0	0
Industrial	0	0
Mixed	10	7
Total	137	100

Source: field survey, 2021.

4.2. Land Value Capture

Land Value capture is the concept that government should be able to capture at least part of this increase in land value along public infrastructure expansion corridors, and use these funds to help pay for the system. While the concept is not new, it has only been successful at raising significant funds for public infrastructure development in a handful of cases.

As the respondents of key informants interview was indicated that in order to implement land value capture mechanisms, in order to determine the rightfulness of implementing land value capturing mechanisms in the study area, the road infrastructural expansion, its impact on land value, the community willingness perception to pay share of the value increment, the development of appropriate method and capability of institutions to undertake the task are assessed.

In the study area questionnaire survey from the respondent showed that, land value reflects the totality of all nearby services (and nuisances) that make a particular place suitable (or unsuitable) for different land use such as for residential, commercial or industrial purposes. As above discussion from these land use, residential land use is the highest in the study area and the residents acquired the land in the different way throughout their live years (Table 2).

Table 2. Land acquisitions of the households.

Items	Frequency	Percentage (%)
purchase before 1975	41	30
Permit system before 1993	62	45.3
Inheritance	10	7.3
Traditional means gift	14	10.1
Lease hold after 1993	10	7.3
Informally occupied	0	0
Others	0	0
Total	137	100

Source: field survey, 2021.

The data has indicated on the above table 2, out of the total respondents 45.3% of respondents were said that they acquired the land through Permit system before 1993, while 30% of respondents were responded that they purchased before 1975, whereas the remaining 10.1%, 7.3 and 7.3% of respondents also were responded that they acquired through Lease hold after 1993, Traditional means gift, and Inheritance respectively. In this result, the majority number of respondents confirmed that they acquired the land through Permit system before 1993 in the study area.

4.3. Over All Infrastructural Expansion in Dire Dawa City

The data collected from different tools prove the existence of different infrastructures services in the city. The effort made to identify the respondent’s attitude about the responsible body for provision of infrastructures indicates 43.8 percent respondents believed state and local government were the responsible body to provide. The remaining 30 percent respondents perceive the community should play their role in the provision of road infrastructure. However, in reality in the city both state and local government was the duty to provide available road infrastructure. The private sectors and the community have no significant contribution to provide road and other infrastructural services. As indicated by 5 key informants, road infrastructures require huge amount of money and it is difficult to construct only by government revenue. Therefore, the government brought fund for road infrastructure expansion from international financiers. Among public infrastructures exist in the study area and expected to appreciate the value of land road infrastructure is discussed below.

Table 3. Infrastructural Expansion in the sub city.

	Frequency	Percent
Road infrastructural Development	41	30
Utility infrastructural Development	12	8.7
Health service Development	10	7.3
Educational development	14	10.2
All are develops	60	43.8
TOTAL	137	100

Source: field survey, 2021.

As shown on the above table 3, the majority of respondents 43.8% of the total respondents explained that there are all above infrastructural expansion in the sub city, 30% answer to the statement that road infrastructure is the most expanded infrastructure than others and the rests 8.7, 7.3 and 10.2 percent explained that there are utility, health, educational infrastructural expansion in the sub city. From this one can conclude that almost all above infrastructural expansion in the sub city.

4.4. Accessibility / Availability of Road Infrastructure Service in Dire Dawa City

Due to increase in population and complexity of the transportation technology in the city, road infrastructures are constructed each year to accommodate the increment in

population and vehicles movement. According to the infrastructure, case team officers of the city municipality explanation road infrastructure increases accessibility by reducing distance and travel cost between areas. This situation increases the demand of the community to live nearby this infrastructure. The increase in demand also contributes for increasing land value. At the same time, willingness to pay for properties near transport stations was increase. Likewise, the finding of [63] concluded that the type of transport service, the distance between the property and the station, the quality of the service and transportation alternatives determines the increase in property value that is the same with this research.

Different roads are expanded in the Dire Dawa city especially within the past 10 years the construction of roads dramatically increasing to respond the increasing flow of the community and economic activity in the city. As pattern of settlement is a major variable that affect the value of land, the average population density around road infrastructure is one person per 60.87m².

Proximity to asphalt road highly affect the value of the property in the city not only the value, the land use of the parcels which is located 30-50 meter from the centre of the asphalt toward both side of the parcel as the master plan show are changed to commercial centre and prohibited to constrict building below the defined building height. This cause is lead to the land value to increase in this area. As table 4 Shows, 39 household respondent lives nearby asphalt road with a total family size of 160 (4.1 per household) on the total parcel area of 8460 meter square (216.33 m² per household) which is a population density of 1 person per 52.875 m².

Coble stone road are constructing and expanding dramatically starting from 1996 E.C. And different job opportunities are created beyond accessibility such as transport servicing, road side trading, opening garage, small shop centres etc. alongside the road changes even the land use to mix without the permission of the city administrative office this create additional land value for the community who has the parcel nearby the road. As the survey, data shows 90 household respondent lives nearby coble road with a total family size of 298 on the total parcel area of 19215-meter square that is a population density of 1 per 64.48m².

