Greenwashing and Capitalist Production of Urban Space:

A case study in Iskandar Malaysia

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Abstract:

Production of urban space is an indispensable component of capitalism. Without production of urban space, capitalism cannot sustain capital accumulation and cope with over-accumulation crises. However, as environmental consciousness grows, urban development projects are increasingly exposed to green pressures and demands because of their associated eco-climatic impacts. One possible way for capitalists to reconcile such pressures and demands with capital accumulation is to develop sustainable 'capitalist' cities that rely heavily on techno-fixes. However, to make such 'techno-fixed' capitalist cities really sustainable from the 'true' sustainability perspective is a tall task. Thus, a more feasible and pragmatic strategy for capitalists is to greenwash their urban development projects.

By greenwashing, a capitalist urban project can not only seemingly adapt to green pressures, but also increase its exchange values by satisfying the lucrative green demands of environmentally conscious rich consumers. Thus, urban greenwashing can be theorized to have two functions: (1) obscuring environmental damages associated with a project, while, (2) increasing the exchange value of the project. These two functions can be empirically confirmed by analyzing the relation between (i) the degree of environmental destruction associated with the project and (ii) the degree of 'promised (or advertised)' greenness of the project; and the relation between (ii) and (iii) the price level of the project.

If we can observe a positive relation between (i) a level of environmental destruction and (ii) a promised greenness, we can conclude that the promised greenness of the project is used, as a greenwashing function (1), for obscuring its environmental damage (and this means, by definition, the project is greenwashed). Similarly, if we can observe a positive relation between (ii) the promised greenness and (iii) a price level, we can conclude that the promised greenness of the project is used, as a greenwashing function (2), for enhancing market competitiveness, and thus the exchange value, of the project. Based on an urban greenwashing framework developed in this thesis and using Iskandar Malaysia project as a case study, this thesis operationalizes and quantifies (i) the environmental destruction; (ii) the promised greenness; and (iii) the price level of 38 target residential projects within the Iskandar region, and empirically confirmed positive relations between (i)-(ii) and (ii)-(iii).

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Eigo Tateishi
May 16th, 2015

*Please note that all opinions and arguments in this thesis do not reflect any official opinions and understandings of the center. The author has full responsibility for all mistakes and contested arguments in this thesis.

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Introduction

> Iskandar Malaysia [is] a smart city template – protecting the environment, promoting equitable development and addressing urban development challenges [through] the creation of smart, livable urban communities that will yield an improved quality of life for thousands of citizens, with safer, cleaner, healthier, more affordable and more vibrant neighborhoods, serviced by more efficient and accessible transportation systems – great destinations for businesses. **(Najib Razak, Malaysia's current Prime Minister, cited in The Guardian by F. Harvey 2012 Nov 2nd)**

> "A strong and Sustainable Metropolis of International standing"
> **(Iskandar Malaysia Vision[1])**

> The problem with green consumerism is that, although buying a "green" product may be the "lesser of two evils," it still operates within a neoliberal, capitalist context that is more concerned with making a profit than with saving the environment. **(Budinsky and Bryant 2013:208)**

Capitalist production of urban space and greenwashing:

As Henri Lefebvre and David Harvey proclaimed, today's large-scale expansions (production of urban space) and re-configurations of urban space (re-production of urban space) are a vital component of the capital accumulation process of capitalism. Such capitalist (re)production of urban space has been making many socio-ecological problems such as dispossession of lands, gentrification, socio-economic segregation, pollution, urban consumerism, unsustainable urban metabolism, environmental destruction, and increasing CO^2 emissions. Thus, as climate change is increasingly seen to pose serious environmental threats to human lives and livelihoods, eco-climatic sustainability[2] of cities has become a pivotal issue. One study estimates that by 2030 approximately 1.2 million km^2 of lands, which is almost equal to the Republic of South Africa, will be converted to urban areas (Seto, Güneralp, and Hutyra 2012).

[1] http://www.irda.com.my/vision-mission.htm
[2] Hereafter, eco-climatic sustainability shall be simply called 'sustainability' or 'sustainable.'

This massive conversion of lands entails massive destruction of vegetation and ecosystems, of biodiversity, and the reduction of CO^2 absorption capacity of the planet. In addition, many studies point out that cities are a primary contributor to global warming. For instance, UN-Habitat estimates that urban activities are responsible for almost 70 % of the total anthropogenic emissions of green house gas (2011). Thus, as concern for eco-climatic issues becomes ever stronger, capitalist (re)production of urban space is increasingly exposed to pressures and demands to be eco-friendly, sustainable, low-carbon, or simply *green*.

How can capitalism respond to such 'green' pressures in order to continue its (re)production of urban space that is an indispensable driver of its own further accumulation? Is it possible for capitalism to even promote capital accumulation by responding to 'green demands'? A plausible and simple answer to these questions may be to reconcile capital accumulation (through production of urban space) with sustainability. It is argued that such sustainable 'capitalist' urban projects (some of them aim at building completely new cities) can attain both sustainability and more economic growth. This can be done, according to major discourses within the camp of sustainable urban development, by introducing eco-friendly, energy-efficient, and low-carbon urban planning and technologies such as more efficient transportation systems and renewable energy infrastructures (New York City 2006; Sioufi 2010; UN-Habitat 2011; Sustainable Development Solutions Network 2013; UN 2014; Arup[3] 2015). Corresponding to this sustainable 'capitalist city' agenda, the number of new "sustainable" urban projects, especially larger ones, has been mushrooming (See Table 1). (Note that, in this thesis, I use the terms "production of urban space" and "urban projects" to refer to relatively larger-scale capitalist green-field developments.)

Such sustainable capitalist cities that rely heavily on techno-fixes have, however, been

[3] Arup is an international company specialized in architectural and urban designs. The company deals with many green urban projects.

contested with the arguments that modern capitalist cities (and their production process) are fundamentally[4] eco-unfriendly and fossil-fuel-dependent. Thus, some scholars (e.g., Rees 1997[5]; Hornborg 2014[6]; Latouche 2010 and 2013[7]) even argue that the notions of sustainable "capitalist" city and sustainable "capitalist" urban development are an oxymoron or a myth. If so, how can strategies to continue capitalist (re)production of urban space amidst the green pressures and demands actually look like? In what way can, in effect, today's increasing number of green urban projects be interpreted? An effective theoretical framework to analyze these issues is *greenwashing*, which is "the act of misleading consumers regarding the environmental practices of a company (firm-level greenwashing) or the environmental benefits of a product or service (product-level greenwashing)" (Delmas and Burbano 2011).

As consumers in the capitalist societies become concerned for eco-climatic issues, green marketing of products and companies has become crucial for corporations to attract green demands (Chang 2011; Delmas and Burbano 2011; Chen and Chang 2013; Nyilasy, Gangadharbatla, and Paladino 2014). However, "being green" and/or "to be green" are a tall task for many companies due to several reasons (e.g., huge costs, firm characteristics, inappropriate incentive structure etc.). Thus, it has been observed that many companies employ greenwashing "to selectively reveal the positive information about the environmental features of their products without disclosing negative information in order to generate green image" (Chen, Lin, and Chang 2013:2412) rather than to be *actually* sustainable. In order to be free from green pressures and be attractive to the environmental-conscious consumers, the number of companies engaging in greenwashing continues to grow nowadays (Horiuchi and Schuchard 2009; Delmas and Burbano 2011).

[4] It must be clarified that this argument is for the modern cities under capitalist logic of accumulation. Admittedly, it is true that a radical change in value systems in the capitalist societies e.g., abandonment of consumption-centric urban culture and of nature-urban dualism can make cities truly sustainable (Blassingame 1998; Martino 2009). However, from the true sustainability perspective (see page 20), capitalist cities are not sustainable, at least, at a theoretical level.

[5] "Sustainable city – at least as we presently defines cities – is an oxymoron" (Rees 1997:307).

[6] "If the "myth" of urban sustainability is founded on the "myth" of technological solutions, it is incumbent on us to approach the global flows underlying modern technologies from the perspective of social theory" (Hornborg 2014:3).

[7] "Sustainable development is an oxymoron" (Latouche 2010:64 and 2013:61).

Similarly, today's proliferation of sustainable capitalist urban projects can be interpreted that real estate developers employ greenwashing strategy in order to avoid or mitigate green pressures, and increase attractiveness and competitiveness of their project by reaching at green demands. Applying greenwashing framework to capitalist urban projects will contribute to critically analyzing emerging sustainable urban projects and exposing capitalist logic of accumulation behind them. This is a significant step to build a solid foundation for discussing how to overcome the sustainable "capitalist" city or sustainable "capitalist" urban development oxymoron, and for imagining a true form of eco-harmonious human habitat. Nevertheless, theorization and empirical supports of urban greenwashing are, it seems, still in their infancy. Thus, this thesis tries to elaborate greenwashing framework of capitalist production of urban space and to empirically test the feasibility of the framework by applying it to the case study of *Iskandar Malaysia*, a typical sustainable capitalist urban project in Malaysia. Due to several constraints, this thesis focuses largely on new capitalist urban projects (production of urban space) and leaves a study on greenwashing and re-configurations of existing urban space for further research opportunities.

Research questions:

In order to elaborate urban greenwashing framework and its empirical supports, through theoretical and empirical analyses, this thesis tries to answer to two research questions:

(1) Why and how can a capitalist urban green-field project be greenwashed?

(2) Can urban greenwashing framework be supported by empirical observations in Iskandar Malaysia?

Structure of the thesis:

Part. I set up a theoretical foundation of empirical analyses. Relying on Henri Lefebvre's

arguments and David Harvey's theory of spatio-temporal fix, this part first succinctly reviews the fundamental importance of production of urban space for capitalism to sustain capital accumulation, and discusses green pressures and demands that capitalist urban projects currently confront. Then, based upon a framework of greenwashing of consumer goods, this part discusses applicability of greenwashing to capitalist production of urban space in order for it to deal with green pressures and demands to ensure further capital accumulation. Finally, a framework of urban greenwashing for empirical analyses shall be synthesized, and two major relations shall be suggested by the framework, namely (1) environmental destruction level and promised greenness; and (2) price level and promised greenness.

Part. II comprises two major chapters. The first chapter 'Methodology' explains the research area, methods, and variables for the empirical study. This part first explains overview and background of the Iskandar Malaysia project, and briefly discusses socio-environmental concerns associated with the project. Then, methods to operationalize, quantify, and detect two relations suggested by our framework constructed in the Part.I are explained. Then, target urban projects and target variables are specified including scoring criteria to quantify the promised greenness of each target project. After the data collection method of the operationalized variables has introduced, this part finally discusses limitations of the methodology. The second chapter 'Outcomes and Discussions' shows and discusses outcomes of the conducted empirical analyses. This chapter first succinctly explains the direction of the entire chapter, and shows a result of greenness evaluation of the target projects, then goes into two sections that correspond to two relations suggested by the framework.

Part. III (Conclusions and Further Possibilities) concludes the entire analyses made by this thesis while thinking about the possibilities of the further research.

[Table 1] Examples of recent sustainable capitalist urban projects

Note: Due to the great shift of demands for urban development from "developed" countries to Asian and middle-east countries last 20 years (Ōsawa 2015:337), all sustainable urban projects listed are planned in Asian-Middle-east countries.

Name of Projct	Place, Country	Projected Term	Project Area Size (square kilometers)	Green Concepts	Source
Iskandar Malaysia	Johor, Malaysia	2006 - 2025	2217.00*	...the green mega-city... a mega-city built along eco-friendly lines, with green energy and an end to the pollution…The plans are for a city that not only incorporates the latest in environmentally friendly technology, but that is designed for social integration.	http://www.theguardian.com/environment/2012/nov/02/iskandar-malaysia-green-megacity
Dongtan Eco-City @ Chongming Eco-Island	Dongtan, China	2005 - 2050 (Halted)	85.00	...a city with a 60 percent smaller ecological footprint, 66 percent reduction in energy demand, 40 percent energy use from bio-energy, 100 percent renewable energy use for buildings, on-site transportation, 83 percent reduction of landfill waste, and almost no carbon emissions...a compact city with low-rise condominiums and high-tech, energy- saving homes interspersed with green spaces...	http://www.designbuild-network.com/projects/dongtan-eco-city/ Chang and Sheppard (2013:62)
Tianjin Eco-City	Tianjin, China	2009 - 2020	30.00	...based on the key components of an "eco system'. Pragmatic and allegorical aspects of ecology...Chinese eco-city, are selected as themes Surrounded by greenery...are the 'green' and 'urban' ... The green spine acts as both a recreational park-scape, green buffer as well as an ecological corridor through which flora and fauna can propagate and traverse through the Eco-City...	http://openbuildings.com/buildings/tianjin-eco-city-profile-4292
Yuelai Eco-City	Chongqing, China	2011 - ?	10.31	...special emphasis on sustainable transportation, infrastructure and energy-efficient uses. In fulfilling this vision...	http://www.calthorpe.com/Yuelai
Masdar City Project	Abu Dhabi, UAE	2006 - 2025	6.40	Masdar City, the first clean-technology cluster to be located in a carbon-neutral, zero-waste city…such high sustainability targets, the city will be an innovator and pioneer in the implementation of innovative sustainable technologies for energy, water, and waste management.	http://www.fosterandpartners.com/projects/masdar-development/ http://www.careers.ch2m.com/worldwide/en/engineering-projects/masdar.asp
Incheon Songdo IBD Eco City	Incheon, South Korea	2001 - 2015	6.07	ONE OF THE WORLDS GREENEST CITIES..sustainable development will be key quality-of-life attributes for both corporations and residents...the first LEED (Leadership in Energy and Environmental Design) certified district in Korea…	http://www.songdo.com/# http://www.cityup.org/ae_ecocity/Cases/Asia/20100118/58827.shtml http://www.songdo.com/songdo-international-business-district/the-city/master-plan.aspx
Chengdu Tianfu District Great City	Chengdu, China	2012 - 2020	1.30	...a self-sustaining, environmentally sensitive 1.3-square-kilometer satellite city...a remarkable series of sustainable benchmarks...48% less energy and 58% less water than a conventional development of similar population...produce 89% less landfill waste and generate 60% less carbon dioxide.	http://smithgill.com/news/great_city_press_release/
Dubai Sustainable City	Dubai, UAE	2013 - 2016	0.46	...consist of...he Institute for Ecological Engineering, ...a "green" school, an eco-resort...organic farms...and 600,000 square feet of solar panels. Each house within the city will be equipped with solar panels...a smart water system that will reduce the water demand of buildings by 30 percent...and there will also be a waste recycling system and 20 organic farms.	http://www.diamond-developers.ae/thesustainablecity/index.html http://inhabitat.com/dubais-sustainable-city-will-be-powered-by-600000-square-feet-of-solar-cells/
Binhai Eco City	Binha, China	2014 - ?	0.20	...as green oases powered by clean, renewable energy...Binhai Eco City is designed to be an example of how cities can be completely green developments….The Eco City development has planned green belt land to the north of the site and aims to push the green land towards the center of the site.	http://www.holmarchitectureoffice.com/# http://en.twwtn.com/Bignews/73226.html?jdfwkey=i1wt5
Hangzhou Green City	Hangzhou, China	2010 - ?	?	...lush green environment is tied to the likewise green waterfront by means of two elevated green passages...Our master planning scheme for Site 3 of Hangzhou proposes a densely populated area that is green, spacious, pleasant and full of natural oxygen, produced by the abundance of plants, bushes and trees.	http://www.onl.eu/?q=projects/hangzhou-green-city

*Total development target area. Each Iskandar project has a much smaller size of development.

Part. I: Theoretical Arrangements

1. Capitalist Production of Urban Space and Its Problems

Throughout sections 1.1 – 1.3, this chapter shall succinctly show how fundamental production of urban space is for capitalism survival by relying on arguments of Lefebvre and Harvey. Then, this chapter shall show increasing green pressures and demands are a crucial issue for capitalism since it can disturb production of urban space that capitalism relying heavily on**.** Readers who are already familiar with Lefebvre and Harvey's arguments can move directly to section 1.3.

1.1. Commodification of Urban Space (Lefebvre)

In many cities in many different societies, now and then, construction of buildings, of infrastructures, of factories, or construction[8] of urban space, have been an important component of making money. Historical records, for example, show that it is about 2000 years ago, construction of urban space already become an important target of investment in the city of Roma. Roman financial brokers actively invested their money in projects to construct ***insulas***, large-scale apartments, in order to generate profits (Ōsawa 2015:39). Urban spaces were valuable, thus profitable, because they were the foundation where people produce surplus values and re-produce themselves. Urban spaces were ***for production*** of goods and services, or it can be said that ***use value of space*** was the fountain of profits. However, after the advent of modern capitalism, its limitless transformative force of commodification made even space per se commoditized. Henri Lefebvre, a French Marxist urban scholar, first[9] proclaimed this that

[8] Here, I intentionally use 'construction' in order to differentiate 'construction of urban space' from '(Capitalist) production of urban space.' Construction of urban space here means that to make spaces ***for (re-)production of goods, services, and ultimately human beings*** (based on use-value priority). On the other hand, production of urban space here means, as defined later on, that producing spaces ***as products*** (based on exchange-value priority).

[9] According to Hashimoto (2012:57).

> city and urban reality are related to use value. Exchange value and the generalization of commodities by industrialization tend to destroy it by subordinating the city and urban reality which are refuges of use value, the origin of a virtual predominance and re-valorization of use (1968/1996:67-68).

As this process of commodification progressed, the fundamental nature of urban spaces changed. Lefebvre claimed that

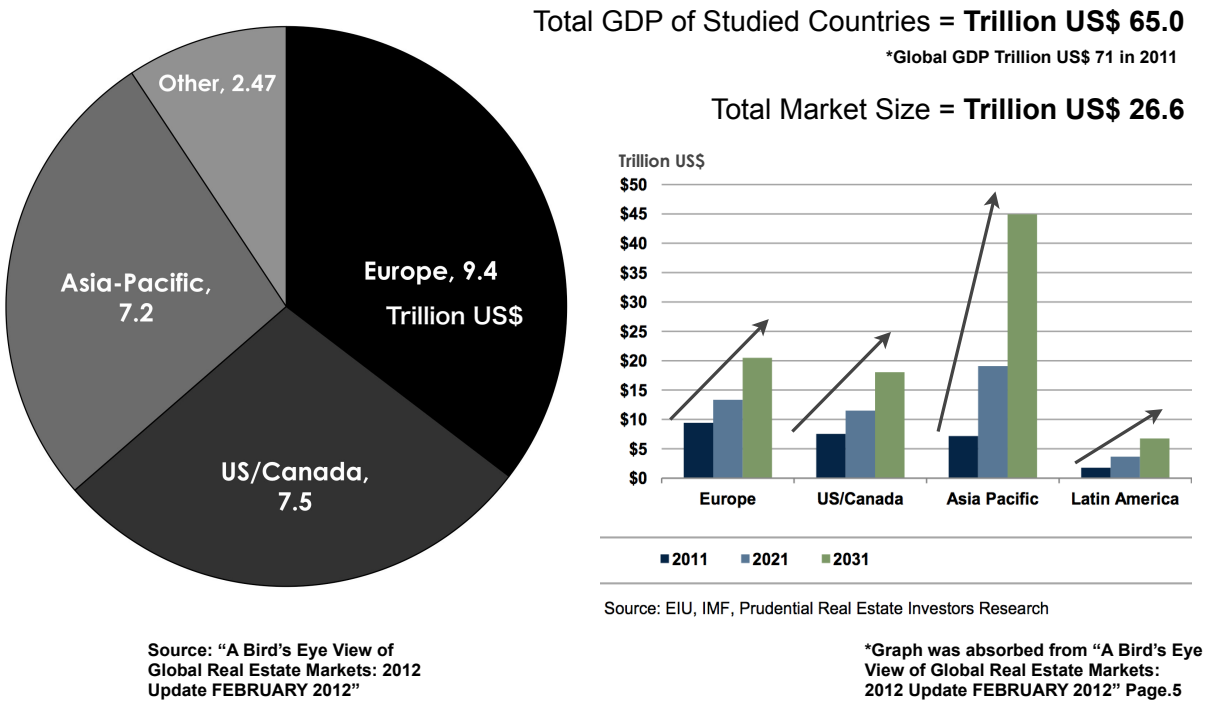
> space itself has begun to be bought and sold...Space is no longer only an indifferent medium, the sum of places where surplus value is created, realized, and distributed. It becomes the product of social labor, the very general object of production, and consequently of the formation of surplus value (1970/2003:154-155).

Namely, urban spaces in the capitalist cosmology exist not only for production, but also ***as products***, or it can be said that ***exchange value*** of space became an important aspect of capital formation. Thus, ***Capitalist production of urban space*** can be defined as producing urban spaces for exchange (within commodity markets).

As modern capitalism became more complicated and larger-scale, it "found new aspiration in the conquest of space, in trivial terms, in real estate speculation, capital projects (inside and outside the city), the buying and selling of space. And it did so on a worldwide scale[10]" (Lefebvre 1970/2003:155). After surplus value realized from industrial sectors (the first circuit of capital formation) has started decreasing due to post-industrialization of the matured capitalist societies, capitalist production of urban space for speculation of real-estate (the second circuit of capital formation) is becoming ever more major driving force of further capital accumulation. As of 2011, the size of global real-estate market is estimated approximately Trillion US$ 26 while the total GDP of the countries studied for this estimation is Trillion US$ 65 (Fiorilla, Kapas, and Liang 2012). These figures show that how huge

[10] This spatial expansion of urban spaces shall be discussed in the next section.

today's real-estate market is, and it is important to note here that the size of real-estate market is projected to continuously grow by 2030, especially in Asia-Pacific (see Figure 1 below).