Table 4. Density of settlement around road infrastructure.

Density of settlement	Asphalt	Coble	All	Total
Household	39	90	8	137
family size	160	298	42	500
Fam_ size per HHs	4.1	3.3	5.25	3.65
Parcel_ area HHs	8460	19215	1780	30435
area per HHs/unit	216.9	213.5	222.5	222.15
Density per m ²	52.875	64.48	42.38	60.87

Source: field survey, 2021.

Like the table 4, shows when the quality of the road infrastructure increases the settlement became denser. This implies the existence of a higher demand to have land or live around road infrastructures. Higher demand to live in a

particular location automatically increases the value of the land in that location. Therefore, the government should implement an appropriate mechanism to capture land value uplift due to the increase in the density of settlements around road infrastructure.

4.5. Advantages for Expansion Road Infrastructure Service in Dire Dawa City

As the respondents from the survey, discussion, and interview road infrastructure are expanding in the city administration. Because road infrastructures are constituted as one of the asset that provide higher yield/income and tends less volatile than equities over the long run. Road Infrastructure also expands to respond to the dynamic increment of population and acute problems that the city faces or expected to face like a natural disaster, flooding, fire, sanitation, etc. Change in technology and interest also force the city to expand modern road infrastructure facility. The government expands road infrastructure and other infrastructure to get political profit or acceptance especially when the election time approaches the ruling party to devote its potential to win the voice of the people. One of the instruments used to get the voice of the community in the study area is promising and constructing different types of public infrastructure.

Infrastructure also constructs to change the quality of life, increase modernization; it makes life easy and enjoyable. The final reason provided from the respondents for the expansion of road infrastructure is since infrastructures are an indicator of civilization, if the city has access to modern types of road infrastructure it will become more developed, attractive and productive. [35] Stated that the quality and types of nation's infrastructure is a critical index of its economic vitality. Reliable transportation is one of the basic elements of a civilized society and a productive economy. In this research article also has indicated / showed that the same result.

4.6. Impacts of Road Infrastructure on Land Value

Road infrastructures in Dire Dawa City creates numbers of benefit ranging from direct benefits to people who use it, road infrastructure operators, businesses and employees to indirect benefits for sections of the community, such as landowners, occupiers, businesses man, developers and governments.

Using road infrastructure provides many direct benefits for city communities. Roads connect communities and provide access to jobs and services, as well as connecting businesses area places with their customers, workforces and supply chains and increase their quality of life and access to opportunities – while also creating a productive, skilled and capable workforce.

Providing road infrastructure also creates indirect benefits for sections of the community whether or not they use it. Road Infrastructure can increase nearby property values and economic activity. For example, private landowners benefit from increases in property values (i.e.

'land value uplift') when places become more attractive because of being near to schools, transportation, parks, and other facilities. Road infrastructure investment can also generate increased economic activity and productivity growth generated from the increased movement of people, improved access to jobs or a larger employee pool due to proximity to infrastructure. Increased economic activity and productivity growth generates higher profits for businesses, increased wages, and revenue, resulting in benefits for the broader community [36].

Based on the data gathered from the interview and focus group discussions in the city on average the impact of one road infrastructure was reflected up to 120 meters from the center of the Road infrastructure service to the individual land parcel / property. Therefore, after inquiring for informants and discussions, I have investigated this debate/reality. I said the statement is not true, so i have applied the GIS measurement results also indicate that the maximum average impact of road infrastructure on land parcel is 100m.

The city administrator and the municipality are also now working to make the city accessible for road infrastructure and planned especially to construct cobble stone road in all kebeles that means almost all parcel value of land in the city increase in price which points out to implement value capture. This opportunity shows that the future possibility to apply land value capturing in the city.

As the road infrastructure authority, office head statement in the city road infrastructures could change the price of land. Road infrastructure constructed somewhere the demand to live and have land around the road infrastructure will increase dramatically. Along with other factors that increase land value or improved property like change in zoning due to the development of the village, and expansion of especially commercial centers the road infrastructure alone also appreciates land value. The local city administrator of Dire Dawa City should design an appropriate land value capture mechanism which is important to capture the value uplift from both direct and indirect beneficiaries. The method should implement in the area where the road infrastructure affects the value of land/property value increment and the captured revenue should be the same percentage of the value uplift.

4.7. The Relation Between Land Value Increment and Road Infrastructure

The relationship between road infrastructure and land value increment determines in the study are indicated that positive relation. According to my questionnaire survey 90.5 percent of households respondents idea, when the road infrastructure constructed or under constructed increases the value of the land parcel, the city administration as a service provider will have the right to reclaim a share of the value uplift.