[Fig 1] Estimated size of global institutional-grade commercial real estate market in 2011
Note: Graphed by the author based on the source: Fiorilla, Manidipa, and Youguo (2012). Left bar chart is directly adapted from Fiorilla, Manidipa, and Youguo (2012:5).

Nearly 40 years ago, Lefebvre argued that "real-estate speculation becomes the principal source for the formation of capital…" (Lefebvre 1970/2003:160), and it is still true today, or (as previous statistics implies) even becoming *truer*. It can be said by modifying Lefebvre's words that today, for capitalism, the second circuit supplants the first, namely production of urban space, is one of the essential components for formation of capital[11].

1.2. Spatio-Temporal Fixes (Harvey)

As it has been shown, capitalist production of urban space (or it can be said commodification

[11] His original phrase is "[t]he second circuit supplants the first, becomes essential (Lefebvre 1970/2003:160)."

of urban space) is an essential part of capital accumulation today. However, Lefebvre's arguments do not explicitly discuss what kind of role production of urban space can play in a crisis phase of ***over-accumulation*** of capital. In addition, only Lefebvre's arguments are not enough to understand a (driving force of) global-scale spatial expansion of capitalist urban spaces. In order to elaborate these points, this section takes a cursory look at David Harvey's theory of spatio-temporal fixes.

Based on Karl Marx's arguments in *Das Kapital* volume 2 and 3[12], David Harvey formulated that individual capitalists, as long as they *remain as* a capitalist, under the harsh intra-capitalist competition, *must continue* to gain profits higher than initial investments, or to accumulate more capital, by increasing both absolute surplus value and relative surplus value[13] (Marx 1867/1976; Harvey 1981). This process occurs, in modern capitalism, especially as a form of an increase of productivity by technological adjustments and innovations. The final outcome of this endless process[14] is, Harvey argues,

> a condition of over-accumulation of capital, defined as an excess of capital in relation to the opportunities to employ that capital profitably. This excess of capital can exist as a surplus of commodities, of money, of productive capacity, and also leads to a surplus of labor power, (widespread unemployment or underemployment) (Harvey 1981:7).

This is a crisis phase of over-accumulation of capital. Under such crises, individual capitalists will be no longer available to utilize surplus capital so that it will be profitable (no further demand for too-much products, no lucrative target of investments, and thus, no further needs

[12] Marx wrote, for instance, that a "capitalist has two objectives: in the first place, he wants to produce a use-value which has exchange-value, i.e. an article destined to be sold, a commodity; and secondly he wants to produce a commodity greater in value than the sum of the values of the commodities used to produce it, namely the means of production and the labor-power he purchased with his good money on the open market. His aim is to produce not only a use-value, but a commodity; not only use-value, but value; and not just value, but also surplus-value (Marx 1867/1976:293)."

[13] According to Marx, absolute surplus value will be generated by the prolongation of the working day while relative surplus value will be generated by the reduction of the necessary labor through techno-social innovations (1976:645).

[14] In reality, this is not likely an endless process. Ecological (not environmental) economic tells us that this process is only able to be endless *unless* negative side effects associated with the process (e.g., global warming, environmental destructions, and dissipation of exergy) have reached at the limit of planetary ecological capacity of absorbing such negative effects. See Nicholas Georgescu-Roegen (1974) and Harman Daly (1991) for instance.

to operate over-productive factories and employees), and they will end up as the ***devaluation of capital***

> as money (through inflation), as commodities (through gluts on the market and falling prices), as productive capacity (through idle or under-utilized plant and equipment, physical infrastructures, etc., culminating in bankruptcy), and the devaluation of labor power (through falling real standards of living of the laborer) (Harvey 1981:7).

It is definitely imperative for capitalist to avoid, or at least mitigate, such devaluation of capital, or economic depression, in order to save their capital and sustain capital formation. We can observe here an internal contradiction of capitalism, that is, the will to further accumulation and its actual outcomes –over-accumulation–, will make an inevitable obstacle to further growth. However, Harvey argues that capitalism is able to (temporarily) fix such crises of devaluation by (a) spatially; (b) temporally absorbing over-accumulated capital; and by sometimes combining (a) and (b) (Harvey2003:109).

(a) Harvey first formulated a ***spatial fix (fixing the over-accumulated capital problem by geographical expansions or re-configurations)***. Harvey assumes four basic spatial strategies that capitalists can take for a spatial fix, namely; (1) to develop new external markets and export commodity capitals to there; (2) to export production capital to new markets; (3) to develop new proletariat labor markets and to exploit them with low wages; and (4) to impose economic (devaluation) risks to other rival economies through international power games, sometime through wars (Harvey 2006:432-438; Jessop 2006:149; Belina 2011:79). (1) to (3) shall be explained more in the following paragraphs since they are relevant to urban expansions and re-configurations.

(1) and (2) are relatively straightforward. If a capitalist has too much products and/or too-much money for investments, and if this capitalist cannot find places within his/her

country where s/he can *profitably* sale and/or invest, then s/he can, possibly together with other capitalists, develop new profitable markets abroad. This process entails new expansions and/or re-configurations of cities, as a market center, and of other built environments (such as ports, airports, and railways).

As for (3), Harvey talked about making new wage labors (as well as wealth and land) through the process of primitive accumulation (e.g., enclosure; colonization). Although forms of primitive accumulation appear less obvious today, accumulation by dispossession is still spreading geographically and intensifying in the name of economic growth, associated with related processes of financialization, privatization, marketization, gentrification, and the like. Through such processes of accumulation, many people are dispossessed of their wealth and land, and imposed to work for capitalist companies as low-wage labor. It is also important to note that in order to organize, educate, and re-produce such an increasing number of cheap wage labors, as Manuel Castells demonstrated, expansions and re-configurations of collective consumption goods (such as infrastructures, cheap apartments, schools, hospitals, and etc.), namely cities, are inevitable (Castells 1977:234-242; Hashimoto 2012:51-52).

(b) Harvey then formulated a ***temporal fix***, that is, to fix the over-accumulated capital problems by "temporal displacement through investment in long-term capital projects[15] or social expenditures (such as education and research)[16] that defer the re-entry of capital values into circulation into the future" (2003:109). By combining spatial fixes, temporal fixes become particularly important when formation of urban built environments is analyzed. ***(a)+(b): A spatio-temporal fix***, that is to absorb and *spatially-fix*[17] surplus capital within built

[15] This is same as "the second circuit of capital formation," which we have discussed in the Lefebvre section. Harvey calls this as a "secondary circuit of fixed capital and consumption fund formation (Harvey 2003:109)."
[16] Harvey calls this as a "tertiary circuit of social expenditures and research and development (Harvey 2003:109)."
[17] As Harvey himself points out that the term "'fix' has a double meaning" in his argument (2003:115), 'fix' is used as 'to resolve' of the over-accumulation problem as well as 'to pin' surplus capital on a particular geographical location (especially on built environments).

environments, and increase future return on investment. Although, in a theoretical sense, spatial fixes and temporal fixes can be studied separately, Harvey points out that strategies of spatial fixes basically cannot be

> divorced from temporal shifts in which surplus capital gets displaced into long-term projects that take many years to return their value to circulation through the productive activity they support (2003:88)…[built environments] can and do absorb massive amounts of capital and labor, particularly…under conditions of geographical expansion (2003:111 [ ] inserted).

Expansions and re-configurations of urban built environments (such as factories, railways, highways, airports, water and sewer services, apartments, skyscrapers) will require not only a huge amount of commodity and productive capital for its own physical expansions and re-organization but also a considerable volume of surplus financial capital (investments)[18]. Such financial investments "can be productive in the long run if they contribute to the future productivity of capital" as forms of, for instance, "a more efficient transport and communications system eases the path to further capital accumulation" (Harvey 2003:111) or of a luxury condominium or office complex whose exchange value is expected to be higher than initial investments (c.f., Lefebvre's arguments).

As the discussion so far has briefly shown, crises of over-accumulation, which are a very structural tendency of capitalism, must be fixed in order for capitalists to survive. Spatial fixes (geographical expansions and re-configurations of urban built environments) and temporal fixes (deferment of realization of investments through built environment projects) are an indispensable mechanism for capitalism to avoid or mitigate these crises.

[18] Harvey also elaborated that, in order for surplus financial capital to be utilized for long-term urban projects, or spatial fix strategies, development of financial institutions and governmental supports are necessary. To make the discussion simple, in this thesis I will not go into further explanation about this topic.

1.3. Urban eco-climatic issues and sustainable cities as a response

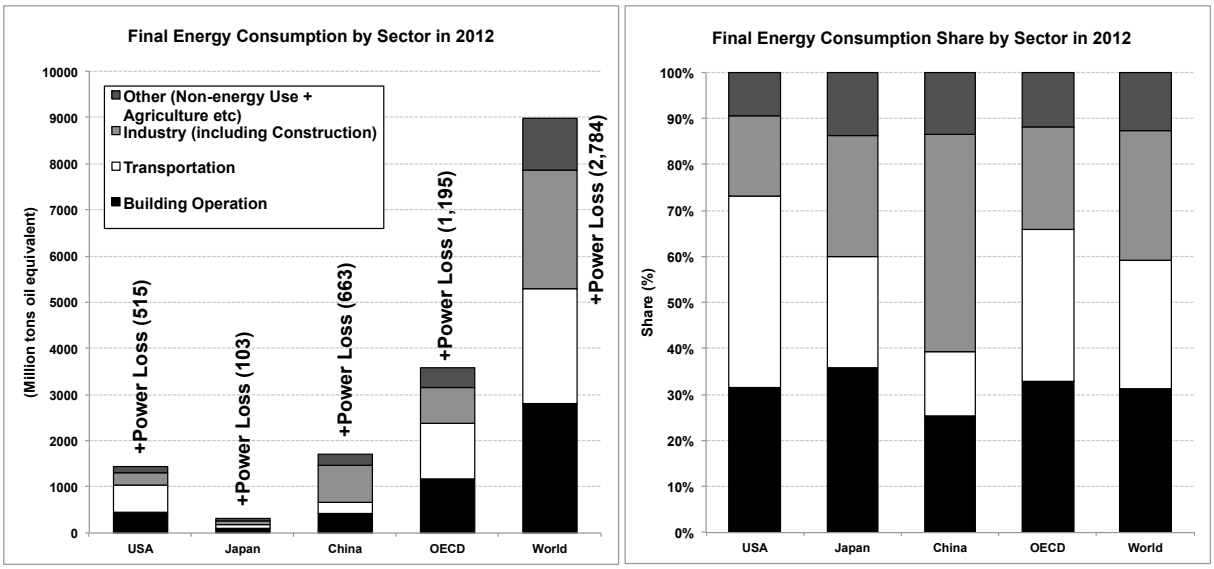
As shown in the previous sections, urban expansions (production of urban space) and re-configurations (re-production of urban space) are an indispensable mechanism of today's capitalism (in terms both of further accumulation and survival). However, it is (at least up to now) impossible for capitalist cities and their (re)production to progress without causing eco-climatic (as well as socio-economic) challenges. Amongst such challenges, increases of vegetation loss and of CO^2 emissions due to rapid urban expansions are one of the issues to be urgently addressed.

United Nations (2014) predicts that the share of global urban population will increase from 50 % today to approximately 70 % in 2050. Alongside with this rapid conversion of human population into urban dwellers, urban areas are expected to grow rapidly. Seto, Güneralp, and Hutyra estimated (2012) that, by 2030, approximately 1.2 million km^2 of lands, which is almost equal to the Republic of South Africa, would be directly converted to urban built-up areas. Such rapid urbanization indirectly destroys vegetation as well. DeFries et al conducted an empirical study across 41 countries within the tropical region, and found that "forest loss is positively correlated with urban population growth and exports of agricultural products" during 2000 and 2005 (2010:178). They concluded that both urban and international demands for food products are important drivers of deforestation of the region. It is no doubt that such worldwide conversion of lands continues to directly and indirectly destroy vegetation and ecosystems, decrease biodiversity, and reduce CO^2 absorption capacity of the planet.

In addition, cities[19] consume a considerable amount of energy in order to light, heat, cool, communicate, transport, and feed the dwellers inside them. For example, in 2014, building and transportation sectors in the USA consumed nearly 70 % of the total primary energy

[19] "Urban lifestyle" could be a more appropriate subject though.

consumption of the country (Office of Energy Efficiency and Renewable Energy 2014). As Figure 2.1 and 2.2 below show, transportation and building operation are responsible for approximately 60 % of energy consumption worldwide in 2012. It is important to note that because both commercial and residential buildings generally last 50-100 years, they continuously require energy and emit CO^2 during such a long period of time (The American Institute of Architects 2015) unless they will be perfectly free from fossil fuel consumption. This massive consumption of energy makes cities a primary contributor to global warming. UN-Habitat estimates that, as of 2011, emissions of anthropogenic green house gas "resulting from cities using production-based figures could be between 40–70 per cent of the total, while a consumption-based calculation suggests levels as high as 60–70 per cent" (2011:16).



[Fig 2.1: Left panel] Absolute final energy consumption by sector in 2012
[Fig 2.2: Right panel] Final energy consumption *share* by sector in 2012
Note: These graphs were made by the author based on the information provide by International Energy Agency's Sankey Diagram[20].

Thus, it is not surprising that as global eco-climatic issues are attracting ever more attentions, capitalist cities and their production began to be exposed to a wide range of pressures and

[20] http://www.iea.org/Sankey/

demands to be eco-friendly, sustainable, low-carbon, or simply green. As I have discussed in sections 1.1 and 1.2, production of urban space is a crucial component for capitalism. These mean that it is inevitable for capitalists to reconcile such critiques and demands to be sustainable with production of urban space (means further economic growth).

A possible and straightforward path for capitalists is to produce capitalist cities so that they will attain both sustainability and economic growth, namely to make sustainable 'capitalist' cities. According to discourses around influential international institutions and firms, such sustainable cities can be achieved by introducing innovative planning and technologies that are eco-friendly and low-carbon (New York City 2006; Sioufi 2010; UN-Habitat 2011; Sustainable Development Solutions Network 2013; Davies 2013:114, United Nations 2014; Arup 2015). Alf Hornborg, who critically analyzes a relation between sustainability and modern industrial technology, also points out that

> [s]eemingly more realistic and less totalitarian, the predominant recipe for urban sustainability today is to develop and apply new technologies (such as recycling and renewable energy) in order to alleviate the pressures of urban growth on the biosphere and rural people engaged in provisioning urban populations. It is no doubt safe to say that mainstream modern discourse on urban sustainability is founded almost exclusively on the last [techno-fixes] of these three options (Hornborg 2014:2, [] added).

In tandem with discourses like "cities are a solution to eco-climatic issues" (c.f., Davis 2010; Rosenzweig et al 2010; El-Sioufi 2010; UN-Habitat 2011), the sustainable city discourse seems to be welcomed (by capitalists) and to be more and more incorporated into the basic concept of architectural and urban projects as Table 1 in the introduction shows.

1.4. Sustainable cities as techno-fix feasible?

However, the feasibility of such sustainable cities relying heavily on techno-fixes is quite

contested. It seems to me that there are four major reasons why this is contested, namely (1) a possibility of the Jevons paradox, (2) socio-politico nature of modern technology, (3) unequal availability of cutting-edge technology, and (4) a fundamental conflict between true sustainability and the capitalist logic of accumulation.

(1) John Bellamy Foster discusses the Jevons paradox in relation to techno-fixes of eco-climatic issues in his book *Ecology Against Capitalism* (2002). According to Foster, William Stanley Jevons, a British economist, wrote about an intriguing paradox in his *The Coal Question* (1865) that Jevons found "increased efficiency in using a natural resource, such as coal, only resulted in increased demand for that resource, not a reduction in demand" (2002:94). An increased energy efficiency of a technology entails more demands for that technology rather than less demands – this is the Jevons paradox. Foster argues that the paradox can be observed today such as energy-efficient cars increased demands for them; technological improvements in refrigerators increased a demand for them, and he concludes that such tendencies "are in effect within industry, independent of individual consumption" (2002:95). The same can be said for the *techno-fixed* sustainable cities. Without an appropriate socio-political measurements, an increased energy efficiency of urban transportation (including automobiles) systems and built environments will make the costs for utilizing them lower, and will end up increasing demands for them. Such increasing demands may offset the reduced energy consumption by the technological improvements in sustainable urban development.

(2) Alf Hornborg constructed an elaborate politico-ecological theory on modern industrial technology. He emphasizes that modern industrial technology is not a mere combination of things and knowledge. Rather, he points out an importance to "understand machines as thoroughly *social* phenomena. They are the result of asymmetric, global transfers of resource"

(2001:11). His understanding of the modern technology denies a common belief that modern industrial technology itself is immune to socio-politico arguments; on the contrary, it implies that modern industrial technology *per se is* a very building block of the global political structure. By Lasswell's definition (1958), kernel questions of 'politics' are "who gets what, when, how," and "where" can be added to these. Therefore, modern industrial technology can be thought of as a part of a global mechanism of deciding who gets what, when, how, and where. According to the arguments by Hornborg, modern industrial technology exists as an unequal and unfair answer to these political questions. He argues "[t]he rational of industrial technology is to save time and space, but a global analysis reveals the extent to which *this is achieved at the expense of human time and natural space elsewhere in the world system*" (2013:20 emphasis added). Based upon these careful theoretical arguments, he questions techno-fixes as a silver bullet to social-ecological issues because "every 'technological' solution is ultimately a social relation in the sense that it will have implications for *the societal distribution of the burden of problem-solving*" (2013:38 emphasis added) and it is "a strategy for capacitating an *affluent minority* of the world's population through an asymmetrical exchange—an expanding net appropriation—of resource from the rest of the world" (2013:35 emphasis added). Hornborg's politico-ecological analysis on technology can be applied to sustainable capitalist cities relying on techno-fixes. A capitalist city may be "sustainable" at a local level, but it will not be so at the *global level* because urban techno-fixes (or urban innovations) are highly likely a mere re-combination of how and where a city gets energy and resources and how and where the city imposes its burdens on. This socio-politico aspect of urban techno-fixes becomes more important when we think of who (or which city) is available to utilize such a techno-fix strategy.

(3) An important problem of urban techno-fixes is that *not all* cities can afford to utilize such cutting-edge technologies because of their high costs (for innovation as well as for actual

installation). There is a possibility that 'techno-fixed' sustainable capitalist cities, or borrowing Mike Davis' pertinent notion (2010) *Noah's Ark,* will be a climate shelter exclusively for an affluent minority. Richard Florida, an urban economic geographer, argues that world cities are being divided into economically successful and not so, and shaping a "spiky" inter-urban economic geography, instead of a simplified geographic understanding such as "the end of geography (e.g., Friedman 2006)" (2005; 2008; 2010; 2014). Enrico Moretti, an urban economist, also points out a geographical inequality, particularly inter-urban economic differences (2012). It can be safely argued that such a spiky urban geography of the economic affluence will affect to what extent a city will be able to develop and utilize expensive and cutting-edge urban techno-fixes. Some studies have already suggested that risks of climate change and the capacity to cope with them are socio-economically and geographically different from city to city (Hadson and Marvin 2009; Hadson and Marvin 2010; UN-Habitat 2011; Hallegatte et al 2013; Revi et al 2014). UN-Habitat additionally points out that ability to handle eco-climatic issues will be unequal even *within* a city due to socio-economic segregation by city-district level (2011).

(4) Intriguingly, these three points do not violate the logic of capitalist accumulation. Urban techno-fixes will generate more demands for certain energy and products and continue to make benefits for few affluent people while reconfiguring the global flows of exergy into and entropy from rich cities. This is not surprising because the idea of sustainable 'capitalist' cities developed as reconciliation between economic growth and sustainability. As I have already discussed, today's capitalist cities and their (re)production are ruled mostly under the capitalist logic of accumulation so that they can continue to drive and ensure further capital accumulation. Urban sustainability by techno-fixes only works unless it will not contradict the fundamental logic of capital accumulation. However, if we really would like to achieve a "true" sustainable city, it must require decreasing (or at least steady) demands for energy and

resources, and its urban metabolism must have a *win-win* (or fair) metabolic relationship with its hinterlands, and its eco-climatic benefits must be for all people, the poor as well as the rich. This true sustainable (or it could be substituted by the word strong sustainable[21]) city contradicts the capitalist logic of accumulation. Thus, in a way similar to some scholars' arguments (e.g., Rees 1997:307; Hornborg 2014; Latouche 2004/2010:64 and 2010/2013:61), the notions of sustainable "capitalist" city and sustainable "capitalist" urban development can be thought of as an oxymoron or a myth. In other word, as long as urban techno-fixes work only within the capitalist logic of accumulation, they will not be a true remedy for eco-climatic challenges.

2. Greenwashing Theory

2.1. Greenwashing overview and its framework

The previous discussions revealed that sustainable capitalist cities and production of them that rely heavily on techno-fixes, as long as they work under the capitalist logic of accumulation, hardly to be truly "sustainable" both from practical and theoretical perspectives. Then, in what way should today's increasing number of sustainable urban projects (c.f., Table 1 in the introduction) be interpreted? If, as I have discussed, sustainable 'capitalist' urban projects are, at a level of their underlying logic, rarely to be actually green, how are they working for an increasing number of pressures and demands to be eco-friendly, sustainable, low-carbon, or green? A possible answer to these questions is to think of sustainable capitalist urban projects as simply *greenwashing*: pretending (fundamentally) not-green as *green* in order to attain economic benefits by reaching at green demands while securing themselves from green critiques.

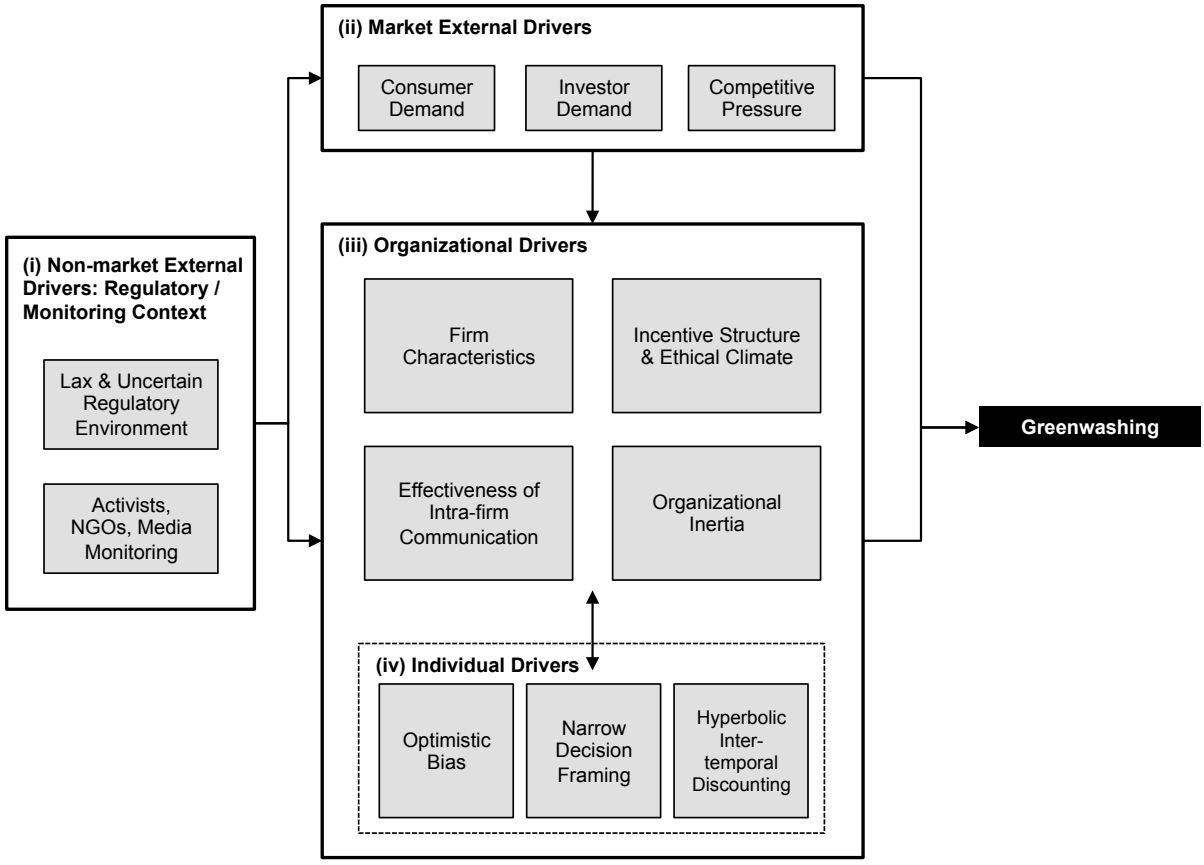
[21] The weak sustainability perspective (or paradigm) postulates that "man-made capital is more important than natural capital" (Davis 2013:111). On the other hand, the strong sustainability perspective (or paradigm) postulates that there is no natural capital that can be substituted by man-made capital (e.g., a technology emulating an ecological function). For further details, see (Davis 2013).

According to Delmas and Burbano (2011), greenwashing is "the act of misleading consumers regarding the environmental practices of a company (firm-level greenwashing) or the environmental benefits of a product or service (product-level greenwashing)." As the rise of eco-climatic consciousness within capitalist societies, green marketing both of products and companies is becoming ever more crucial for corporations to attract green demands as well as showing their commitment to corporate social responsibility for sustainability (Chang 2011; Delmas and Burbano 2011; Chen and Chang 2013; Nyilasy, Gangadharbatla, and Paladino 2014). The number of green advertisements has grown nearly tenfold in the last 20 years, and it has approximately tripled since 2006 (Delmas and Burbano 2011:64). However, "being green" and/or "to be green" is not an easy task for many companies due to huge costs and necessary efforts to be so. In addition, it must be noted here that, as I have discussed previously, the logic of true sustainability theoretically contradicts the capitalist logic of accumulation that rules over the entire production of consumer goods. Thus, from the true sustainability perspective (c.f., Davies 2013), "capitalist" producers and consumers will never be truly sustainable. By facing such difficulty of achieving real greenness, many companies have fallen for the seduction of greenwashing "to selectively reveal the positive information about the environmental features of their products without disclosing negative information in order to generate green image" (Chen, Lin, and Chang 2013:2412) rather than to be truly sustainable. To make matters worse, the number of companies engaging in greenwashing continues to grow and even skyrocket nowadays (Horiuchi and Schuchard 2009; Delmas and Burbano 2011). For instance, according to TerraChoice, a research organization for greenwashing[22], judged by its 2008/2009 survey that more than ***95 %*** of consumer goods committed at least one of the "Seven Sins of Greenwashing"[23] (Delmas and Burbano 2011).

[22] TerraChoice was acquired by UL, a premier safety science firm, and resources provided by the organization is no longer available online.

[23] The "Seven Sins of Greenwashing" are 7 criteria made by UL (former TerraChoice) in order to detect greenwashing product. According to UL, the Seven Sins of Greenwashing consist of sin of (1) the hidden trade-off, of (2) no proof, of (3) vagueness, of (4) worshiping false labels, of (5) irrelevance, of (6) lesser of two evils, and of (7) fibbing. For more detail, see http://sinsofgreenwashing.com/findings/the-seven-sins/

Then, more specifically why do a growing number of firms (intentionally or unintentionally) commit greenwashing? What kind of drivers can thrust a company to employ greenwashing strategy? A concise study by Delmas and Burbano (2011) gives us a solid framework of greenwashing drivers. According to them, greenwashing and its drivers can be categorized into four different levels: **(i)** non-market external drivers, **(ii)** market external drivers, **(iii)** organizational (or company) drivers, and **(iv)** individual (within a company) drivers (see Figure 3 below). Note here that, their study focuses only on "poor environmental performers" (Ibid:67), thus they treat "firm environmental performance as fixed and focus on firm communication about environmental performance" (Ibid:68). Let us succinctly review Delmas and Burbano's greenwashing framework and drivers:



Adapted from Delmas & Burbano (Figure.1 in 2011:67) and modified by the author (2015)

[Fig 3] Framework of greenwashing and greenwashing drivers at different levels

(i) Non-market external drivers:

As we can imagine, regulations and regulators related to greenwashing both at national and international levels are a *critical* factor for firms to decide whether or not they will commit greenwashing. Current lax and uncertain regulatory context allows firms to be easily seduced by greenwashing (Ibid:69-70). In such a context, activist groups, NGOs, and media "currently play a critical role as informal monitors of firm greenwashing" (Ibid:70). As environmental consciousness has been rising within the capitalist societies, such groups are getting ever more influential to impose companies to stop greenwashing. Nevertheless, due to the lax and uncertain regulatory context of greenwashing, these groups can "only bring about reputational damage to greenwashing firms" (Ibid:71). At this level, Demas and Burbano talk about the regulatory context *for greenwashing* not for poor environmental performance as a whole. However, it is no doubt that these factors, especially informal monitoring groups, also form pressures on companies to be *sustainable* in tandem with market external factors.

(ii) Market external drivers:

Delmas and Burbano point out that market external factors are "critical to understanding why some environmentally low-performing firms choose to greenwash" (Ibid:71). In the age of rising eco-climatic consciousness, poor-environmental performers always confront various forms of pressures and demands "from both consumers and investors to appear to be environmentally friendly and thus face incentives to communicate positively about their environmental performance" (Ibid:71-72). In addition to this, I would like to point out that poor-environmental performers also face lucrative demands on "really" green products from the environmental conscious consumers. Delmas and Burbano point out that the competitive landscape of a market is also important. Capitalist companies, as Marx first mentioned, are always exposed to the harsh competition in the market, thus it is inevitable for them to continuously catch up a successful business practices of their competitors in order to not

being left behind, and "research has shown that this applies to the adoption of green practices" (Ibid:72). As "being green" becomes a more crucial factor for the market competition, companies, regardless whether they are good or poor environmental performers, must appear to be *green* in order to keep their competitiveness within the fierce market.

(iii) Organizational (or company) drivers:

Firm characteristics, incentive structure and ethical climate, effectiveness of intra-firm communication, and organizational inertia are important factors for companies to form their response to external drivers:

-Firm Characteristics:

All companies are different in their size, belonging industry, profitability, product lifecycle, core competencies, and etc. Such characteristics, according to Delmas and Burbano, undoubtedly affect the strategy mix of a firm (Ibid:73). As I have touched previously, the latent benefits to greenwashing companies include more accessibility to green-conscious consumers and investors, and such latent benefits will also be changed by basic firm characteristics (Ibid:73). In addition, the intensity of green pressures can vary as well because of company attributes. Delmas and Burbano point out that consumer products companies likely confront consumer pressures (and demands) that are much stronger than those for service or non-consumer products companies (ibid:73). Similarly, people (as well as NGOs and media) tend to pay attention to environmental practice of large and famous corporations, and thus these corporations also "likely face greater levels of investor pressure than smaller, private firms" (Ibid:73). Particularly, companies belonging to "dirty" or "not-green" industries, such as energy and utilities, are more likely to be "targeted by activists and NGOs" (Ibid:73). It can be said that real estate developers operating large-scale green-field projects also belong as belonging to such "dirty" or "not-green" industries, and thus likely confront

intensive green pressures (Parsa and Farshchi 1996).

-Incentive Structure and Ethical Climate:

If a company has a climate or an incentive structure that allows employees to conduct unethical behavior, that is, "a harmful effect on others and is either illegal or morally unacceptable in the larger community" (Ibid:73), such a company tends to commit greenwashing. We can think of greenwashing as an example of such 'unethical behavior' (Ibid:74). Thus, when the company does not have a climate or an incentive structure to prevent the company (individual employees) from conducting unethical behavior, the company likely does not prevent itself from committing greenwashing.

-Organizational Inertia:

Large organizations having a long history tend to persist in their traditions, successful models, and way of thinking. Such organizational inertia prevents a firm from improving, or even discarding, the firm's "business-as-usual" (which often must be changed in order to be more sustainable).

-Effectiveness of Intra-firm Communication:

It is not easy for you to fully understand what your coworkers are working for as well as what your company's products exactly are, particularly if your company hires more than, say, 20,000 employees. Ineffective intra-firm communication and knowledge management systems can make misunderstandings about a product between different workers as well as departments. For example, due to the inefficient intra-firm communication in your company, marketing people misunderstood (overestimated) the greenness of a product even though people in actual design and production processes correctly understand its real green performance. This misunderstanding of the product by the marketing people will lead the

company to unintentional greenwashing.

(iv) Individual (within a company) drivers:

Because an organization is a gathering of individuals, individual-level psychological and cognitive factors affect "decision-making processes and thus influence how external drivers translate into motivation for action" (Ibid:76). Delmas and Burbano's framework deals with four such individual factors: *narrow decision framing* (the tendency to decide something within limited information and assumptions), *hyperbolic inter-temporal discounting* (the tendency that people are impatient over short horizons and patient over long horizons. In other words, people *cannot* wait for eating a fruit *in the front of them* even though they *can* wait for growing a fruit), and *optimistic bias* (the tendency that people unreasonably think of a thing as better (not worse) than the reality). According to Delmas and Burbano, these four individual factors can create an individual inclination for committing greenwashing.

Simplifying the framework

Delmas and Burbano's greenwashing framework is, as I have reviewed, developed and structured quite well, however, let us in this thesis ignore a large part of (i) non-market external drivers except for their green pressures and (iv) all individual drivers. This is because (i') to discuss the regulatory context of greenwashing as well as greening per se requires extensive analyses on policy making and legislative systems, and this is out of scope of this thesis; and (iv') to discuss individual-level factors requires solid knowledge about psychology, cognitive science, and organizational behavior, which is also out of scope of this thesis. Then, let us simplify Delmas and Burbano's framework into a **demand side** (consumers and investors),a **supply side** (real estate developers, investors, governmental institutions, other beneficiaries, and a nexus of them), and a **regulation side** (regulators, activists, NGOs, media, and non-beneficiary stakeholders). As Delmas and Burbano's framework states, there are

green pressures on the supply side both from the demand and regulation sides. In addition, there are green demands from the demand side, which the supply side is eager to reach at. In order to response both to green pressures and demands, the supply side tends to be compelled to make green efforts; however, as we have seen, various drivers, particularly organizational drivers of the supply side, lead the supply side not to actually making green efforts but to greenwashing. In sum, (poor environmental performance) companies take greenwashing strategy in order *to avoid or mitigate green pressures* (from the regulation and demand sides), at the same time, *to reach at green demands* (from the demand side) in order to reap profits.

2.2. Different patterns of urban greenwashing?

Likewise, today's proliferation of sustainable capitalist urban projects relying on techno-fixes (based upon the myth of reconciliation between economic growth and sustainability) can be interpreted that the supply side (a nexus of real estate developers, investors, governmental institutions, and other beneficiaries), intentionally or unintentionally, employs greenwashing strategy in order to **(function 1)** avoid or mitigate green pressure both from the regulation and demand sides by pretending its projects as sustainable, and at the same time to **(function 2)** keep or increase attractiveness and market-competitiveness, and thus to keep or increase an exchange value, of its projects by reaching at green demands from the demand side. However, admittedly, it is fair to point out that to think of all sustainable capitalist urban projects as greenwashing is oversimplification and even an unfair evaluation for some sincere urban green efforts. I agree with such a rebuttal, and thus see a need to theoretically elaborate such points before we are moving to further discussions on these two functionalities. Let us take a closer look at Table 2 below.

[Table 2] Possible evaluation of 'promised' greenness observed in marketing strategy

Perspective / Underlying Logic for ***Evaluation***	**"Capitalist" Urban Projects**					
	(a) Production of Urban Space (Completely new development in the non-urban lands)			**(b) Re-production of Urban Space** (Up-grade, revitalization, or re-development of the existing urban built environments)		
	(g) Projects with "Green" Marketing (Promised to be green)		**(ng) No Green Marketing**	**(g) Projects with "Green" Marketing** (Promised to be green)		**(ng) No Green Marketing**
	(+) Real efforts (by Techno-fixes)	**(0) No real efforts**		**(+) Real efforts (by Techno-fixes)**	**(0) No real efforts**	
Capitalist Logic (or Weak Sustainability)	**Could be really (or relatively) green** (a,g,+)	**GW** (a,g,0)		**Could be really (or relatively) green** (b,g,+)	**GW** (b,g,0)	
True Sustainability (or Strong Sustainability)	**GW** (a,g,+)	**GW** (a,g,0)		**GW** (b,g,+)	**GW** (b,g,0)	

Table 2 shows possible evaluation about *greenness promised* by green marketing ('promised' greenness) of different types of capitalist urban projects. First, let us sort capitalist urban projects into **(a)** production of urban space (completely new developments in the non-urban lands) and **(b)** re-production of urban space (any kind of up-grade, revitalization, or re-development of the *existing* urban built environments). Note that, even though the target of analysis of this thesis is only *production* of urban space, I would like to discuss *re-production* of urban space here as well in order to be theoretically precise. Then, regarding both **(a)** and **(b)**, let us sort them into **(g)** projects with green marketing and **(ng)** projects with ***no*** green marketing. At this step, "capitalist production and re-production of urban space with **(ng)** no green marketing" are ignored by our theoretical discussion since they are, without green marketing efforts, ***not*** greenwashing at all regardless whether or not they, in reality, try to be sustainable. Next, let us sort the remaining "green" urban projects (**a,g** and **b,g**) into **(+)** projects with real green efforts (techno-fixes) and **(0)** no real green efforts. At this stage, by definition, projects with **(0)** no real green efforts (namely, **a,g,0** and **b,g,0**) are judged as *greenwashing*.

Difficult cases are the green development with real efforts **(a,g,+)** and the green re-development with real efforts **(b,g,+)**. From the capitalist logic perspective (which is similar to the weak sustainability point of view in terms of its positive attitude to the feasibility of techno-fixes), both **(a,g,+)** and **(b,g,+)** could be really, or relative to other old built environments, *sustainable* by innovative techno-fixes. However, if we would like to evaluate **(a,g,+)** and **(b,g,+)** *from the true sustainably point of view*, both types of projects will be theoretically judged as greenwashing. As for **(a,g,+) projects**, this is because (1) a new (green-field) urban project, by definition, is inevitable to convert non-urban lands (e.g., forests, grasslands, farms, croplands etc.) into urban built environments, which entails destruction of environments and ecosystems; (2) as I have discusses, it is doubtful that techno-fixes and new configuration(s), which associated with the such techno-fixes, of metabolic flows are truly sustainable and ecologically-just *at the global level*; and (3) capitalist production of *new* urban space means a spatial encroachment of the global capitalist logic of accumulation (based upon exchange value, unlimited production and consumption, and systemic[24] socio-economic inequality) on the vernacular sustainable logic (based upon use value, steady-sustainable production and consumption, and historical-cultural differences). As for **(b,g,+)** projects, they are greenwashing from the true sustainability perspective because of reason (2). However, note that, unlike **(a,g,+)** projects, **(b,g,+)** projects can retain a theoretical possibility to be sustainable even from the true sustainability perspective because of their less (or minimum) destruction of environments; nevertheless, reason (2) seems sufficient to prevent **(b,g,+)** projects from achieving true urban sustainability.

From now on, let us focus again on production of urban space, as our initial direction. More elaborated theoretical and empirical analyses on the relationship between urban greenwashing

[24] As for this point, Baudrillard elaborately discusses that growth based on Capitalism is very function of inequality. "At best, we can say the system stabilizes around a certain rate of distortion, or, in other words, stabilizes, whatever the absolute volume of wealth, at a point which includes a systematic inequality" (Baudrillard 1998:52), and thus "we shall say that it is growth it self which is a function of inequality" (Ibid:53).

and capitalist *re*-production of urban space are out of scope of this thesis (which does not mean that such a topic is less important than greenwashing and production of urban space). As I have discussed, capitalist production of sustainable urban space have a possibility to be truly (or relatively) sustainable when we stand on the capitalist logic perspective (or the weak sustainability point of view).

However, from the true sustainability perspective, all capitalist 'sustainable' projects (again, hereafter our scope of analysis is large-scale green-field development) are theoretically greenwashing. This finding is significant because of its theoretical implication that a radical change at philosophical, moral, and ethical levels must be required in order to achieve a true sustainable urban society. However, it seems that critical discussions from the true sustainability perspective will be no more productive in order for us to develop empirical methodology. In this sense, it is productive for us to think of a possible empirical method to distinguish large-scale sustainable urban projects suspected as greenwashing both by the capitalist logic and true sustainability perspectives, namely (a,g,0) projects, from (a,g,+) projects. How can (a,g,0) projects (equal to urban greenwashing) be empirically distinguished from (a,g,+) projects? Or, how can we empirically detect green-field urban projects suspected to employ the urban greenwashing strategy? In order to think of this point, let us integrate all theoretical discussions developed in this section, and try to build a possible theoretical framework of "urban" greenwashing that can be interpreted into an empirical framework.

3. Urban Greenwashing: A Framework and Two Key Relations

3.1. Summary and a framework

Before we will go further, it must be productive to restate here important premises that the entire urban greenwashing logic in this thesis relies on:

(Premise-1: P-1) As our starting point, it is assumed that *actual degradation of eco-climatic conditions* on this globe is ongoing now, and this is the issue that human beings must urgently cope with.

(P-2) As this eco-climatic challenge intensifies, *a widespread concern about eco-climatic issues and green discourses* have been formed (and are being formed) especially within the capitalist societies.

(P-3) Sections 1.1 and 1.2 show that production of urban space is an indispensable component of capitalism in order to attain further capital accumulation (through commodification and exchange of space) as well as to fix over-accumulation crises (through spatio-temporal fixes).

(P-4) Capitalist urban projects have entailed massive vegetation loss and a continuous increase both of absolute and relative emissions of CO^2. Thus, they have been exposed to a wide range of pressures and demands to be eco-friendly, sustainable, low-carbon, or simply green (See section 1.3).

(P-5) However, capitalists (a nexus of real estate developers, investors and governmental institutions, and other beneficiaries) cannot stop their production of urban space because it contradicts (P-3). Therefore, a possible pathway for capitalists is to produce capitalist cities so that they will attain both eco-climatic sustainability and economic growth, namely to make sustainable 'capitalist' cities. By introducing innovative planning and technologies that are eco-friendly and low-carbon, such sustainable capitalist cities can be achieved (cities reconciling between economic growth and sustainability by techno-fixes).

(P-6) The feasibility and effectiveness of capitalist sustainable cities (and production of them)

are, however, quite questionable because of (1) a possibility of the Jevons paradox, of (2) socio-politico nature of modern industrial technology, of (3) unequal availability of cutting-edge technology, and of (4) a fundamental conflict between true sustainability and the capitalist logic of accumulation. Thus, capitalist green urban projects can be thought of as simply ***greenwashing***: pretending *fundamentally not-green* as *green* in order to attain economic benefits by attracting green demands while securing themselves from green pressures.