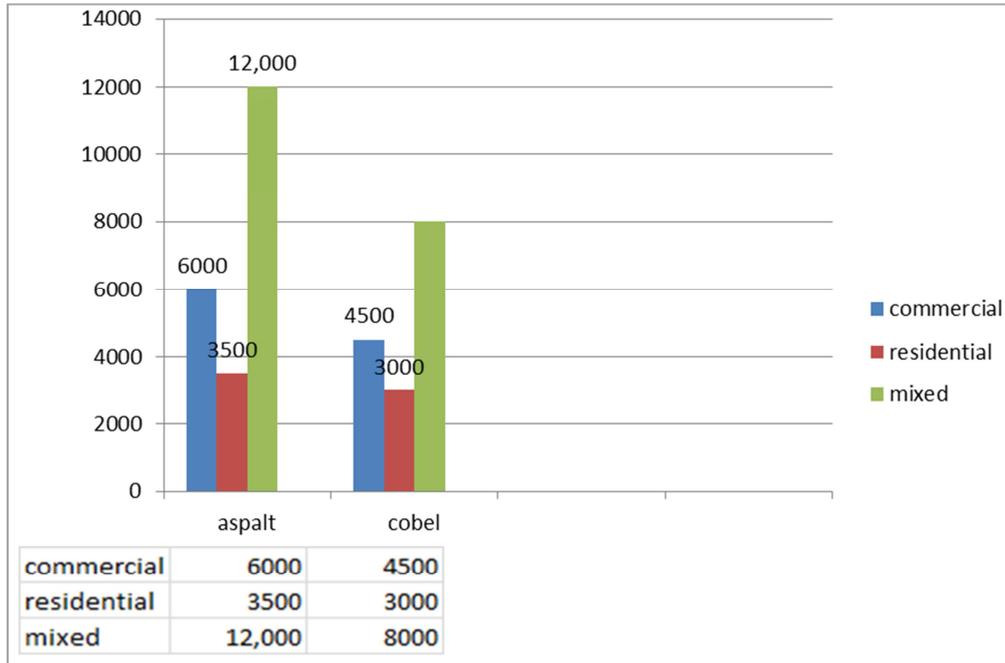
Figure 2 shows the house rental price on different land use under the different quality of road constructed. When the quality of the road increases the price of a rental house in each land use also increases. This proves the premise that

road infrastructure development increases the value of the land parcel.

Table 5. Land Value Increment and road Infrastructure.

Do you think there is a price change on your house after the road construction?					
Variable		Frequency	Percent	Valid percent	Cumulative percent
Valid	Yes	124	90.5%	90.5%	90.5%
	No	13	9.5%	9.5%	9.5%
Total		137	100%	100%	100%

Source: field survey, 2021.



Source: field survey, 2021.

Figure 2. Impacts of road on different land use rental price.

In this regard, out of 137 respondents, 90.5% were responded agree and 9.5% also were responded no for the statement. As the data indicated the majority 90.5% of respondents were responded agree. Accordingly, the majority of respondents indicated that there is a price change on their house after road construction. As the majority of respondents stated that after road construction around the study area the rent value of the house increased 100% value of the rent house before the construction of the road.

Generally, As the respondent questionnaires’ survey, the property is proximity to the main road the value of the property is increased and the buyer is willing to buy that

property whereas, the property value is decreasing where it is far from the main road, has fewer people willing to buy that property. It is mostly argued that the value of the property is determined by the proximity to the main road. It is expected that property closest to the main road will have the highest value, with values decreasing in distance from the main road. The property that is along the newly constructed road is in high demand and command high value because of their proximity to the major road. Most of 90 them are used for building commercial shopping stores and complex, petroleum filling stations, office complex, educational institutions among others.

Table 6. Rent value before and after road construction.

Land use type	Type of house	Size of house	Rent before construction of road	Rent after road construction
Commercial	G+0	4*4 sq. Meter	3000	6000 ETB
residential	G+0	2*2 sq. Meter	1700	3500 ETB
Mixed	G+0	3*4 sq. Meter	6000	12000 ETB

Source: field survey, 2021.

Table 6, it shows that different rental prices have occurred in different types of land use before and after road construction.

Therefore, before the constructed of the road, a one-room

commercial house was rented in 3,000 and the after the completed of the road constructed were rented in 6,000.

Whereas before the road constructed are one-room residential

house was rented in 1700, and also after road constructed completed the house was rented in 3500. In addition to this, the mixed house (some part of residential and commercial) before the constructed of the road was rented in 6,000 and after the completed of the road construction was rented 12,000 birr.

As discussed in the different literature review part land values increment due to public activity like new roads, transport links, commercial developments, etc. According to UN-Habitat [58, 42] examined that the increment of land value due to public action, such as investment in infrastructure, the provision of public service, and planning and land use regulation, can also affect the value of the land and rental house.

In fact, all these activities, called goods, generate a large amount of positive externalities, most of which are captured by the landowners/property owner in terms of increases in land values. According to the data which has indicated on the table above table as respondents stated that rent after construction of road increased by 100% in all cases.