Based upon these premises, let us elaborate a possible urban greenwashing framework. As an archetypical framework, I have studied Delmas and Burbano's greenwashing framework (See section 2.1), and I decided to ignore in this thesis a large part of "non-market external" drivers except for their green pressures and all "individual" drivers shown in their framework. Then, I simplified the greenwashing drivers of the framework into **(D) the demand side** (consumers and investors), **(S) the supply side** (companies, investors, government, beneficiaries), and **(R) the regulation side** (regulators, activists, NGOs, media, and non-beneficiary stakeholders). Let us elaborate these three categories of drivers (or actors) of urban greenwashing:

(D) The demand side of urban greenwashing framework:

As Delmas and Burbano state, pressures to be green and demands on green products from the demand side are playing a critical role in forming green marketing (including greenwashing) strategy of the supply side. In our urban greenwashing framework, the demand side consists of consumers who want to buy a real estate property for actual living or for a speculative purpose; and investors who invest in real estate developer(s) probably as a stockholder. Note that I would like to distinguish such stockholders from investors who *directly* invest in a particular urban project who are thus one of the direct beneficiaries of that project. I assume that those who directly invest in the urban project will act more like real estate developers

together with other beneficiaries that form a supply nexus. Let us elaborate the characteristics of consumers in our urban greenwashing framework.

Newly developed (private) properties are expensive. Take residential properties as an example, prices of some Iskandar Malaysia residential properties are approximately *three times* higher than the median property price of the city region (we shall come back to this statistics in the "Empirical Analyses" section). Such expensive prices of new properties are not surprising if we think about current upward trends of *overall* property price level particularly within the emerging regions, for example, in 2014, prices gained in real terms in China by 13%, the Philippines by 13%, and Malaysia by 5% (Scatigna, Szemeret, and Tsatsaronis 2014:70-71).

Taking such expensive prices into account, it is reasonable to assume that average consumers of capitalist urban projects are highly likely rich people who have a sufficient amount of saving, earn a relatively higher salary, and are (socio-financially) trustful enough to get a housing loan. Admittedly, within such a consumer group, there must be those who are completely not interested in eco-climatic issues. Nevertheless, it is no doubt that the number of green-conscious consumers in the real estate markets also has been increasing alongside with raising eco-climatic concerns.

These green (rich) consumers in the real estate markets can have several reasons why they tend to be attracted by green urban properties. For some, it is simply because they are really worried about eco-climatic conditions of the globe, and thus only green properties are an ethically and/or morally justifiable option for them. For some, it is more like conspicuous consumption in Veblen's sense[25] in order to show their financial affordability to buy relatively expensive green properties (c.f., Griskevicius, Tybur, and Van den Bergh 2010).

[25] Thorstein Veblen wrote, in his *The Theory of the Leisure Class* (1899), that "[t]he basis on which good repute in any highly organized industrial community ultimately rests is pecuniary strength; and the means of showing pecuniary strength, and so of gaining or retaining a good name, are leisure and a conspicuous consumption of goods" (1899/2007:59).

For some, it is because they would like to be socially differentiated from others by showing their 'cultured' and 'sophisticated' tastes in (or a style of consumption of) the place to live[26] (also c.f., Griskevicius, Tybur, and Van den Bergh 2010). For some, it is simply because they would like to live or work in a tranquil and green residential or office environment. It must note here that these reasons that form green demands can easily be reversed to pressures against or disinclination for non-green urban projects.

(R) The regulation side of urban greenwashing framework:

In our model, 'pressures from regulation side' mainly mean pressures t*o be green* rather than pressures to stop greenwashing. As I have discussed, large-scale green-field urban projects likely entail a massive conversion of non-urban lands (e.g., vegetation, farmlands, and croplands) into new urban built-ups. Such a large-scale conversion of lands tends to be subjected to national/international environmental regulations and to monitoring and/or pressures by environmental activists, NGOs, environmental oriented politicians, and media (non stakeholders but yet conscious about eco-climatic issues).

In addition, such a large-scale land conversion highly likely negatively affects socio-economically poor and weak neighbors in and around the construction site through displacements, environmental degradation, and the "improvements" of socio-economic conditions of the neighborhood (similar to gentrification). There is also a possibility that farmers and fishermen will be indirectly affected by the environmental damages caused by the construction. In tandem with environmental-conscious non-stakeholders, these non-beneficiaries but yet stakeholders of an urban project will push the supply side

[26] Related to this, Baudrillard writes about inconspicuous consumption that "is no longer displayed in ostentation (Veblen's 'conspicuous consumption'), but in discretion, sobriety and self-effacement. These latter merely represent a further degree of luxury, an added element of ostentation which goes over into its opposite and, hence, *a more subtle difference*. Differentiation may then take the form of the rejection of objects, the rejection of 'consumption', and yet this still remains the very ultimate in consumption (Baudrillard 1970/1998:90)." Baudrillard's inconspicuous consumption can be interpreted today as: to less consume of goods with a 'cultured' and 'sophisticated' manner.

(especially the real estate developers) to improve or even stop the project.

(S) The supply side of urban greenwashing framework:

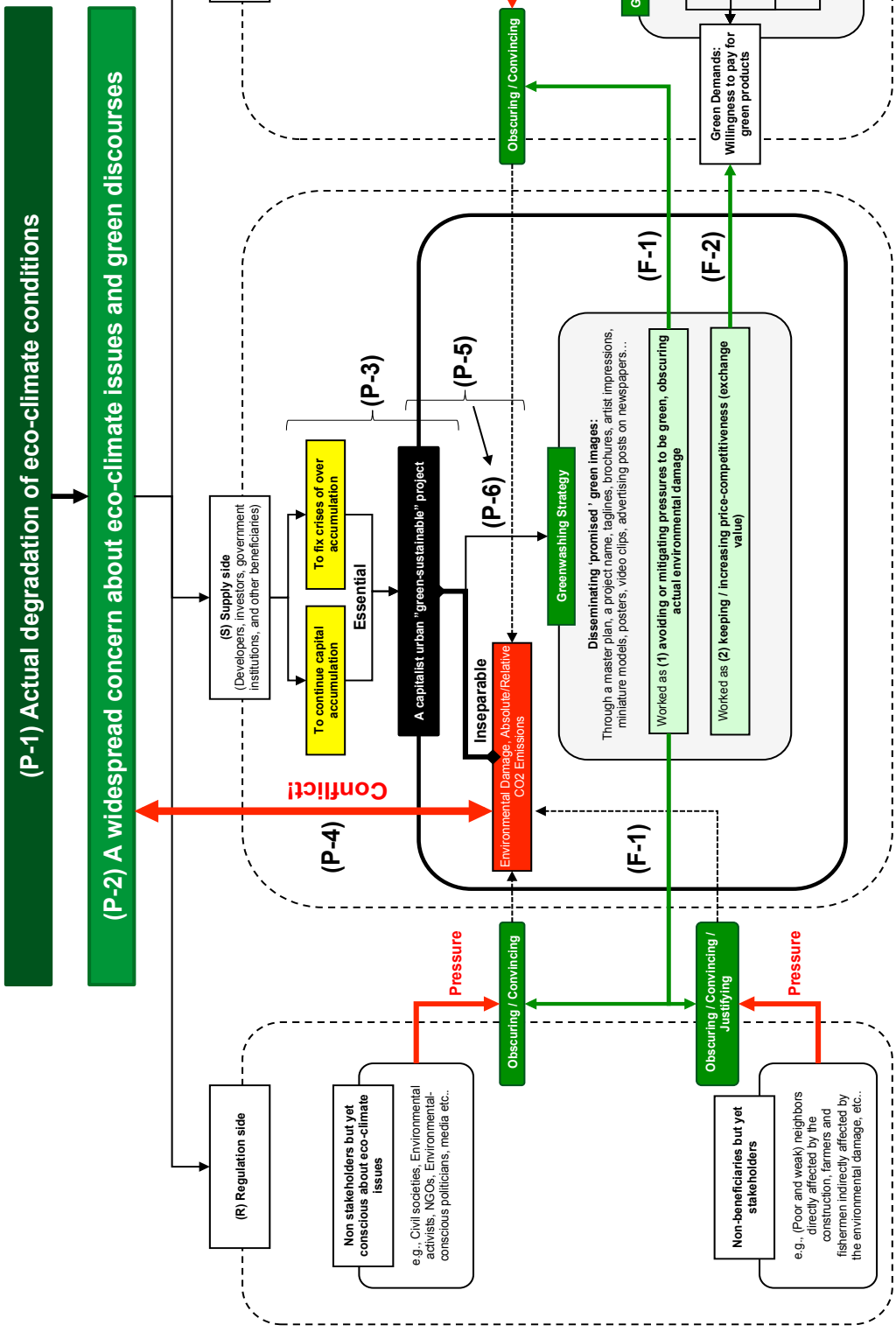
As it was shown, the demand side generates both green demands (or willingness to pay for sustainable properties) and green pressures against or disinclination for non-green properties. The regulation side forms green pressures against green-field capitalist urban projects *per se* because of eco-climatic impacts associated with the projects. Under such a situation, the supply side, which is a nexus between real estate developers, direct investors, government institutions, and other beneficiaries, confronts two challenges: **(1) how to manage green pressures** both from the demand and regulation sides; and **(2) how to keep or increase** the market competitiveness, and thus, exchange values, of its projects by reaping green demands from the demand side. However, as the premise 6 states, it is a tall task for capitalist urban projects to achieve true sustainable conditions including the minimization of vegetation loss prior to actual land procurement. An effective way for the supply side to cope with the two challenges above while making no (or less) efforts to be sustainable is to employ urban greenwashing strategy.

Urban greenwashing works, similar to greenwashing of consumer goods, at the levels of marketing and advertisement. By disseminating 'promised' green images through several marketing tools such as a master plan, a project name, taglines, brochures, artist impressions, miniature models, posters, video clips, advertising posts on newspapers etc., the supply side can, intentionally or unintentionally, generate untrue (or overestimated) green impressions on, namely *greenwash*, capitalist green-field projects (production of urban space). Such urban greenwashing works so that it will respond to the two challenges stated above: **(Function-1)** to manage green pressures both from the demand and regulation sides by obscuring environmental damages caused by an urban project, convincing the regulation side, and

justifying the project; and **(Function-2)** to keep or increase the market competitiveness, and thus, exchange values, of the project by reaching at green demands through ‘promised’ green images disseminated by several marketing tools.

Figure 4 below shows a framework of urban greenwashing developed by integrating all theoretical discussions so far. It shows a model mechanism of why a capitalist green-field urban project needs to be greenwashed and how urban greenwashing strategy possibly works for avoiding green pressures as well as for keeping or increasing the exchange value of the project.

Our theoretical discussions in order to develop a possible framework of urban greenwashing are about to arrive at their goal. I would like to finish this section by briefly discussing two possible relationships suggested by the two functionalities of urban greenwashing I have just attained. These two relationships shall be a ‘bridge’ between the theoretical considerations and the empirical analyses in the next chapter.



[Fig 4] Framework of urban greenwashing
Note: It explains why capitalist urban projects need to be greenwashed and how urban greenwashing strategy possibly works for avoiding pressures to be green as well as for keeping or increasing market competitiveness (=exchange value) of the project. All components of the figure have been specifically explained in the discussions so far. The figure was made by the author (2015).

3.2. Relation 1: Environmental destruction and promised greenness?

The first relation suggested by **(Function-1)**, *namely urban greenwashing for avoiding or mitigating green pressures on a capitalist urban project*, is that the degree of environmental destruction caused by an urban project and the degree of 'promised' greenness of the project. We can assume that the more serious the environmental destruction (e.g., the larger the extent of vegetation destruction) occurs due to the construction of a project, the stronger green pressures both from the regulation and demand sides on (and the less attractiveness of) the project become. The supply side must cope with such green pressures (and less attractiveness) by making more efforts to convey green images of the project. Such increasing 'green' efforts can be detected as an increasing degree of 'promised' greenness of the project within various marketing tools. Thus, it can be theoretically predicted that, if we can properly operationalize (i) the degree of environmental destruction and (ii) the degree of promised greenness of a green-field urban project, we can expect to observe a *positive* relation between these two variables, namely (i) and (ii). In accordance with the definition of greenwashing in this thesis, urban projects showing higher degrees both of (i) the environmental destruction and (ii) the promised greenness shall be determined as a perfect example of urban greenwashing.

3.3. Relation 2: Price level and promised greenness?

The second relation suggested by **(Function-2)**, *namely urban greenwashing for keeping or increasing the market competitiveness, and thus, exchange value, of a capitalist urban project*, is that the price level of an urban project and the degree of 'promised' greenness of the project. We can assume that the more the supply side makes efforts to convey green images of a project, and thus the more green images of the project successfully reached at the demand side (green-conscious rich consumers), the higher the price level of the project remains or becomes relative to other rival projects because of successfully reaping green demands. Thus, it can be theoretically predicted that, if we can properly operationalize (ii) the degree of promised greenness and (iii) the price level of an green-field urban project, we may observe a *positive*

relation between these two variables, namely (ii) and (iii).

By empirically analyzing these two relations predicted by our framework of urban greenwashing, namely (i)-(ii) and (ii)-(iii), it can be not only empirically detected (a,g,0: greenwashing) projects, but also revealed that urban greenwashing strategy is used by capitalists for fighting against competitors and for achieving further capital accumulation.

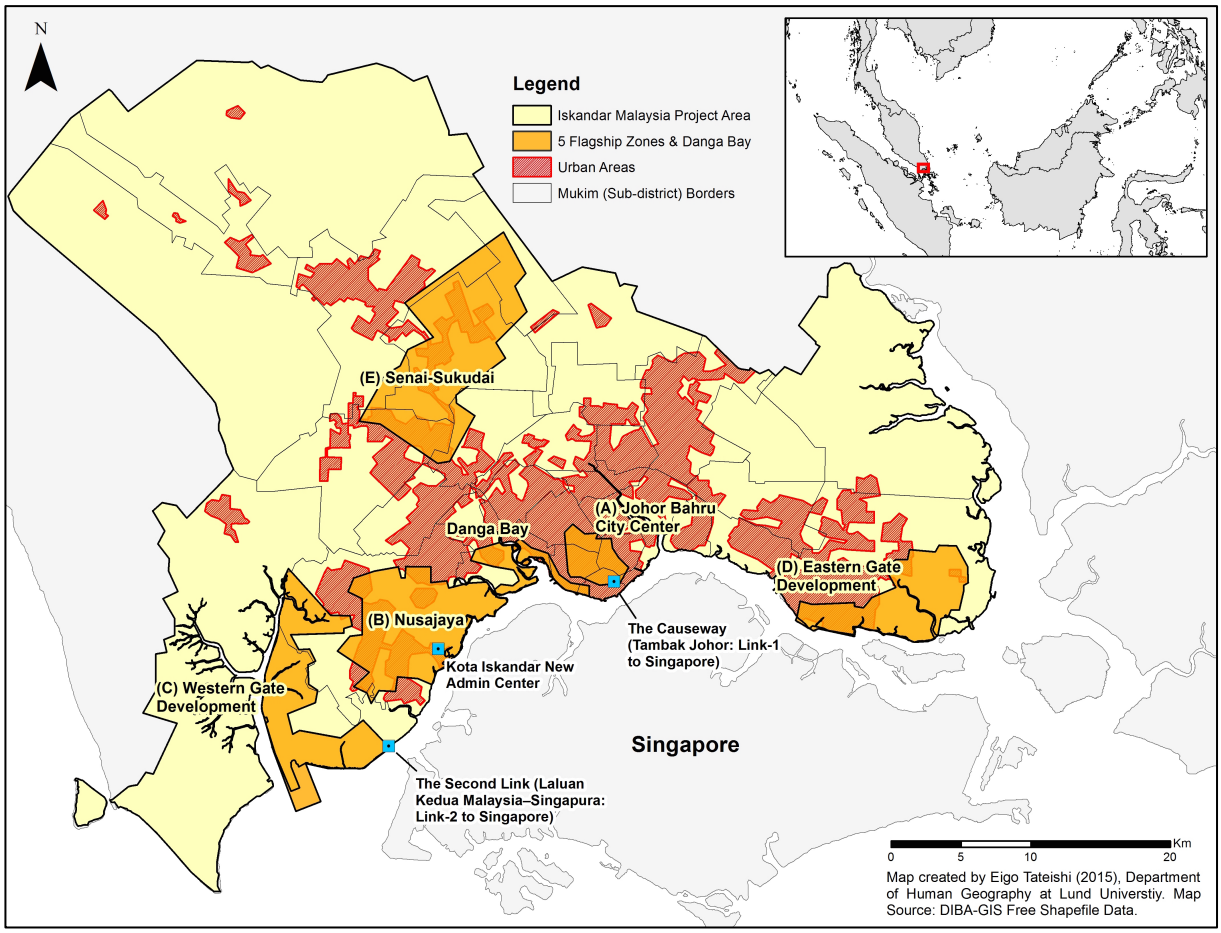
Part. II: Empirical Analyses

4. Methodology

4.1. Overview of the study area: Iskandar Malaysia

In 2006, the government of Malaysia inaugurated the Iskandar Malaysia Project (hereafter called **Iskandar**), which is a government-led massive urban development mainly in Johor Bahru district situated in the southern tip of the Malay Peninsula (see Figure 5). Iskandar aims at, by 2025, doubling its population, doubling GDP per capita, and generating five times larger GDP compared to the year 2005 (Iskandar Malaysia Comprehensive Development Plan[27] 2006). These ambitious goals have attracted a huge volume of investments from all over the world, especially from Singapore that is located just next to J.B. (IRDA 2011; JETRO 2014) (See Figure 6 and Table 3). Iskandar is a complex mixture of Malaysian elites' motivation to attain further economic growth through urban projects and global (especially Singaporean) capital's motivation to sustain its capital accumulation (Rizzo and Glasson 2011; 2012; Rizzo and Khan 2013).

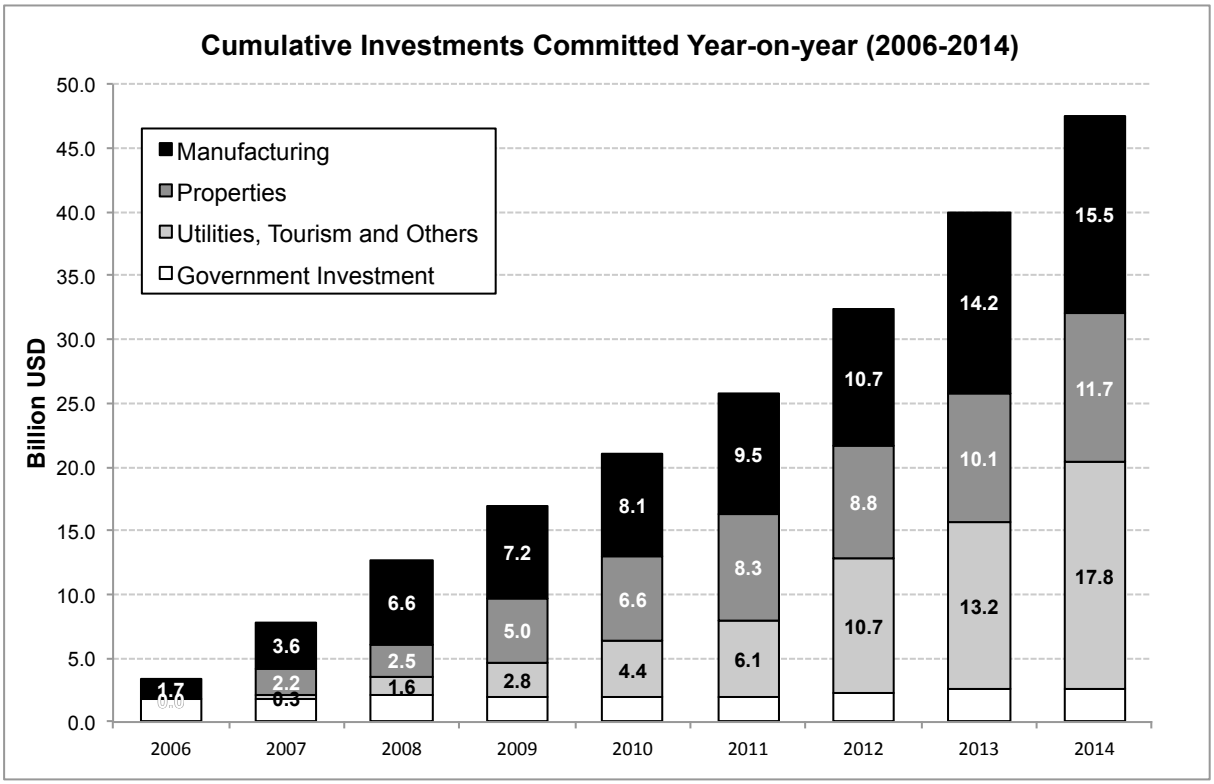
[27] Hereafter called as **Iskandar CDP**.



[Fig 5] Reference map of Iskandar Malaysia

Note: This map is created by synthesizing several information: geographical shapes of urban area are made by the author from a satellite image provided by Esri (2015); Mukim (Sub-district borders) are made by the author based upon the GIS information on WEB GIS Wilayah Iskandar[28]; locations of Iskandar Malaysia development area and five flagships + Danga bay are made by the author based on Iskandar CDP (2006).

[28] http://geoportal.johor.gov.my/mapserver2012/geojohor/wilayah/index.html



[Fig 6] Cumulative investments (commitment basis) to Iskandar Malaysia project during 2006 to 2014

Note: Graphed by the author based on the source: Japan External Trade Organization, Singapore Branch (2014). Approximately 35 % of the total investments came from overseas.

[Table 3] Top five countries contributing to foreign investments to Iskandar Malaysia project

Note: As this table clearly shows, Singapore is the largest investors to the project. Tabled by the author based on the source: Japan External Trade Organization, Singapore Branch (2014).