4.8. Land-Use Type of Tenants

4.8.1. Commercial

Commercial properties are properties acquired for investment. Commercial properties follow the growth and movement of population. It includes retail sales establishments, restaurants, hotels/motels, and service stations, including gravel and sandpits. The below table has answered that which land-use type highly or regularly occupied in the study area. Accordingly, 76% of the respondents believed that commercial land-use types are to the highest degree experienced in the tenants than another group of land-use types. In addition to this 7% of the tenant respondents also conceded that residential land use types

existed in the area. While 17% of respondents infer that mixed land-use types that somewhere includes both residential and commercial were involved in the area.

However, from the data as discussed in the following table the majority of respondents (76) were responded that commercial land-use types account for the highest degree.

According to the respondent's answer, they rented the commercial house of their space after the construction of road infrastructure. As some of them stated the rent house value is highly increased when they compare it with before the construction of the road around the main road. As the tenants responded their rent place for the commercial purpose is near to the asphalt road in the study area. This is tasted by [41].

Table 7. Land use type of the tenants.

Items	Frequency	Percentage
Residential	2	7
Commercial	22	76
Mixed	5	17
Total	29	100

Source: field survey, 2021.

4.8.2. Land Value Increment and Road Infrastructure

The relationship between road infrastructure and land value increment determines the rightfulness and legality to implement land value capture. From 93 percent of tenants' respondents when the infrastructure constructed or under constructed increases the value of the land parcel. This shows the government as a service provider will have the right to reclaim a share of the value uplift. Figure 3 shows the house rental price on different land use under the different quality of road. When the quality of the road increases the price of a rental house in each land use increases. This proves the premise that road infrastructure increases the value of the land parcel.

Table 8. Land use type of the tenants.

Is there rental price change on your rent house due to road constructed?					
Variable		Frequency	Percent	Valid percent	Cumulative percent
Valid	Yes	27	93%	93%	93%
	No	2	7%	7%	100%
Total		29	100%	100%	

Source: field survey, 2021.

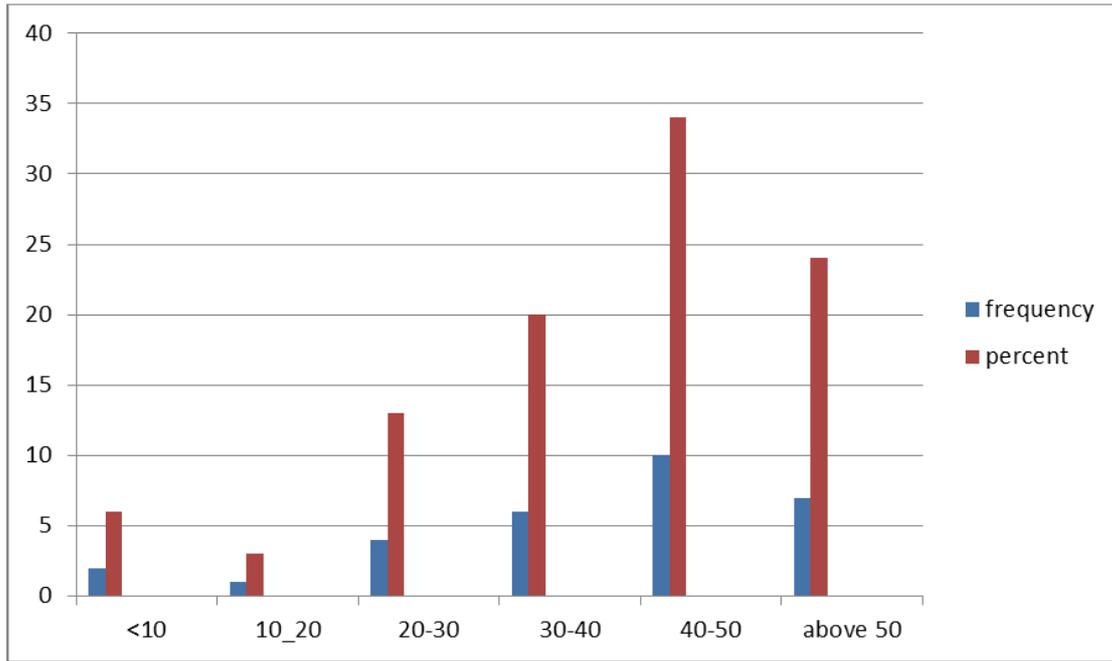
In this regard, out of 29 respondents, 93% were responded agree and 7% also were responded no for the statement. As the data indicated the majority 93% of respondents were responded agree. Accordingly, the majority of respondents indicated that there is a price change on their house after road construction. As the majority of respondents stated that after road construction around the study area the rent value of the house increased above 40% value of the rent house before the construction of the road.

Do the amount of rent of your commercial space increased in the last ten years?

Table 9. Rental increment of the tenants.

Percentage of rental increment	No of respondents	
	Frequency	Percent
< 10	2	6
10 – 20	1	3
20 – 30	4	13
30 – 40	6	20
40 – 50	10	34
Above 50	7	24
total	29	100%

Source: field survey, 2021.



Source: field survey, 2021.

Figure 3. Percentage of rental increment.

5. Conclusion

This study was intended to access the rightfulness of implementing land value capture to finance infrastructure from publicly created value, the relationship between land value increment and road infrastructure,

The emphasis was given to the case of Dire Dawa City in 02 kebele. To undertake an investigation, the qualitative and quantitative research method was used and data was collected by using of data collection mechanism. In Dire Dawa City land value capture was demonstrated through the relationship between the existing road infrastructures and land value increment.

By conducting qualitative research in Palembang, this paper identified a list of enabling factors and barriers that may influence the implementation of LVC in the future. Even though some precondition for LVC implementation already existed, the local government needs to improve and strengthen many features to succeed LVC implementation in Palembang. We argued that before LVC implementation, it is essential to establish an implementing agency of LVC that functions to conduct plan, construct, and monitor LVC projects. Furthermore, achieving a public consensus and increasing public trust is also important because the LVC projects involve various stakeholders from different groups.

This paper involved in-depth interviews with several experts who represent different groups with different backgrounds. However, to cross-check the validity and reliability of the information, the researcher only compared it with secondary data to confirm the interview results. Further research is needed to investigate these issues using a mixed-method approach, combining the interview with a

quantitative survey. Future research may also include calculating the benefits from LVC projects. Also, the proposed strategies can be developed in more detail by interviewing other related participants from different agencies, such as the transportation agency and land agency. However, this method is rather time-consuming.

So the result of this research article discloses that currently implementing land value capture in dire dawa city has a great challenge to provide additional finance source because of the absence of professional trained valuer, problem on readiness to share, high corruption and unfair road infrastructure development and expansion, problem on legal and enforceable support to capture land value increment.

Land value capture is a mechanism to cover the cost of road infrastructure development by capturing part of the value created by road infrastructure. This is based on the value of the parcel or property near the road infrastructure that reflects the accessibility of the location.

Therefore, it is rational and equitable to capture a portion of the value uplift to finance road infrastructural development.

Therefore, policy-makers, road authority and service provider and land administration office and information agency must be design how closely supervise urban road infrastructures; strengthen public and private collaboration and avoid individualism, rent-seeking and work on how to introduce and raise fund through implementing efficient land value capturing mechanism.

Generally, the dramatic expansion of road infrastructure affects nearby and value in the city but it is characterized by week organizational structure and inefficient collection of value capture in the city.