	2012	2013	2014
1. Singapore	**2**	**3.4**	**3.62**
2. USA	0.2	1.2	2
2. Spain	1.3	1.3	1.3
4. Japan	1.1	1.2	1.2
5. Nederland	0.8	0.8	0.8

Billion US$ (Cumulative Commitment-basis)

It can be observed that emerging dominance of exchange value over use value, namely commodification of urban space, within the Iskandar region. Correspondingly, many news

articles issued within the region have been warning a potential property bubble within the Iskandar region (e.g., Wei-Shen and Musa 2014; Yahya 2014; Lee 2014; Rakwan 2014; Siew-Ying 2014; Tan 2014). In addition, Iskandar can be seen as a typical example of spatio-temporal fixes in order to avoid the crisis of regional-level over accumulation of the Singaporean economy. The global capital that is constantly flowing into Singapore, a world-leading capital entrepôt, is now overflowing beyond Singapore's quite limited territory to neighboring areas such as the Riau islands and Iskandar through capitalist production and re-production of urban space (Bunnell, Nuzaini and Sidaway 2006: Rizzo and Glasson 2011; 2012).

An important aspect of Iskandar from the perspective of this thesis is that the project emphasizes its aspiration to be "eco-friendly," "sustainable," and "low-carbon" (Iskandar CDP 2006; The Guardian by F. Harvey 2012; Joeman at IRDA 2012; Hussein at IRDA 2014; Iskandar Malaysia Official Website 2014). It is observable that these aspirations to be "sustainable" are not only flowered in both public and private documentations related to the project but also materialized even in miniature models and artist impressions of Iskandar residential and office projects (e.g., Figure 7 and 8 below).

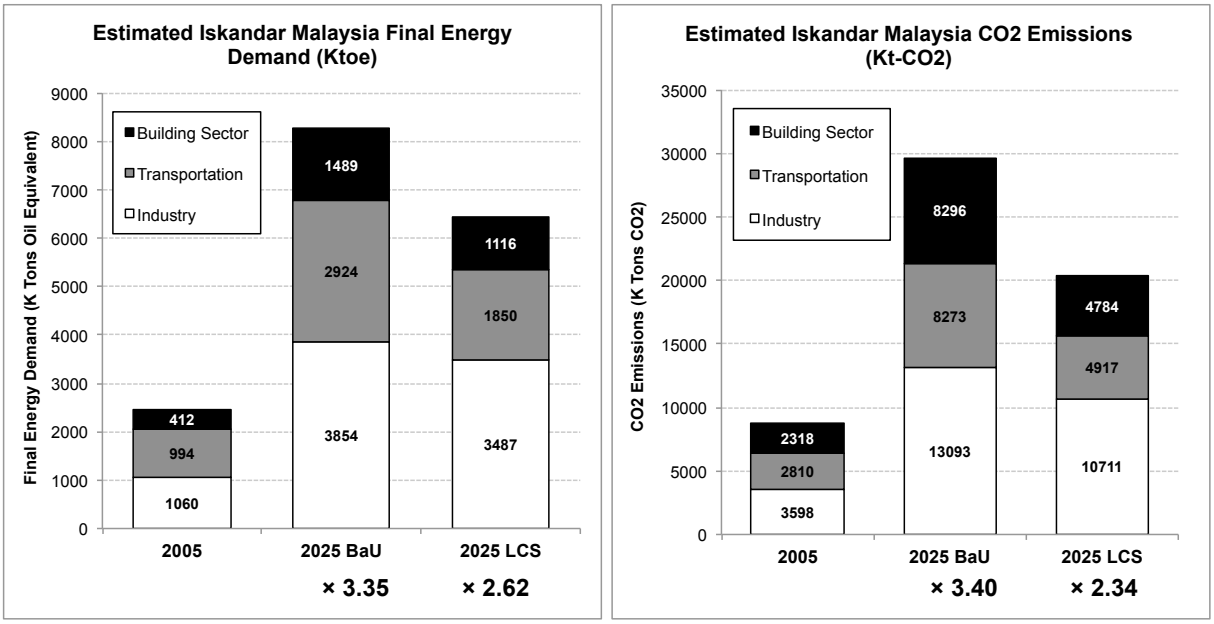
[Fig 7] Miniature model of Kota Iskandar zone, a new central administrative district
Note: The picture taken by the author in 2014. This model displays a metropolis with many forest reserves.

[Fig 8] Miniature model of Country Garden condominiums, an intensive and massive development ongoing in Danga bay
Note: The picture taken by the author in 2014. According to this model, exclusive gardens will be created on the rooftop of the condominiums.

Despite its aspirations to be sustainable, there is evidence that Iskandar has impacted on the environments and ecosystems within the region. For instances, Nasongkhla and Sintusingha (2013) report that the local people have been witnessing the decrease of mangroves and other vegetation, the decrease of water quality, and the loss of biodiversity. Another study revealed that around 25 % of the citizens in Johor Bahru worry about negative environmental and ecological impacts caused by Iskandar (Rabe, Osman, Bachok 2014). As for CO^2 emissions, it is estimated that, in 2025, Iskandar (when it will be fully developed) even in a Low Carbon Society (LCS) scenario (means that all possible socio-technological measures to reduce CO^2 emissions have been taken) will consume 2.6 times larger amount of energy, and will emit 2.3 times larger volume of CO^2 compared to the levels of 2005 (Natsuoka, Simson, and Gomi 2013). These values will be, in a Business as Usual (BaU) scenario, 3.3 times and 3.4 times larger respectively (See Figure 9.1 and 9.2). In reality, it is suspected that even the LCS scenario is hard to be attained. One clear fact supporting this suspicion is that Iskandar has 4.7 billion Malaysian Ringgit (RM) budget for highway construction while it allocated *only* (compared to the budget for car-promotion) 3.0 billion RM has Light Rail Transit (LRT) and Mass and Rapid Transit (MRT) projects (IRDA 2008). Dispersed mega-gated residential projects of Iskandar and "proposed urban highways are more likely to encourage rather than discourage the use of private vehicles" (Rizzo and Khan 2013).

As another problem of the project, it is reported that there are many socio-cultural impacts associated with Iskandar developments. For example, several *Kampongs* (traditional-local communities, in Malay language, whose residents tend to be socially weak and poor) and squatter settlements within the Iskandar region are now in danger of both direct and indirect displacement without sufficient compensations and considerations (Rizzo and Glasson 2012:424; The Star Online by Z. Musa 2012, Nasongkhla and Sintusingha 2013). It can be observed that *Singaporeanization* and *Bumiputralization* are ongoing (Nasongkhla and

Sintusingha 2013) in the cityscapes of Johor Bahru, which means that homogenization of the urban landscapes and urban lifestyle based exclusively upon Singapore and/or Bumiputra (dominant Malay ethnicity) rationalities and preferences.



[Fig 9.1: Left panel] Estimated energy consumption in two different scenarios: Business as Usual (BaU) and Low Carbon Society (LCS)
[Fig 9.2: Right panel] Estimated CO^2 emissions in the case BaU and LCS
Note: As the graphs clearly show, Iskandar project will consume and emit more amounts of energy and CO^2 even in the LCS scenario. These graphs adapted (and modified by the author) from Natsuoka, Simson, and Gomi (2013).

4.2. An empirical method to confirm two relations predicted by the framework

In the chapter 3, I theorized that by urban greenwashing, an urban project will avoid or mitigate increasing green pressures while keeping or increasing its exchange values by reaching at lucrative green demands. In our framework urban greenwashing, thus, comprises two major functionalities: (1) obscuring environmental damages caused by a project; (2) keeping or increasing market competitiveness (exchange value) of the project.

I have already discussed, in the end of the chapter 3, that the two empirically testable relationships suggested by our urban greenwashing framework, namely (1) relationship

between (i) environmental destruction level and (ii) promised greenness level of an urban project; and (2) relationship between (ii) promised greenness level and (iii) price level of the project. By operationalizing and empirically analyzing these variables and relationships, we can confirm two functions actually work under the urban greenwashing framework. Let us, then, elaborate these two relationships.

For ease of operationalization process, let us write (i) as **[EnvD]**, (ii) as **[Grn]**, and (iii) as **[Prc]**. If we can detect a **positive** relation between [Grn] and [EnvD], namely [Grn]↑∧ [EnvD]↑, we can conclude within our framework that the promised greenness of the projects that show a combination between high [EnvD] and [Grn] is used, as a greenwashing function, for (1) obscuring its environmental damage. An important note here is that even though I implicitly assume a causal relation [EnvD]↑→[Grn]↑, this causal relation cannot be reliably proved only by the analyses of this thesis. [Grn]↑→[EnvD]↑ or a dialectical causal relation between two variables could also be a plausible possibility. Similarly, if we can observe a **positive** relation between [Grn] and [Prc], namely [Grn]↑∧ [Prc]↑, we can conclude within our framework that the promised greenness of the projects that show a combination between high [Grn] and [Prc] is used, as a greenwashing function, for (2) increasing its price level (Again, our implicit assumption [Grn]↑→[Prc]↑ cannot be convincingly proved by our analyses. [Prc]↑→[Grn]↑ or a dialectical causal relation could be a plausible possibility).

It is important to note here that there are other possibilities of [Grn]-[EnvD] and [Grn]-[Prc] relations as shown in Table 4.1 and 4.2 below.

[Table 4.1] All possibilities of [Grn]-[EnvD] relation

	Environmental Destruction Level **[EnvD]**		
Promised Greenness **[Grn]**	Random Distribution **(NO Relation)**	↑ **Increase**	↓ **Decrease**
	↑ **Increase**	**(II)** [Grn]↑∧[EnvD]↑ **(Greenwhashing for obscuring?)**	**(I)** [Grn]↑∧[EnvD]↓ **(Greening as Promised)**

		Environmental Destruction Level **[EnvD]**	
		Close to the origin 0	**Far from the origin 0**
Promised Greenness **[Grn]**	**No Greenness (=0) / Greenness as a common strategy for all observed projects (=Constant)**	**(III)** [Grn]*∧[EnvD----] **(Unassuming Greening)**	**(IV)** [Grn]*∧[----EnvD] **(Crude Destruction)**

NOTE: [Grn] >= 0, [Prc] >= 0, *= 0 / Constant

First, let us study each possibility of [Grn]-[EnvD] relation on Table 4.1:

(Quadrant I) [Grn]↑∧ [EnvD]↓, or **Greening as Promised possibility**, is that when promised greenness becomes higher, environmental destruction level becomes lower. This can be interpreted that, real estate developers actually tried to reduce eco-climatic impacts in accordance with the promised greenness and green efforts. This possibility corresponds to (a,g,+) on Table 2.

(Quadrant II) [Grn]↑∧ [EnvD]↑ shows a possibility of **urban greenwashing function (1)**, and thus a pure example of **urban greenwashing.** Disseminated 'promised' greenness is highly likely working for avoiding or mitigating green pressures. This possibility corresponds to (a,g,0) on Table 2.

(Quadrant III) If [Grn] is 0 (no promised greenness was observed amongst all target urban projects) or *almost constant* (to disseminate promised greenness, or green marketing, is just a

common strategy for all target urban projects, and thus it has no differentiation effect from the marketing point of view) and a majority of target projects shows low environmental destruction level [EnvD----], this relation implies that these projects have not damaged the surrounding environments while their developers are not actively marketing such fact, namely **Unassuming Greening possibility.**

(Quadrant IV) On the other hand, if [Grn] is 0 or almost constant and a majority of target projects shows high environmental destruction level, this relation implies that many projects destruct environments without any hesitation and even without any effort to obscure or justify such destruction, namely **Crude Destruction possibility**.

In addition to these four possibilities, there is a possibility of observing a **random distribution** of [Grn] and [EnvD].

[Table 4.2] All possibilities of [Grn]-[Prc] relation

	Price Level **[Prc]**		
Promised Greenness **[Grn]**	Random Distribution **(NO Relation)**	**↑ Increase**	**↓ Decrease**
	↑ Increase	**(II)** [Grn]↑∧[Prc]↑ **(Greenwhashing for increasing exchange values?)**	**(I)** [Grn]↑∧[Prc]↓ **(Greening for Poor)**

		Price Level **[Prc]**	
		Close to the origin 0	**Far from the origin 0**
Promised Greenness **[Grn]**	**No Greenness (=0) / Greenness as a common strategy for all observed projects (=Constant)**	**(III)** [Grn]*∧[Prc----] **(Cheap Development)**	**(IV)** [Grn]*∧[----Prc] **(Luxury Development)**

NOTE: [Grn] >= 0, [Prc] >= 0, *= 0 / Constant

Then, let us study each possibility of [Grn]-[Prc] relation on Table 4.2:

(Quadrant I) [Grn]↑∧ [Prc]↓, or **Greening for Poor possibility**, is that when promised greenness becomes higher, price level becomes lower. This is theoretically possible, but practically least likely. A possible situation can be that a 'pro-poor' government develops many sustainable 'public' projects while the rich is not attracted (or not allowed to buy) such green properties (note that these projects are not necessarily 'truly sustainable' because we just analyze the [Grn]-[Prc] relationship. In order to confirm this point, we should also refer to the [Grn]-[EnvD] relationship of each project at the same time. See the section 5.5).

(Quadrant II) [Grn]↑∧ [Prc]↑ shows a possibility of **urban greenwashing function (2).** Disseminated 'promised' greenness is highly likely working for keeping or increasing market competitiveness of each target projects by reaching at green demands. A project located on the quadrant II corresponds to (a,g,0) on Table 2 *if that project also shows* [Grn]↑∧ [EnvD]↑ (See the section 5.5).

(Quadrant III) If [Grn] is 0 or almost constant and a majority of target projects shows low price level [Prc----], this relation implies that these projects are merely a group of cheap property developments (**Cheap Developments).**

(Quadrant IV) On the other hand, if [Grn] is 0 or almost constant and a majority of target projects shows high price level [----Prc], this relation implies that these projects are a group of **luxury developments** that are not relaying on green marketing but on other marketing strength.

In addition to these four possibilities, there is a possibility of observing a **random distribution** of [Grn] and [Prc].

An important empirical weak point of this methodology is to reduce urban greenwashing, as a complex socio-politico-economic phenomenon, into mere spatial-numerical relationships (I would like to call this as spatial-numerical reductionism). In reality, urban greenwashing is developed and implemented by a supply nexus, which comprises a number of individuals, within a web of complex social interactions both with the demand and regulation sides. In this sense, this methodology cannot perfectly reveal **what people in a supply nexus, particularly in real estate developers, are thinking**, that is one of the key information to understand the causality of [Grn]-[EnvD] and [Grn]-[Prc] positive/negative relations (even including a slight possibility that these relations are just a coincidence). In order to improve this empirical weak point, I initially planned to conduct interviews with people in real estate developers engaging in Iskandar project. However, due to time and budgetary constraints, such interviews could not be done. Nevertheless, I believe that, as a step for more valid and reliable empirical studies, to observe any positive or negative relations between target variables is academically significant in order to understand and built the empirical foundation of urban greenwashing research.

The following section shall specify target urban projects, operationalize required variables, and explain data collection method for this methodology within the context of Iskandar.

4.3. Targets, variables, collection methods, notes, and limitations

Target Projects:

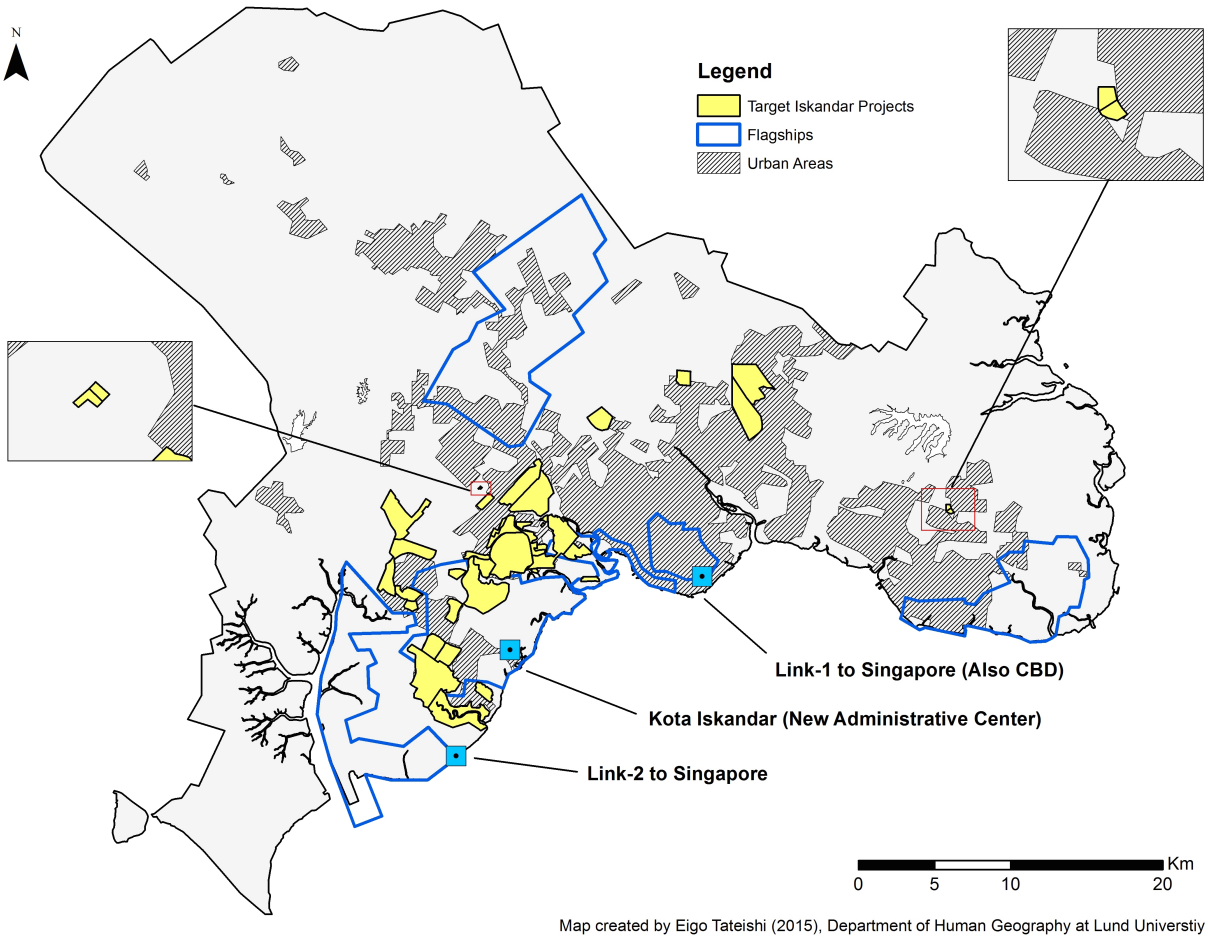
38 bungalow and terrace-house residential projects (some of them are mixed-use) related to Iskandar were chosen (see Fig 10) for our empirical analyses from a real estate website

Iskandar 360° @ Property.CC[29]. Although a majority of target projects are located within/around Nusajaya zone (refer to Fig 5) where a number of intensive green-field urban projects is ongoing, few projects are situated in the areas far from Nusajaya. Even though these projects are different in size, location, concept, and project term, they are common in project type (bungalow and/or terrace house), being Iskandar-related, being relatively new (or still under-construction).

There are two reasons why condominium and apartment projects were excluded from this study: (1) project site size of such projects tends to be smaller than that of bungalow and terrace house projects (this is not preferable from the methodological point of view since NASA satellite images used to estimate vegetation loss provide only 250-m^2 spatial resolution. See the next section); (2) it is hard to estimate, within a limited period of time, to what extent collective facilities (e.g., a sky bar lounge, a sky common space, or a yacht harbor[30]) and high-rise architectures itself are reflected in a price of each compartment.

One important note here is that, as mentioned previously, many of projects undergoing in and around Nusajaya are green-field, and a larger part of Nusajaya is covered by vegetation. Thus, project sites most likely were (or are being) procured by eliminating such vegetation. This means that, at the moment of selecting target projects, there is already a latent bias to higher vegetation loss (higher environmental destruction). Nevertheless, as we shall see later on, the extent of vegetation loss of each target project largely differs from project to project (see Figure 16), so this bias can be considered as a minor issue.

[29] http://www.property.cc/iskandar-360
[30] Not few number of Iskandar condominium projects are situated in bay areas (e.g., Danga bay and Kota Iskandar bay area), and have a yacht harbor for their owners.



[Fig 10] Locations of 38 bungalow and terrace-house (some of them are mixed-use) projects
Note: A majority of target projects are situated in and around Nusajaya zone where the most intensive developments are ongoing. The shape of each target project was made by the author based on the official master plan of each project and Google Map.

Promised Greenness Score [Grn]:

A promised greenness (proposed and advertised in a master plan, brochures, documents, websites, and other marketing tools) score of each target project shall be evaluated based upon three criteria below, and it has a range between 0 to 3 points.

(1) Green Project Name (0.0 ~ 0.5 ~ 1.0 Point):

A project name can be seen as an important element of marketing and adverting strategy for the project. To use green words, such as green, eco, and sustainable in the project name shows a clear commitment of the developers to green marketing. If a project name has a *direct* green

word like **green**, **eco**, **environmental, eco-friendly, environmental-friendly, sustainable, low-carbon, nature, natural, low-carbon,** the project will get **1 point** for this criterion. If a project name has an *indirect* green word like **garden, park, countryside,** the project will get **0.5 point** for this criterion.