References

- [1] Abelson, P. (2018). Analysis of Value Capture Instruments. *Economic Papers*, 37 (4), 399–411. <https://doi.org/10.1111/1759-3441.12234>.
- [2] Aveline-Dubach, N., & Blandeau, G. (2019). The Political Economy of Transit Value Capture: The Changing Business Model of the MTRC in Hong Kong. *Urban Studies*, 56 (16), 1–17. <https://doi.org/10.1177%2F0042098018821519>.
- [3] Andreas Hartmann (2016). Value creation of road infrastructure networks: A structural equation approach. Peer review under responsibility of Periodical Offices of Chang'an University. Available online at www.sciencedirect.com. ScienceDirect journal homepage: www.elsevier.com/locate/jtte journal of traffic and transportation engineering (english edition) 2016; 3 (1): 28 e3 6 <http://dx.doi.org/10.1016/j.jtte.2015.09.003>.
- [4] Arturo Bujanda and Thomas M. Fullerton, Jr., 2018, Infrastructure Impacts on Commercial Property Values across El Paso in 2013, Technical Report TX18-1, University of Texas at El Paso Border Region Modeling Project.
- [5] Baker, D. M., & Lee, B. (2019). How does light rail transit (LRT) impact gentrification? Evidence from fourteen US urbanized areas. *Journal of Planning Education and Research*, 39 (1), 35–49. <https://doi.org/10.1177/0739456X17713619>
- [6] Berawi, M. A., Suwartha, N., Salsabila, F., Gunawan, Miraj, P., & Woodhead, R. (2019). Land Value Capture Modeling in Commercial and Office Areas Using a Big Data Approach. *International Journal of Technology*, 10 (6), 1150–1156. <https://dx.doi.org/10.14716/ijtech.v10i6.3640>.
- [7] Budiati, L. (2020). Building the Integrity of Urban Development Planner Through Corruption Risk Management and Assessment: Literature Review. *The Journal of Indonesia Sustainable Development Planning*, 1 (1), 83–104.
- [8] Bujanda, Arturo and Fullerton, Thomas M. Jr., "Infrastructure Impacts on Commercial Property Values Across El Paso in 2013" (2018). Border Region Modeling Project. 55. https://digitalcommons.utep.edu/border_region/55
- [9] City of Vancouver, 2019. Land Value Capture as a Source of Revenue for Local Government: Discussion Paper. City Manager Office of the City Manager I City of Vancouver 604.873.7627 I sadhu.johnston@vancouver.ca.
- [10] Chwiałkowski, C.; Zydroń, A et al, 2022. The Impact of Urban Public Transport on Residential Transaction Prices: A Case Study of Poznań, Poland. *ISPRS Int. J. Geo-Inf.* 2022, 11, 74. <https://doi.org/10.3390/ijgi11020074>
- [11] C P Ng, T H Law (2019). Road infrastructure development and economic growth. *Materials Science and Engineering* 512 (2019) 012045 IOP Publishing doi: 10.1088/1757-899X/512/1/012045.
- [12] Degualem Mekuriaw Alemu 2018. The Impact of Urban Land Use Changes on Residential Property Values The Case of Bole Sub City, Addis Ababa.
- [13] Eva Ivanova, and Jana Masarova et al, 2017. IMPORTANCE OF ROAD INFRASTRUCTURE IN THE ECONOMIC DEVELOPMENT AND COMPETITIVENESS. Alexander Dubcek University of Trencin, Slovakia <http://dx.doi.org/10.5755/j01.em.18.2.4253>. ISSN 2029-9338.
- [14] Falcocchio, J. C., Malik, A., & Kontokosta, C. E. (2018). A Data-driven Methodology for Equitable Value-capture Financing of Public Transit Operations and Maintenance. *Transport Policy*, 66, 107–115. <https://doi.org/10.1016/j.tranpol.2018.02.005>.
- [15] F M Jakarni and S Kulanthayan (2019). Road infrastructure development and economic growth. *Materials Science and Engineering* 512 (2019) 012045 IOP Publishing doi: 10.1088/1757-899X/512/1/012045.
- [16] Fraser, S. (2018) ‘What Is the Definition of Land Value?’ Home Guides | SF Gate, Available at: <http://homeguides.sfgate.com/definition-land-value-7962.html>. Accessed 23 March 2018.
- [17] Gwartney, T. (2018) ‘Estimating land value’. Available at: <http://www.henrygeorge.org/ted.htm>. Accessed on 23 March 2018.
- [18] Gielen, D. M., & Mualam, N. (2019). A Framework for Analyzing the Effectiveness and Efficiency of Land Readjustment Regulations: Comparison of Germany, Spain and Israel. *Land Use Policy*, 87. <https://doi.org/10.1016/j.landusepol.2019.104077>.
- [19] Gunawan, & Berawi, M. A. (2018). Conceptual Development of Land Value Capture (LVC) Model in Indonesia Infrastructure Project to Increase Project Benefits. *Proceedings of the International Conference on Industrial Engineering and Operations Management*, 1027.
- [20] Germán, L., and A. E. Bernstein. 2018. “Land Value Capture: Tools to Finance Our Urban Future.” Policy Brief. Cambridge, MA: Lincoln Institute of Land Policy.
- [21] Gong, W.; Li, J.; Ng, M. K. Deciphering Property Development around High-Speed Railway Stations through Land Value Capture: Case Studies in Shenzhen and Hong Kong. *Sustainability* 2021, 13, 12605. <https://doi.org/10.3390/su132212605>.
- [22] Grover, R., & Walacik, M. (2019). Property Valuation and Taxation for Fiscal Sustainability– Lessons for Poland. *Real Estate Management and Valuation*, 27 (1), 35–48. <https://doi.org/10.2478/remav-2019-0004>.
- [23] Higgins, C. D. (2019). A 4D Spatio-temporal Approach to Modelling Land Value Uplift from Rapid Transit in High Density and Topographically-rich Cities. *Landscape and Urban Planning*, 185, 68–82. <https://doi.org/10.1016/j.landurbplan.2018.12.011>.
- [24] http://www.ehow.com/list_7592567_effects-road-construction-property-values.html.
- [25] Jedwab, R., & Storeygard, A. (2019). The average and heterogeneous effects of transportation investments: Evidence from Sub-Saharan Africa 1960–2010. Working paper No. 2019-8, National Bureau of Economic Research. <https://doi.org/10.3386/w27670>.
- [26] Kim, J. (2018). CePACs and Their Value Capture Viability in the U.S. for Infrastructure Funding (Working Paper WP18JK1).
- [27] Kilic O., Baser U., Gulser C., et al, (2019). *Factors explaining urban land value variability: a case study in Atakum District, Samsun-Turkey*, *New Medit*, 18 (4): pp. 79-88, <http://dx.doi.org/10.30682/nm1904f>.

- [28] Kyriacou, A. P., Muinel-Gallo, L., & Roca-Sagalés, O. (2019). The efficiency of transport infrastructure investment and the role of government quality: An empirical analysis. *Transport Policy*, 74, 93–102. <https://doi.org/10.1016/j.tranpol.2018.11.017>.
- [29] Li, X., & Love, P. E. D. (2020). Employing Land Value Capture in Urban Rail Transit Public Private Partnerships: Retrospective Analysis of Delhi's Airport Metro Express. *Research in Transportation Business & Management*, 32. <https://doi.org/10.1016/j.rtbm.2020.100431>.
- [30] Li, S., Chen, L., & Zhao, P. (2019). The impact of metro services on housing prices: a case study from Beijing. *Transportation*, 46 (4), 1291–1317. <https://doi.org/10.1007/s11116-017-9834-7>
- [31] Liu, J. H.; Shi, W. Impact of bike facilities on residential property prices. *Transp. Res. Rec.* 2017, 2662, 50–58. [CrossRef].
- [32] Liza Cirolia and Philipp Rode et al, 2019. Urban infrastructure for development. LSE Cities Working Papers Research Strand 03: Urban Governance and Institutional Frameworks.
- [33] Loo, B. P. Y., Bryson, J. R., Song, M., & Harris, C. (2018). Risking Multi-billion Decisions on Underground Railways: Land Value Capture, Differential Rent and Financialization in London and Hong Kong. *Tunnelling and Underground Space Technology*, 81. <https://doi.org/10.1016/j.tust.2018.07.01>.
- [34] Mangioni, V. (2019). Value capture taxation: alternate sources of revenue for Sub-Central government in Australia. *Journal of Financial Management of Property and Construction*, 24 (2). <https://doi.org/10.1108/JFMPC-11-2018-0065>.
- [35] Maria Jubiz-Diaz, and Maria Saltarin-Molino et al, 2021. Effect of Infrastructure Investment and Freight Accessibility on Gross Domestic Product: A Data-Driven Geographical Approach. *Hindawi Journal of Advanced Transportation* Volume 2021, Article ID 5530114, 22 pages <https://doi.org/10.1155/2021/5530114>.
- [36] MAKATA, I F. and DR. ESTHER I O. Et al, 2019. An Examination of the Impact of Infrastructural Facilities on Commercial Property Values in Onitsha, Anambra State, Nigeria. *MAY 2019 | IRE Journals | Volume 2 Issue 11 | ISSN: 2456-8880*.
- [37] Mahendra, A., et al. 2020. “Urban Land Value Capture in São Paulo, Addis Ababa, and Hyderabad: Differing Interpretations, Equity Impacts, and Enabling Conditions.” Working Paper. Cambridge, MA: Lincoln Institute of Land Policy. Available online at <http://www.wri.org/publication/urban-land-value-capture>.
- [38] Mathur, S. (2019). An Evaluative Framework for Examining the Use of Land Value Capture to Fund Public Transportation Projects. *Land Use Policy*, 86, 357–364. <https://doi.org/10.1016/j.landusepol.2019.05.021>
- [39] Mabrutunnisa, Doddy Aditya Iskandar et al., 2021. Land Value Capture as Financial Resource for Infrastructure Development in Palembang City. E-ISSN: 2722-0842 | P-ISSN: 2721-8309. Available online at <http://journal.pusbindiklatren.bappenas.go.id/>. Vol. 2 No. 1-April 2021.
- [40] McAllister, P. (2019). The Taxing Problems of Land Value Capture, Planning Obligations and Viability Tests: Some Reasonable Models. *Town Planning Review*, 90 (4). pp. 429-451. ISSN 1478 341X doi: <https://doi.org/10.3828/tpr.2019.28> Available at <http://centaur.reading.ac.uk/84241/>
- [41] Mohammed A. B, and Perdana, M. et al, (2020). Impact of rail transit station proximity to commercial property prices: utilizing big data in urban real estate. <https://doi.org/10.1186/s40537-020-00348-z>.
- [42] Mulugeta Tenaw. Et al, 2018. Land Value Capture: Capture Land Value Increment due to Public Infrastructural Development in Debre Markos Town.
- [43] Natarajan, G. (2017) ‘Land value As an Unearned Increment’, *Urban economics*. Available at: <http://gulzar05.blogspot.com/2007/11/land-value-as-uneared-increment.html> accessed on 23 March 2018.
- [44] Nwagbara, V. and Iyama, W. (2019) Assessment of the Environmental Impact of Road Infrastructure in Countries: A Study of the Namibia Scenario. *Journal of Geoscience and Environment Protection*, 7, 86-101. doi: 10.4236/gep.2019.712006_
- [45] Noring, L. (2019). Public asset corporation: A new vehicle for urban regeneration and infrastructure finance. *Cities*, 88, 125–135. <https://doi.org/10.1016/j.cities.2019.01.002>.
- [46] Olorunfemi S., 2021, Performance assessment of the state of road infrastructure in selected urban centers in Kogi State in Nigeria, *Prace Komisji Geografii Komunikacji PTG*, 24 (1), 31-43. *Transport Geography Papers of Polish Geographical Society* 2021, 24 (1), 31-43 DOI 10.4467/2543859XPKG.21.002.14945. <https://orcid.org/0000-0002-3218-6562>.
- [47] Perera M T U. et al. 2021. Evaluation of Land Value Capture for Financing Transportation Infrastructure Development in Sri Lankan Cities. Department of Town & Country Planning, University of Moratuwa, Sri Lanka thariperera44@gmail.com.
- [48] Prus, P.; Sikora, M. The Impact of Transport Infrastructure on the Sustainable Development of the Region—Case Study. *Agriculture* 2021, 11, 279. <https://doi.org/10.3390/agriculture11040279>.
- [49] Published by the Royal Institution of Chartered Surveyors (RICS), (2020). Land value capture: Attitudes from the house-building industry on alternative mechanisms. <https://www.rics.org/uk/news-insight/research/>. The views expressed by the authors are not necessarily those of RICS nor any body connected with RICS. Neither the authors, nor RICS accept any liability arising from the use of this publication.
- [50] Porter, M. E., & Kramer, M. R. (2019). Creating shared value. In *Lenssen G., Smith N. (eds) Managing sustainable business* (pp. 323–346). Springer, Dordrecht. https://doi.org/10.1007/978-94-024-1144-7_16.
- [51] P L Hadi, T Wasanta and W Santosa et al, 2021. Land use change due to road construction. *IOP Conf. Series: Earth and Environmental Science* 920 (2021) 012003 IOP Publishing doi: 10.1088/1755-1315/920/1/012003.
- [52] Royal Institution of Chartered Surveyors (RICS, 2020), *RICS valuation – professional standards: Incorporating the international valuation standards*. Norwich, UK: Published by Royal Institution of Chartered Surveyors (RICS); Printed in Great Britain by Page Bros.
- [53] Seo, K., Salon, D., Kuby, M., & Golub, A. (2019). Hedonic modeling of commercial property values: distance decay from the links and nodes of rail and highway infrastructure. *Transportation*, 46, 859–882. <https://doi.org/10.1007/s11116-018-9861-z>.