(2) Green Planning and Concepts (0 ~ 1 Point):

Separated from a project name, if a project uses green words and/or concepts such as **green**, **eco**, **environmental, eco-friendly, environmental-friendly, sustainable, low-carbon, nature, natural, low-carbon, greenery, gardens, forests, park, ecology, sanctuary, botanical, grass,** this project will acquire **1 point** for this criterion. In this evaluation, there is no scoring weight based upon the number of green words and/or the importance of each green word in order to avoid an arbitrary manipulation of the outcome.

(3) Other Green-features (0 ~ 1 Point):

This criterion counts other outstanding green features of each target project. If a project has **an environmental certificate or award, an actual plan in its master plan to have huge gardens or forest reserves, an actual plan to install "environmental," "energy-efficient," and/or "low-carbon" technologies,** the project will acquire **1 point** for this criterion. In this evaluation, there is no scoring weight based upon the number of green features and/or the importance of each feature in order to avoid an arbitrary manipulation of the outcome.

Required information to conduct these evaluations was attained by studying various official marketing tools such as a master plan, websites, brochures and documents, press releases, and video clips of each project. Information and ads on unofficial websites were also utilized for a complementary purpose. I fully agree with an opinion that these scores are rough and over-simplified, and may have a problem in its reliability and validity. Nevertheless, taking

into consideration limited time and resources for this thesis project, these scores will perform sufficiently for our analytical purpose as the first step on the further researches.

Vegetation Loss (representing Environmental Destruction) [EnvD]:

The loss of vegetation such as grasslands, forests, mangroves, and croplands can be a reliable representative indicator of environmental destruction. Vegetation, especially tropical rain forests and mangroves observed in the Iskandar region, contains complex ecosystems that consist of many life forms (Begon, Townsend, and Happer 2006:24; Aluri 2013). In addition, the loss of waterfront vegetation, especially mangroves, will also impact the quality of aquatic ecosystems (Aluri 2013). Thus, the destruction of vegetation directly and indirectly impacts on regional ecosystems. Besides, the loss of vegetation can be an indirect indicator for evaluating CO^2 emissions. This is because, as previously mentioned in the section 1.3, the loss of vegetation directly decreases the total capacity of CO^2 absorption of the globe.

As such, our empirical method employs the level of vegetation loss as a representative indicator of overall environmental destruction caused by each target project. For this purpose, I attained Moderate Resolution Imaging Spectroradiometer (MODIS) satellite images Product Code: MOD13Q (Enhanced Vegetation Index (EVI))[31and32] provided by the United State National Aeronautics and Space Administration (NASA). EVI works based on a scientific fact that the reflection rate of near infrared light (NIR) and visible light (VIS) differ between dense and healthy leaves and parse and unhealthy leaves. For instance, according to Weier and Herring (2000), dense and healthy leaves reflect 50 % of NIR and 8 % of VIS whereas sparse and unhealthy leaves reflect 40 % of NIR and 30 % of VIS. EVI can indicate a density

[31] https://lpdaac.usgs.gov/products/modis_products_table/mod13q1

[32] To be accurate, MOD13Q data set contains two different indices: Normalized Difference Vegetation Index (NDVI) and Enhanced Vegetation Index (EVI). Even though these two indices are complement each other (Vegetation Index and Phenology Lab n.d), EVI has some advantages over NDVI, for example, reduction of atmospheric distortion and sensitivity for slight vegetation change (Solano et al 2010).

of vegetation by detecting and calculating these slight differences of NIR and VIS values[33]. These EVI satellite images have 250-m^2 spatial resolution and 64-day[34] temporal resolution during 2000 - 2013. For an ease of data processing, EVI values were reclassified into 12 classes, and analyzed both at a regional level and at an each target project level.

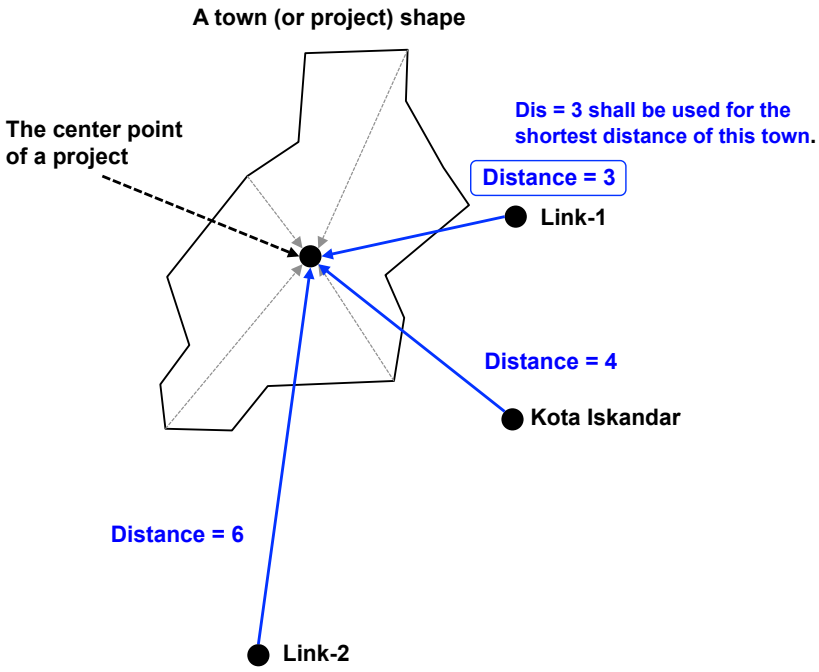
Property Price [Prc]:

Because Iskandar Regional Development Authority (IRDA), the head management office of Iskandar project, does not publicly provide reliable and comprehensive socio-cultural and property data within the Iskandar region[35], it is very hard to gather a set of accurate price level data of properties within the region. Thus, I collected price data (as of 2015 March) of more than 8,500 property advertisements posted on four Malaysian property websites: Propwall.my, iProperty.com, PropertyGuru Malaysia, and Property.CC. The set of price data collected was categorized into 131 different town levels. The data includes prices of all types of properties, namely, empty land, residential, commercial, and industrial properties. By analyzing the data, a median square feet price (RM[36]/sf) of all types of properties by each town level was calculated. In addition to this price data, a **middle** price (not median price) of each target project was calculated based on more accurate sources, namely official marketing tools (e.g., a website and a master plan), although the data from commercial websites were used for a complementary purpose. These middle prices of target projects were attained by summing up the minimum and maximum prices of a project and dividing this value by 2.

[33] As for more technical detail of EVI, refer to Solano et al 2010 pp.2-3.
[34] The maximum temporal resolution is 16 days. For an ease of data processing, 64-day resolution was selected instead.
[35] "What makes the situation difficult to read is the lack of transparency from the Iskandar Regional Development Authority (IRDA), who only releases quarterly figures on monetary investment but not job creation or population growth" (DrWealth 2014). My experience also shows that IRDA is not willing to provide information and data regarding Iskandar. I asked, by a letter with a study purpose, the authority to provide information and data via an appropriate connection (July 2014); however, I have not yet received any reply from the authority even as of May of 2015. A conversation with an urban researcher in Johor Bahru (intentionally covers his affiliation) reveals that IRDA is unwilling to help him by providing information that he requires.
[36] RM: Malaysian Ringgit

Distance [Dis]:

The shortest distance of each town or project from Link-1, Link-2, or Kota Iskandar (see Fig 5) was calculated by using ArcGIS software based on geographical coordinates of three important points and towns (or projects). A center point of each town (or project) shape was used for this calculation (see Figure 11 below).



[Fig 11] Calculation method of the shortest distance
Note: Center points were automatically calculated by ArcGIS software.

I would like to finish this section by summing up all unit, source, note, and limitation of data and variables used for this thesis (see Table 5).

[Table 5] Summary of unit, source, and limitation of data and variables

Category	Variable / Geographical Data	Abbreviation	Type	Unit	Collection Method / Source	Note / Limitation
Basic	Mukim Administrative Borders	-	Map Data	-	Mukim (Sub-district) boders were made by the author based on the GIS information on WEB GIS Wilayah Iskandar (http://geoportal.johor.gov.my/mapserver2012/geojohor/wilayah/index.html)	-
	Rough Urban Area	-	Map Data	-	Made based on "World Imagery" (Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community 2015)	-
	Five Flagships + Danga bay	-	Map Data	-	Made based on a map in the Iskandar CDP book.	-
Target	38 Projects within Iskandar	-	Target	**Project**	Iskandar 360° in Property.CC (http://www.property.cc/iskandar-360)	Collected relatively new (as of 2015 March) bungalow and terrace house projects related to Iskandar Malaysia project mainly within/around Nusajaya zone where intensive developments are onging. Few projects outside of Nusajaya were also included in order to be compared.
	Project Sites	-	Map Data	**Site**	Made based on Google Map and an official master plan etc of each project.	-
Promised Greenness	Promised Greenness Score	**[Grn]**	Variable	**Pts** (Points 0 - 3)	Required information to conduct these scoring was attained by studying an official master plan, a website, brochures and documents, and press releases of each project.	These scores are rough and over-simplified, and may have a problem in its reliability and validity.
Environmental Destruction	Enhanced Vegetation Index (EVI)	**[EnvD]**	Variable	**Class** (1 - 12)	NASA (National Aeronautics and Space Administration) MODIS (MODerate resolution Imaging Spectroradiometer) Product [MOD13Q] (https://lpdaac.usgs.gov/products/modis_products_table/mod13q1)	250-m^2 spatial resolution; 64 days temporal resolution during 2000 - 2013. EVI values were reclassified into 12 classes. There may be, in raw data, errors in values due to technical issues.
	Decrease of Vegetation (Absolute Loss of Vegetation) between 2000 - 2013	**[Ab-EnvD]**	Variable	**Km2** (Square Km)	Calculated based on EVI	There may be errors caused by the problem of raw date.
	Percentage of Vegetation Loss during 2000 - 2013 (% Decrease of Vegetation)	**[%-EnvD]**	Variable	**%** (Percent)	Calculated based on EVI	There may be errors caused by the problem of raw date.
Pricing	Town (Taman) Location	-	Map Data	-	Made based on Google Map.	-
	Median Square Feet (sf) Price of All Types of Properties by Town Level	-	Variable	**RM / sf** Malaysian Ringgit per Square Feet	Gathered from several property Website: Propwall.my (http://www.propwall.my/) iProperty.com (http://www.iproperty.com.my/) PropertyGuru Malaysia (http://www.propertyguru.com.my/) Property.CC (http://www.property.cc/)	The total number of collected samples is approximately 8,500 within 131 towns. The data is as of 2015 March. This data includes prices of all types of properties, namely, empty land, residential, commercial, and industrial properties.
	Shortest Distance from Link-1, Link-2, or Kota Iskandar	**[Dis]**	Variable	**Geographical Unit**	Calculated based on several geographical data by using ArcGIS software.	Link-1: **The Causeway (Tambak Johor)**, Link-2: **The Second Link (Laluan Kedua Malaysia-Singapura)**. See the Map.1. A center point of each town project shape was used for the calculation.
	Middle Price of the Target Projects	**[Prc]**	Variable	**RM/ / sf**	Mainly attained from an official master plan, a website, brochures, and advertisements of each project. Commercial websites were used as a complementary purpose: Propwall.my; iProperty.com; PropertyGuru Malaysia; and Property CC.	These middle prices were attained by summing up the minimum and maximum prices of a project and dividing this value by 2.

5. Outcomes and Discussions

5.1. Direction

An epistemologically reliable study must be based upon knowledge both of the whole and the parts of a subject to be studied. What appears as an observed phenomenon in a part as *local* can be a *general* trend of the whole, and vice verse. In order to avoid this sort of misinterpretation of observed phenomena, this chapter tries to discuss both the whole (the entire Iskandar Malaysia development area)[37] and the parts (the target projects) except for the coming "5.2. Promised greenness score" section. Due to severe time and resource limitations, it was impossible to quantify the promised greenness scores of all Iskandar and non-Iskandar projects. This implies that this thesis still holds an epistemological uncertainty about promised greenness score. An extreme example of such uncertainty is that a number of 'high' promised greenness projects, regardless of whether or not they are cheap and expensive; large and small; new and old, can be observed in the entire Iskandar region. If this occurred, the coming empirical discussions would be imposed to a serious adjustment, or even judged as invalid. Even though more than 8,500 observations of property ads in the entire Iskandar tells green marketing and advertising are not common, it is methodologically honest to note here that this thesis relies on an assumption that 'high' promised greenness scores amongst the population are associated with at least one socio-economic factor unique to each project, and thus expected to show an uneven or random spatial distribution.

[37] Admittedly, it is true that a larger analytical scale can be a more proper 'whole' of this study, for instances, the entire country of Malaysia, the entire region of Southeast Asia, or even the entire world. Especially, a discussion and observation in a world (global) scale is important to grasp a global dynamism of Capitalist production of urban space. It is; however, hard for this thesis to deal with such a scale of analysis due to time, resource, and even page limitations.

5.2. Promised greenness score

Results:

Table 6 shows the scoring outcome of the promised greenness score [Grn] of 38 target Iskandar projects. Amongst 38 targets, three urban projects got maximum score 3.0.

[Table 6] Outcome of scoring [Grn] of 38 target Iskandar residential projects

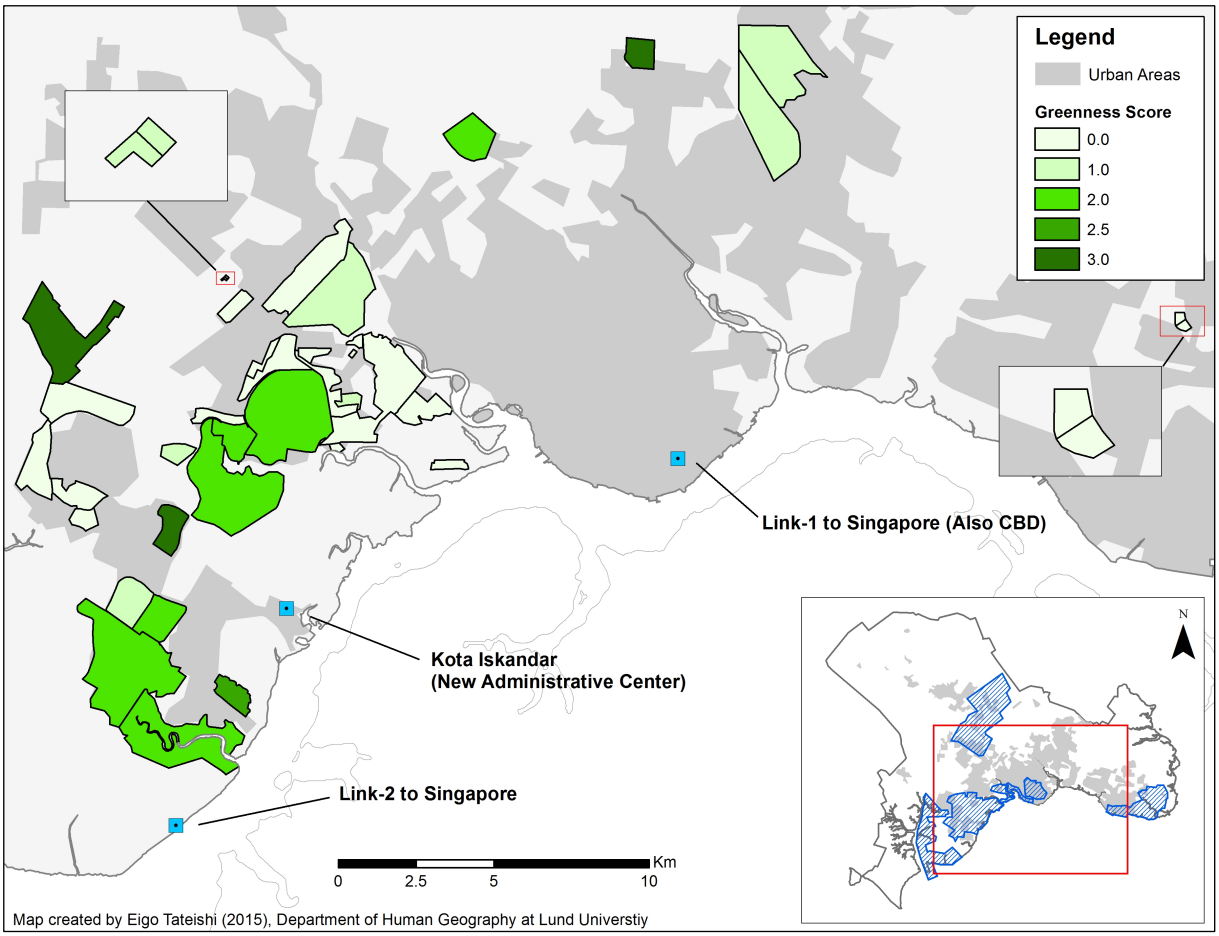
Note: Sentences and words on the "Actual Green Words and Features" are directly retrieved from various sources. These sources are shown in the **Appendix.A** as a form of URL links.

StartYear	CompYear	(1) Green Project Name	(2) Green Planning and Concepts	(3) Other Green-features	Promised Greenness Score	Actual Green Words and Features (Reference of all sentences here is in the appendix section)
2007	2018	1	1	1	3	Certificates, Award-winning Eco Township, Eco Village is Now Available for Sale!, ...inspiring environment created to inculcate a desire to learn and engage with nature. ,green building, Eco Homes
2013	2016	1	1	1	3	Amongst soft grass. Beyond its magnificent gates, a world of surreal beauty awaits: a pristine lake in the shape of a butterfly, a plethora of breathtaking gardens and parks, masterfully-crafted steel sculptures, luxuriant greenery as far as your eyes can wander, and indulging facilities. "Located within Nusajaya and directly neighbouring EduCity, EcoBotanic is a premium gated and guarded township featuring cluster, semi-detached and bungalow homes."
	2016	1	1	1	3	"FORESTA" "ECO HAB"..living in nature's miracle…, A sanctuary that protects…A home for nature.. In an effort to create a natural and holistic ecosystem, 15 % of the total land are in Setia Eco Cascadia is reserved for the cultivation of flora…Eco Homes...Stroll amid the green. The green connectors in Setia Eco Cascadia serve as....their back garden through the natural greenery...the residents to experience a deeper connection with Mother Nature...can be found in these green paradise...one of the many eco-friendly features of Setia Eco Cascadia is the linear garden concept....
	Ongoing	0.5	1	1	2.5	*Official Website very inspires Greenery + Masterplan shows a large space of green area* Inspired by nature and the art of living naturally,…on the fringe of a natural mangrove forest, a 12.5 acre wellness sanctuary makes this holistic retreat a self-sustained haven... with its unique blend of landed homes and green spaces...Peppered with green pockets... Plenty of greenery to greet you, wherever you may be....Centerpark: The best place to take in Avira's green and lush landscape...sense of space and harmony with nature...
2008	2012	0	1	1	2	a gated and guarded community..., it features lush greenery via tis landscaped parks and gardens with the lake, forest, wetland and canal themes...., it features 7 parks with 31 lush gardens with several themes such as the Green Lawn Garden, Sacred Garden and valley Garden, as well as a 20 acre forest and 2km-long lake water land.,garden-themed luxury residential development.
1992	2025	0	1	1	2	Designed within a natural environment, Leisure Farm Resort's master plan also emphasizes on the preservation of the existing ecology occupied with its green program to enhance the qualit of life... Private Tropical Sanctuary: Experience countryside tranquility amidst lush greenery, soothing waterways, tropically inspired recreational facilities and manicured gardens..., 12 precincts which aim to provide a comfortable abode along with eco-friendly surroundings…a natural mangrove forest, 50 acres of orchard and plantation including the award-winning 22-acre Kayu Manis Orchard and Nursery. There are four community parks, 11 themed gardens, and barbecue areas scattered around....22-acre award winning orchard, 4 Community Parks, 11 Themed Gardens..."If you're thinking about buying Leisure Farm Properties because you love the concept and is indeed a nature-lover, then purchases near the launch price would be a bargain for you (Propwall Report)."
	2013	0	1	1	2	Environmental architecture is heavily emphasized in Horizon Hills. A commitment to meet the needs for a healthy community. Large areas in the township is dedicated to botanical nature such as parks, lush green fields, and meandering waterways complemented by boardwalks and long continuous jogging trails. Tree lined boulevards and verdant green reserves nurture an active lifestyle for you and your family.
	Ongoing	0	1	1	2	CITY FOR THE HEART'S DESIRES, NATURE'S BEAUTY FOR THE SOUL, Nature's Capital City. This is where the perfect balance of yin and yang come together across 1,800 acres of world-class architecture and nature's design…..,, you will always be connected to nature via eco parks, green pockets, water bodies, and green corridors. Because this is a sustainable city built to always flourish within 40% nature. Life's perfect balance in the beauty of nature, for today and tomorrow. This is Nature's Capital City.
	2015	0	1	1	2	Closed to 650-acre Nusajaya Regional Park..., I Enjoy cleaner air, cooler surroundings, greener environment and enchanting views.
1997	2013	0	1	1	2	The township's most outstanding feature is its lush greenery which includes an award-winning 20-acre town park as well as smaller parks, gardens and mature streetscape. Verdant Township, ..residents with a green, peaceful environment..., Award winning 20-acre town park.., Australian "Green-Street Concept" to provide an exclusive lifestyle befitting the modern era. Its impeccable heritage in characterised by extensively landscaped environment, ample green, meticulously designed houses and wide access ways.
		0	1	1	2	Enhanced by lush greenery of 3.8 acres townpark, this is home to smart living where you truly belong. ..Green Features: Solar water heating system…rain water harvesting system …smart home system…enjoy stylish green living with reduced electricity costs.

[Table 6 Continued] Outcome of scoring [Grn] of 38 target Iskandar residential projects

StartYear	CompYear	(1) Green Project Name	(2) Green Planning and Concepts	(3) Other Green-features	Promised Greenness Score	Actual Green Words and Features (Reference of all sentences here is in the appendix section)
2005	Completed	0	1	0	1	is an exclusive bungalow only enclave located in the prime residential area of Nusajaya ….its picturesque lake vistas and lush green central park while its 24-hour security creates a sanctuary for your total peace of mind.
	Completed	0	1	0	1	nestled amid green surrounds., The exclusive residential enclave
	2015	0	1	0	1	Conceptualized as a 'green' enclave..., it is designed with environmental sustainability in mind...,
	2015	0	1	0	1	Nestled among the jaded greens.., a lush canvas for reconnnection with nature..., 'Greenery' that greets you all around…, is set within a green environment that blends nature to offset the normal hustle and bustle of city living.
	2015	0	1	0	1	Nestled among the jaded greens.., a lush canvas for reconnnection with nature..., 'Greenery' that greets you all around…, is set within a green environment that blends nature to offset the normal hustle and bustle of city living.
	2015	0	0	1	1	Sutera Go Green
	Ongoing	0	0	1	1	lush green parks
1997	Ongoing	0	0	1	1	*A large central park* Set amidst natural surrounding, the township comes complete with 2 recreational parks with 5 lakes that enhances the beauty of the immediate environment.
2002	Completed	0	0	0	0	
2010	2013	0	0	0	0	
	?	0	0	0	0	
	?	0	0	0	0	
	2010	0	0	0	0	
	?	0	0	0	0	
	?	0	0	0	0	
	?	0	0	0	0	
	?	0	0	0	0	
	2010	0	0	0	0	
	2014	0	0	0	0	*Minimum Price (/sf) was culculated by using estimated Built-up size (1500).
1981	2014	0	0	0	0	
	?	0	0	0	0	
	?	0	0	0	0	
	?	0	0	0	0	
	?	0	0	0	0	
	Old	0	0	0	0	
	2017	0	0	0	0	
	2016	0	0	0	0	

Figure 12 shows the spatial distribution of promised greenness score [Grn] of each target projects. A dark-green color indicates the highest greenness score 3.0, and a pale-green color indicates the lowest greenness 0.0 (see the legend on the figure). In the following sections, these evaluated [Grn] promised greenness scores shall be analyzed with [EnvD] environmental destruction level (section 5.3) and [Prc] price level (section 5.4).

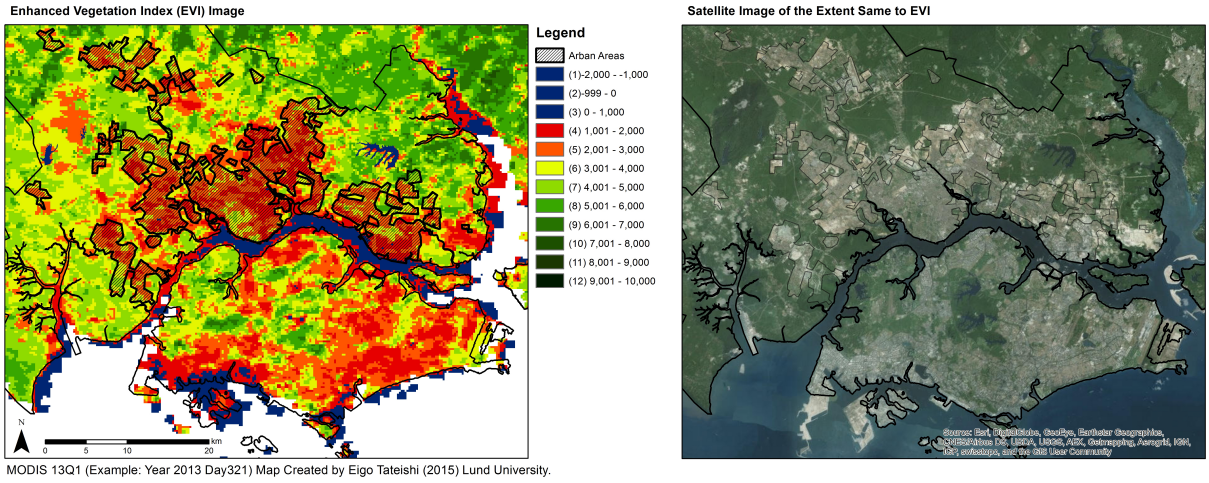


[Fig 12] Spatial distribution of [Grn] of each target Iskandar projects

5.3. Environmental destruction and promised greenness

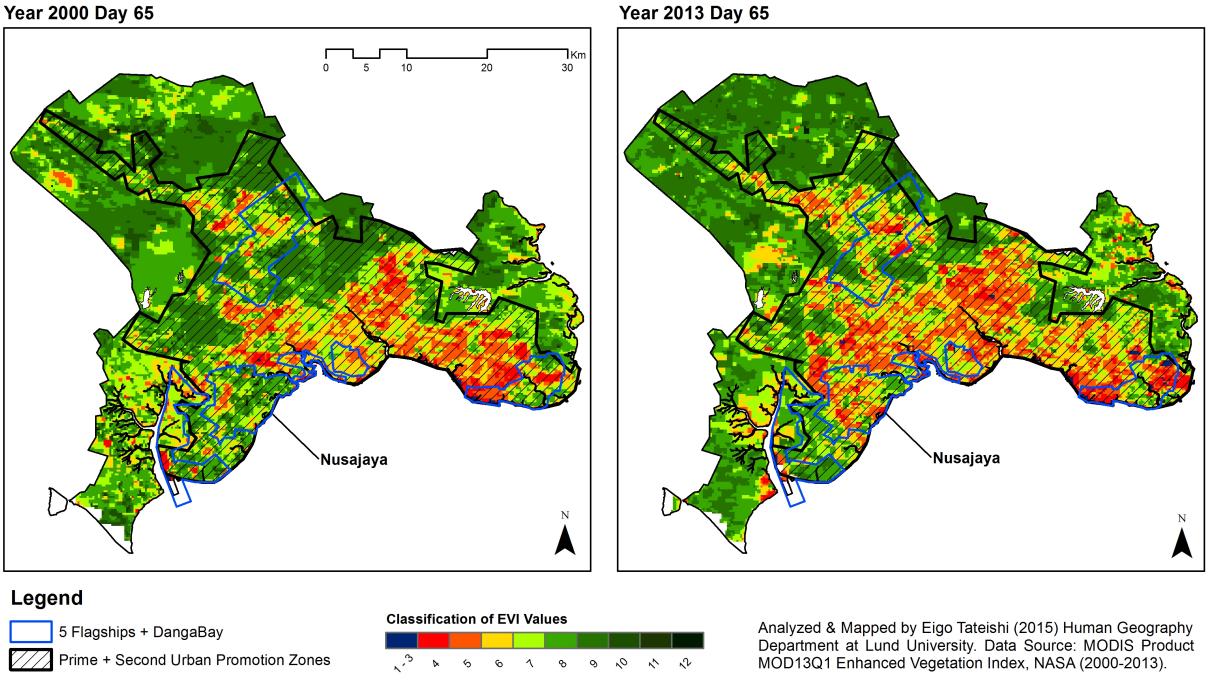
At the entire Iskandar level (general tendency):

First of all, this section shall explain the classification method of EVI values in this thesis project and its validity. Figure 13.1 shows an actual distribution of all EVI classes (from 1 to 12) within the Iskandar region in 2013 Day 321 with the shape of rough urban areas. Figure 13.2 shows a satellite image of the same geographical extent in order to be compared to the EVI distribution and urban shapes on the left panel. A comparison between two maps tells us that 4 - 6 EVI classes roughly correspond to urban areas and could-be barren lands. On the other hand, class 7 -12 EVI classes roughly correspond to dense vegetation.



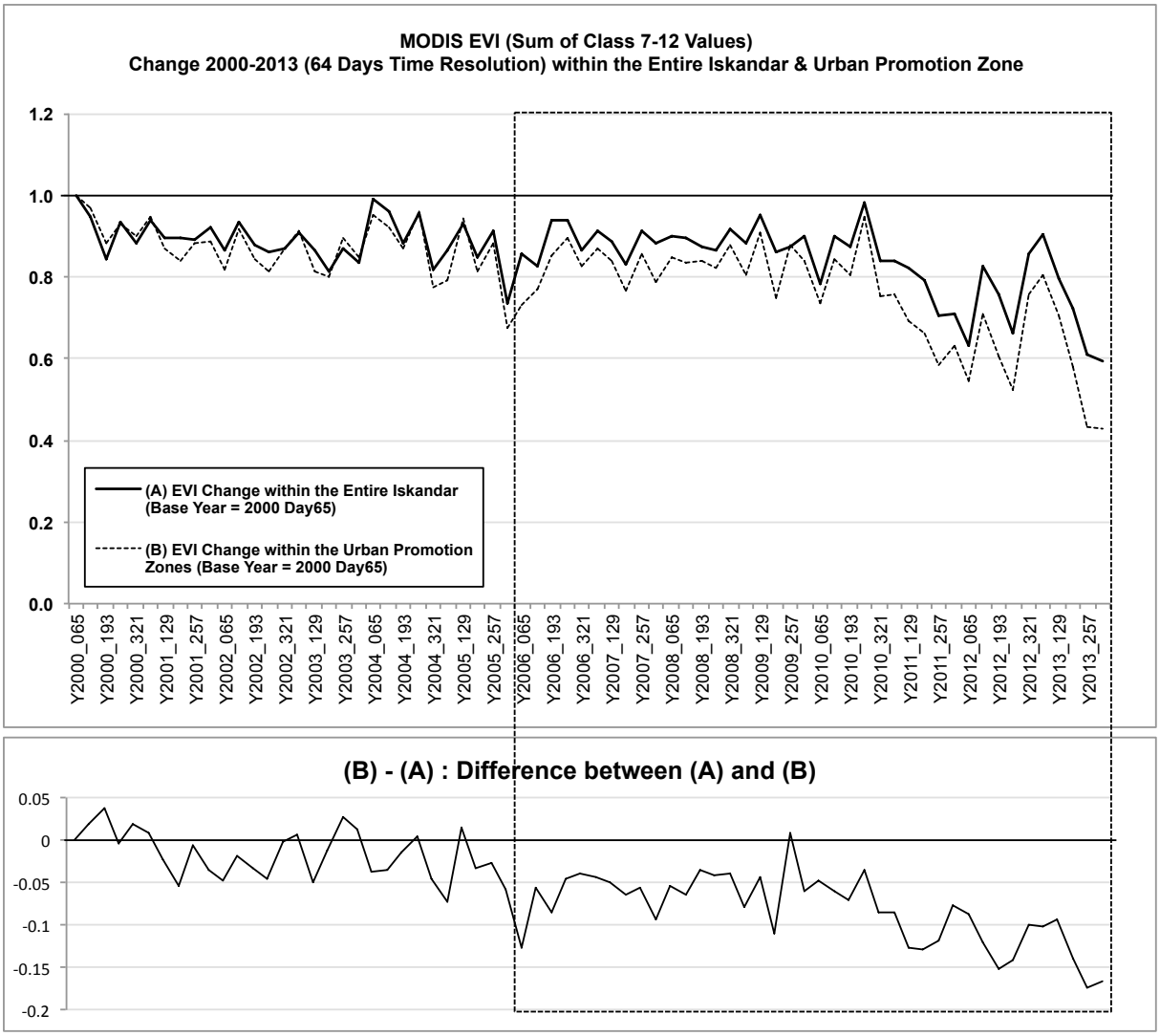
[Fig 13.1: Left panel] Actual distribution of all EVI classes (from 1 to 12) within the Iskandar region
[Fig 13.2: Right panel] Satellite image of the same geographical extent

Keeping these classified EVI values in mind, then, we shall see an actual change of vegetation during 2000 and 2013. Figure 14 below shows a comparison of the distribution of EVI classes between the day 65 of 2000 and the day 65 of 2013 within the entire Iskandar region. Overall, within and around five flagships and Danga bay zones, massive losses of vegetation are detected between 2000 and 2013. A huge decrease of vegetation within Nusajaya is also clearly observed. Because such vegetation losses are mainly detected within and around the urban promotion zones (see the legend on the figure), Iskandar urban development is highly likely responsible for the observed decrease of vegetation.



[Fig 14] Comparison of the distribution of EVI classes between the day 65 of 2000 and the day 65 of 2013 within the entire Iskandar region

In order to more precisely analyze these vegetation losses, a change of the total number of 7-12 EVI classes (corresponding to high-density vegetation) was calculated. Figure 15 (Top panel) shows historical movements of the sum of class 7 - 12 EVI values (equal to dense vegetation) within the entire Iskandar region (A: black curve) and within the prime and second urban promotion zones (B: dot curve). A gradual downward trend, especially after 2006, is observed both in (A) and (B). Figure 15 (Bottom panle) shows a historical trend of (B) minus (A), which means differences between vegetation change within the entire Iskandar and the urban promotion zones. A gradual downward trend on this graph empirically reveals that the vegetation density within the urban promotion zones has been decreasing much quicker than that within the entire Iskandar region. This outcome suggests that intensive and rapid urban development within the urban promotion zones affects (is responsible for) such a quick and massive decrease of vegetation. These empirical analyses prove that a massive destruction of vegetation has been ongoing within the entire Iskandar region, and it is safely concluded that this destruction is mostly due to urban development projects related to Iskandar Malaysia project.



[Top panel on Fig 15] Historical movements of the sum of class 7 - 12 EVI values within the entire Iskandar region and within the prime and second urban promotion zones
[Bottom panel on Fig 15] Historical trend of (B) minus (A)

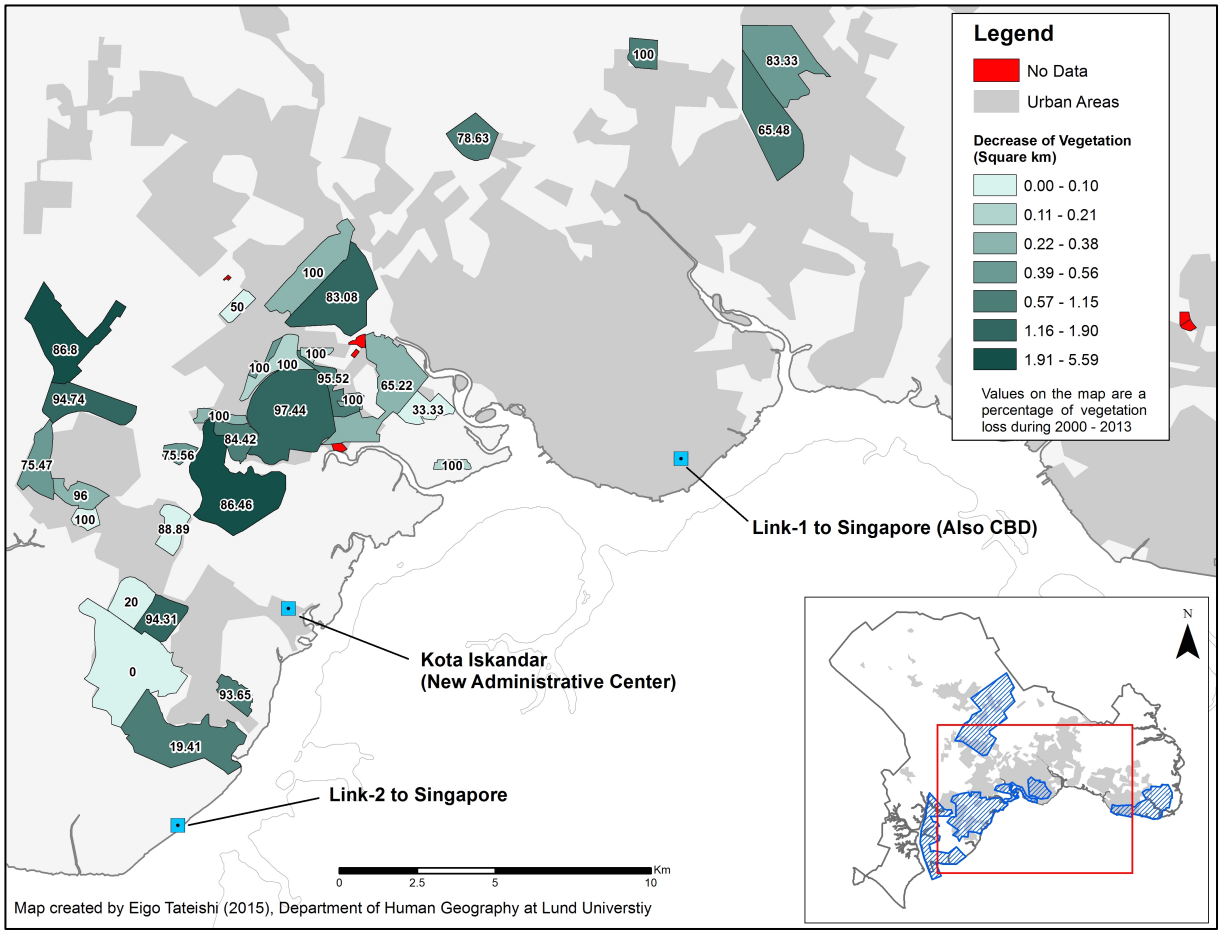
The next section studies a relation between vegetation destruction [EnvD] and promised greenness score [Grn] by taking a closer look at the target Iskandar projects mainly situated within Nusajaya. An important note here is that the outcome attained in the next section is already slightly biased. This is because, as it was shown, Nusajaya is one of the major vegetation-losing areas (see again Figure 14), thus, target projects located in Nusajaya likely show a higher level of environmental destruction [EnvD]. Nevertheless, as we shall see in the following sections, environmental destruction level of each project differs from each other, and it is important to study whether there is a relation between such a difference in the [EnvD] level and the promised greenness score [Grn].

Summary of Empirical Findings:

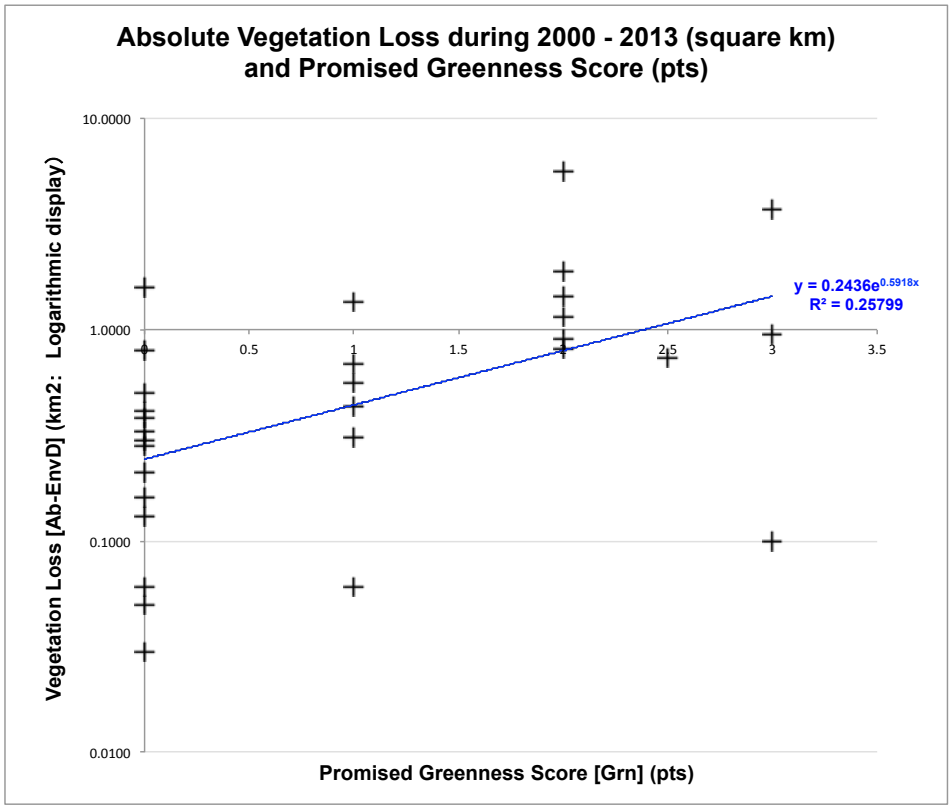
- A massive destruction of vegetation has been ongoing within the entire Iskandar region, five flagships and Danga bay zones, in partiuclar, show a huge decrease of vegetation.
- The density of vegetation within the urban promotion zones has been decreasing much quicker than that within the entire Iskandar region.
- Thus, Iskandar-related urban projcet are highly likely responsible for the massive destruction of vegetation within the region.

At the 38 target project level:

Figure 16 below shows both absolute loss of vegetation (green colors) **[Ab-EnvD]** and percent loss of vegetation (values on the map) **[%-EnvD]** of each target project. The actual source date of this map and of the following analyses is shown in **Appendix. B**. Note that due to their smaller size of project site, **seven projects** are technically not able to attain EVI values, and thus omitted from this analysis. An important note here is that a smaller number of absolute vegetation loss [Ab-EnvD] (km^2) of a project does not necessarily mean that the project is low environmental impact. This is because there is a possibility that the project site was already low-vegetation before the project has started. As for the percentage [%-EnvD], even though many projects show nearly 100 % reduction of vegetation, there are also some projects showing a low destruction rate. Figure 17 and 18 indicate relationships between the absolute loss of vegetation and greenness score, and the percent loss of vegetation and greenness score.