- [54] Sharma, R. (2018). Financing Urban Rail Projects through Land Value Capture –The Indian Case. Curtin University, Perth, Australia.
- [55] Sharma, R., & Newman, P. (2018). Does Urban Rail Increase Land Value in Emerging Cities? Value Uplift from Bangalore Metro. *Transportation Research Part A*, 117, 70–86.
- [56] Simon Hull, Rosalie Kingwill, et al. 2020. An Introduction to Land Administration. <https://doi.org/10.1016/j.tra.2018.08.020>.
- [57] The Economist Intelligence Unit Limited 2019. The critical role of infrastructure for the Sustainable Development Goals.
- [58] United Nations Human Settlements Programme (UN-Habitat, 2021). The Role of Land in Achieving Adequate and Affordable Housing.
- [59] Urban Development Institute of Australia (UDIA) February 2017. USING VALUE CAPTURE TO HELP DELIVER MAJOR LAND TRANSPORT INFRASTRUCTURE. SUBMISSION ON THE COMMONWEALTH DISCUSSION PAPER.
- [60] Wisnu, L. (2019). Value Capturing for Regional Road Development: A Responsive Institution.
- [61] White, R., & Wahba, S. (2019). Addressing Constraints to Private Financing of Urban (Climate) Infrastructure in Developing Countries. *International Journal of Urban Sustainable Development*. <https://doi.org/doi:10.1080/19463138.2018.1559970>.
- [62] Wu, J., Hu, Y., Tao, L., & He, Q. (2018). Value Capture in Protected Areas from the Perspective of Common-pool Resource Governance: A Case Study of Jiuzhai Valley National Park, China. *Land Use Policy*, 79, 452–462. <https://doi.org/10.1016/j.landusepol.2018.08.047>.
- [63] Wang, X., et al, 2019. The Use of Value Capture for Transport Projects in China: Opportunities and Challenges. *Asian Transport Studies*, Volume 5, Issue 5 (2019), 784–810.
- [64] Xu, X., Wang, J., Peng, H., & Wu, R. (2019). Prediction of academic performance associated with internet usage behaviors using machine learning algorithms. *Comput. Human Behav.*, 98.
- [65] Yang, L., Zhou, J., & Shyr, O. F. (2019). Does bus accessibility affect property prices? *Cities*, 84, 56–65. <https://doi.org/10.1016/j.cities.2018.07.005>.
- [66] Yen, B. T., Mulley, C., & Shearer, H. (2019). Different Stories from Different Approaches in Evaluating Property Value Uplift: Evidence from the Gold Coast Light Rail System in Australia. *Transportation Research Record*, 2673 (3), 11–23. <https://doi.org/10.1177/0361198118823001>.
- [67] Yen, B. T., Mulley, C., Shearer, H., & Burke, M. (2018). Announcement, construction or delivery: When does value uplift occur for residential properties? Evidence from the Gold Coast Light Rail system in Australia. *Land use policy*, 73, 412–422.
- [68] (Zhang, B.; Li, W.; Lownes, N.; Zhang, C. Estimating the Impacts of Proximity to Public Transportation on Residential Property Values: An Empirical Analysis for Hartford and Stamford Areas, Connecticut. *ISPRS Int. J. Geo-Inf.* 2021, 10, 44. <https://doi.org/10.3390/ijgi10020044>.