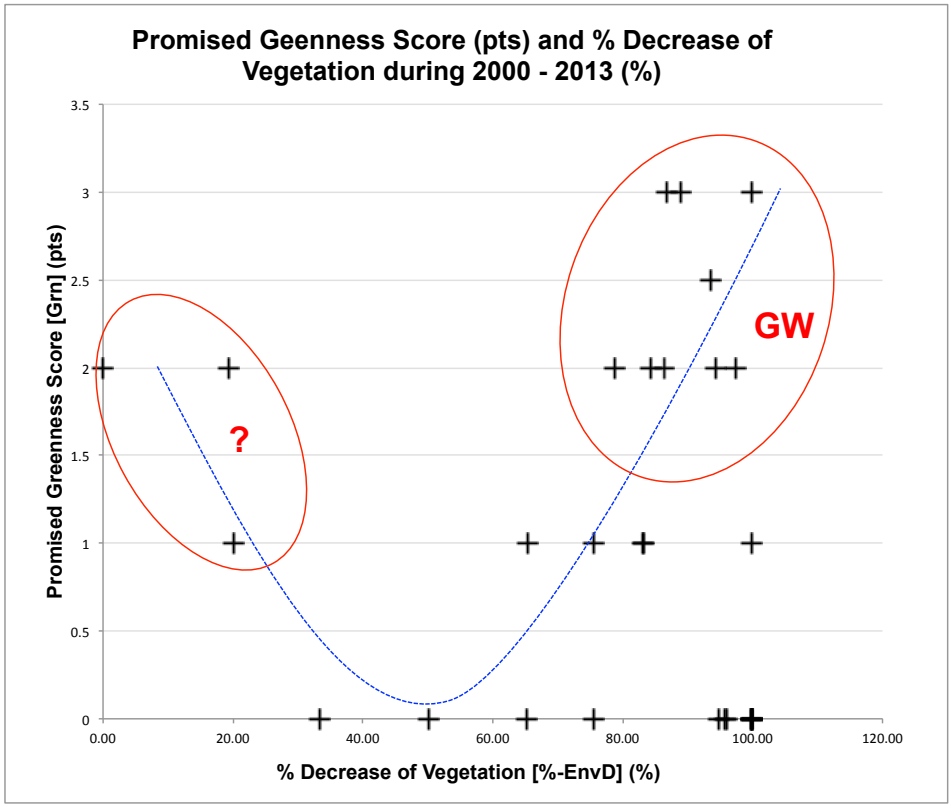


[Fig 16] [Ab-EnvD] (green colors) and [%-EnvD] (values on the map) of each target project (total 31)



[Fig 17] Relationship between [Ab-EnvD] (km^2) and [Grn] of each target project

First, let us focus on Figure 17 that shows a relationship between [Ab-EnvD] (km^2) and [Grn]. Because the scale of [Ab-EnvD] of each project is very different from project to project, the y-axis is displayed in the logarithmic manner. The graph shows a **moderate positive relationship 1: the environmental destruction level and the promised greenness,** namely [Grn]↑∧ [Ab-EnvD]↑. Even though it is hard to conclude a causal relationship between two variables as mentioned in the methodology section, this moderate positive relationship between [Grn] and [Ab-EnvD] empirically supports urban greenwashing function (1): to manage green pressures both from the demand and regulation sides by obscuring environmental damages caused by an urban project, convincing the regulation and demand sides, and justifying the project.



[Fig 18] Relationship between [%-EnvD] and [Grn] of each target project

Then, let us focus on Figure 18 that shows a relationship between [%-EnvD] and [Grn]. Note

that a blue curve on the panel is just a visual aid to make a pattern easier to be recognized, thus no statistical meaning. The graph shows **a positive relationship that clearer** than the previous [Ad-EnvD]-[Grb]. The more portion (percentage) of vegetation within a project site was lost, the higher promised greenness score of the project becomes, namely [Grn]↑∧ [%-EnvD]↑. This outcome convincingly supports urban greenwashing function (1). This is because if sustainable urban projects ***really*** tried to mitigate environmental damage (=vegetation loss), the pattern on the graph must become opposite (the less portion of vegetation within a project site was lost, the higher promised greenness score of the project becomes, namely [Grn]↑∧ [%-EnvD]↓). In accordance with the definition in this thesis, projects plotted around **'GW'** on the graph are perfect examples of urban greenwashing. So, we now empirically detected the existence of urban greenwashing projects. Another intriguing point is that, on the left side of the panel (around **'?'**), there are three plots showing [Grn] scores above 0 (1~2) while showing very low [%-EnvD] (0 % ~ 20%). Unfortunately, these particularities can be explained either by (1) the construction site was already developed before 2000; or (2) the project is really new and large, and cutting down trees are ongoing right now.

Summary of Empirical Findings:

- **A moderate positive relationship,** namely [Grn]↑∧ [Ab-EnvD]↑, was observed.
- **A clear positive relationship**, namely [Grn]↑∧ [%-EnvD]↑, was observed.
- These empirical outcomes support urban greenwashing function (1) in our framework. Thus, we detected the existence of urban greenwashing Iskandar projects, in accordance with our definition.

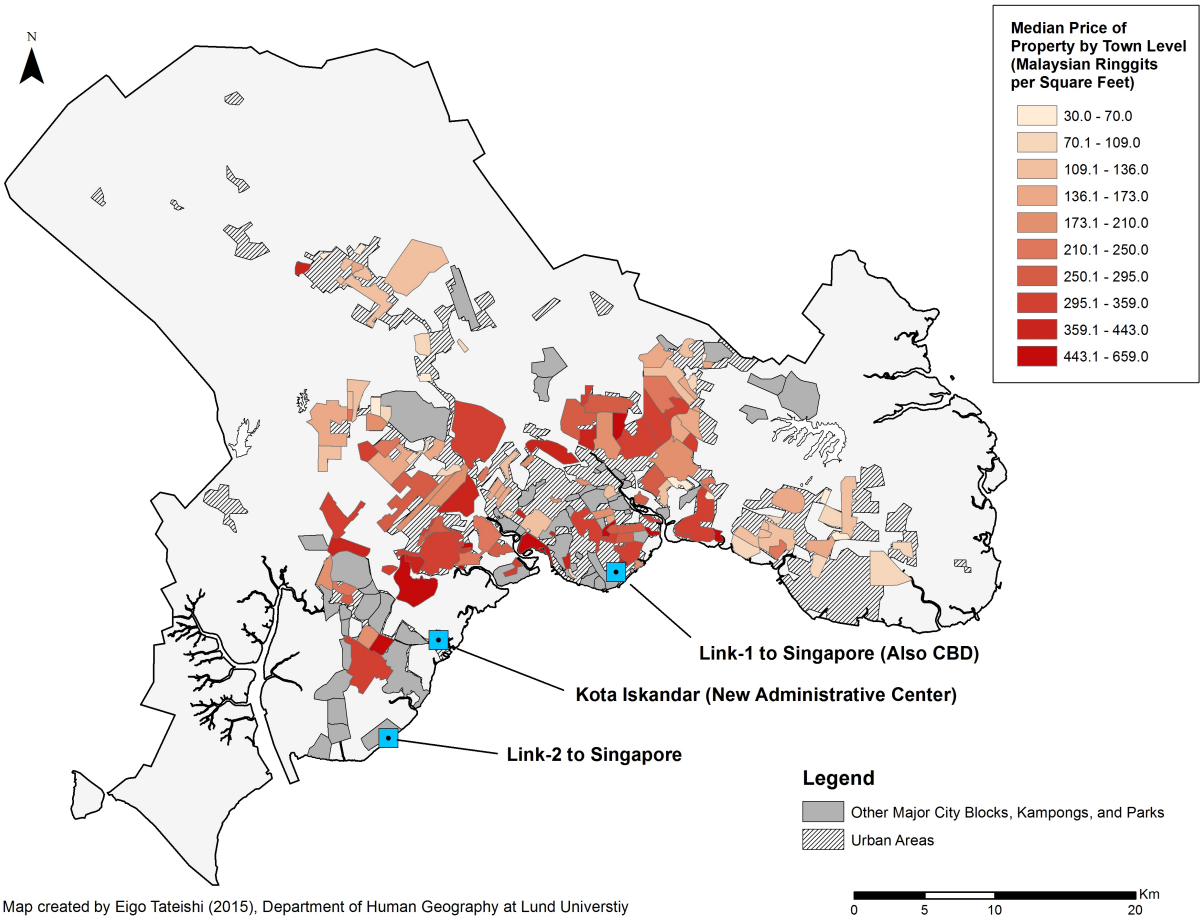
5.4. Price level and promised greenness

At the entire Iskandar level (general tendency):

As explained in the section 4.3, comprehensive and complete data of property price in the Iskandar region is hard to attain because IRDA does not publicly provide such information. Thus, based upon information on property websites, property price level (median square feet price) at each Taman (town) level was estimated (Figure 19 below). Due to the lack of data, the estimation is not perfectly accurate and completed, but it is reliable enough to detect a general trendcy of price levels trend and a spatial distribution of such price levels in the region.

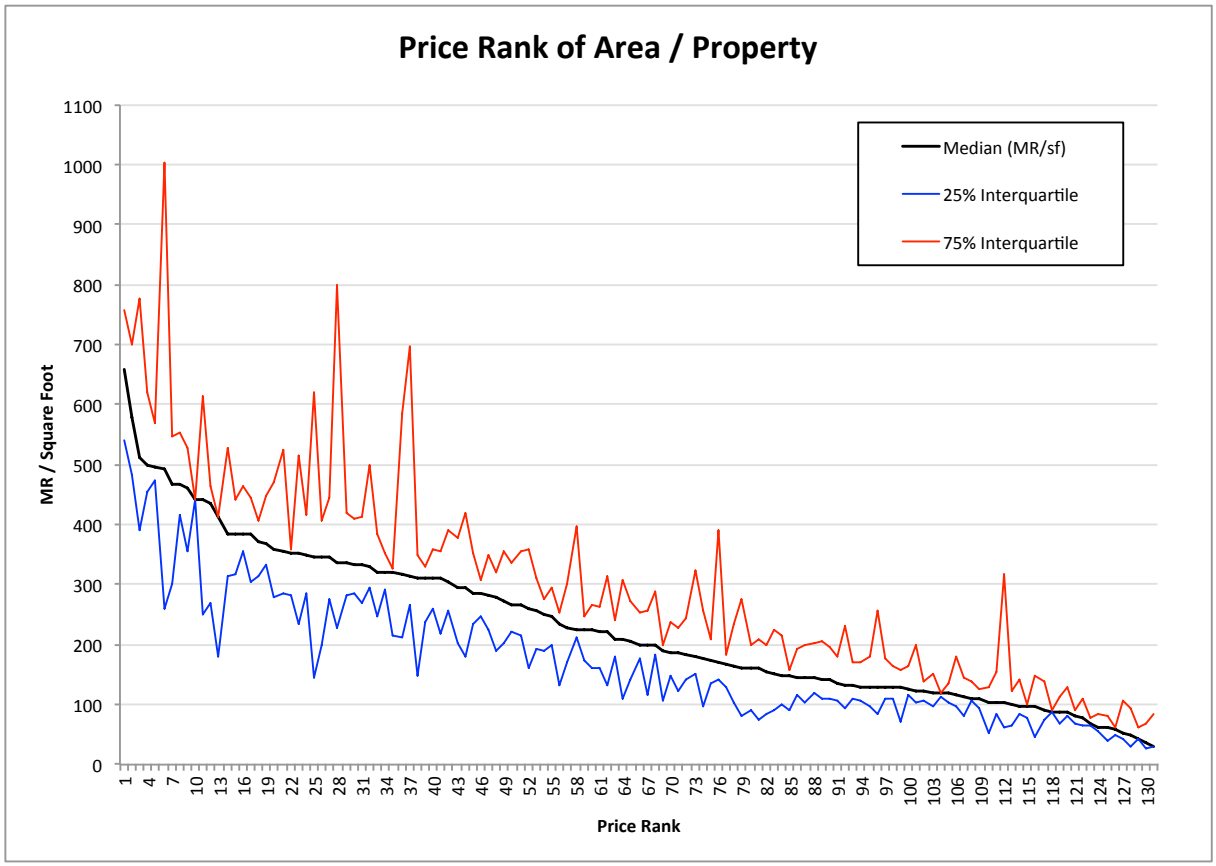
As Figure 19 indicates, the towns within and around Nusajaya zone show relatively higher price levels similar to the towns within and around the central business distric. This can be explaind by facts that (1) they tend to contain quite new developments; (2) they are close to Kota Iskandar, a new political-administrative center; and (3) they have convenient access to the secondary link to Singapore. (2) and (3) are predicted by the bid rent theory, a theory that "asssumes a trade-off between the cost of land and distance from the city center, rent bids generally decreasing with increasing distance from the center" (Pacione 2009:675).

Based upon this price data, a price rank of 131 towns was calculated (Figure 20 below). According to Figure 20, the maximum median sf price is 659.5 RM, and the median of the *median sf price* is 198.5 RM. Thus a range of property selling price between 300 ~ 400 RM / sf seems relatively expensive, and the prices above 401 RM / sf seems very luxurious.



[Fig 19] Distribution of the median square feet (sf) price of all types of properties by town level (as of 2015 February)

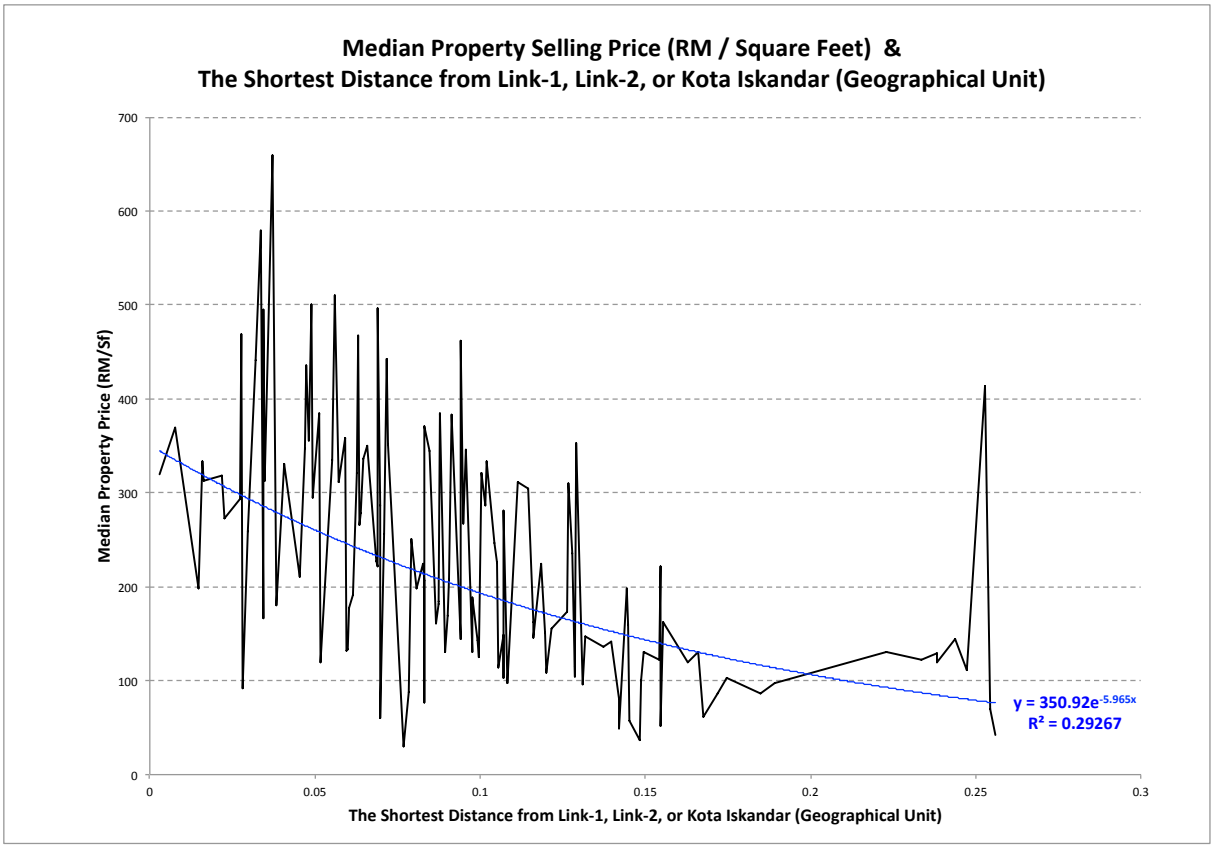
Note: A strong-red color indicates higher median sf price, and a weak-red color indicates lower median sf price.



[Fig 20] Price range of all types of properties by each town level
Note: It indicates the median sf price (**black** curve), 25 % interquartile sf price (**blue** curve), and 75 % interquartile sf price (**red** curve).

In order to analyze a relationship between each town's median sf price level and each town's distance from three important geographical points (link1-CBD, lin-2, and Kota Iskandar), the next Figure 21 plots a combination of the sf price level and the *shortest* distance from three points (from link 1, link 2, ***or*** Kota Iskandar) of each town. The curve of this scatter plot roughly follows the curve pattern predicted by the bid rent[38] theory (c.f., Pacione 2009:141), and thus, generally speaking, a distance from Link-1 (CBD), Link-2, or Kota Iskandar is an important determinant factor of the property prices in the real estate market of the Iskandar region.

[38] As its name clearly shows, the bid rent theory predicts a relation ship between the **rent** level and the distance form a CBD of a study unit (e.g., district, town). Thus, this Figure 21, which plots a combination of and *the median sf price* and the shortest distance of each town (or project), is just an approximation of the theory.



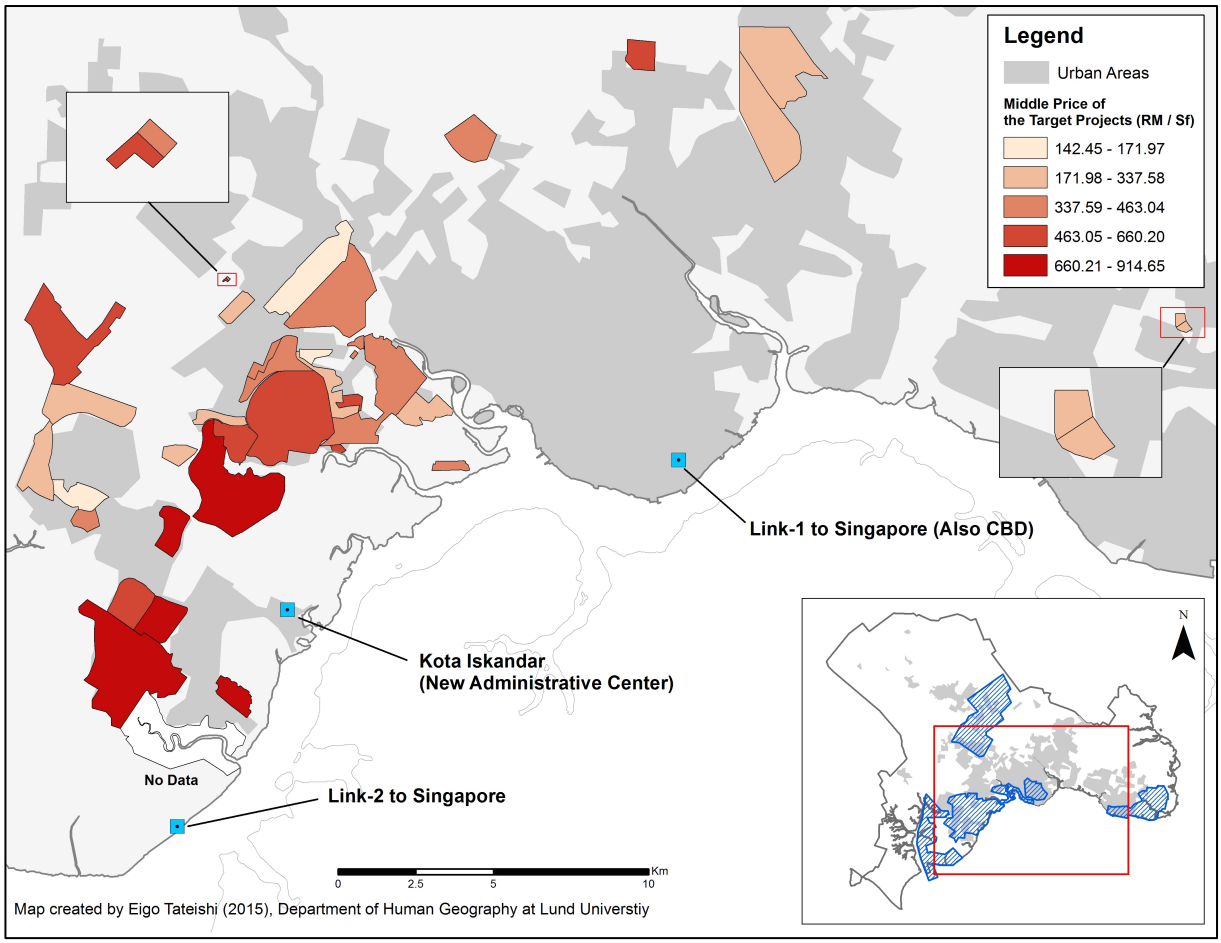
[Fig 21] Combination of the shortest distance from three important points and the price level of each town
Note: This curve roughly follows what the bid rent theory predicts.

Summary of Empirical Findings:

- Relatively higher price levels within and around Nusajaya zone can be explaind by facts that (1) they tend to contain new developments; (2) they are close to Kota Iskandar; and (3) they have a convenient access to Link-2.
- The median of the *median sf price* is 198.5 RM. A range of property selling price between 300 ~ 400 RM / sf seems relatively expensive, and the prices above 401 RM / sf seems very luxurious.
- Generally speaking, a distance from Link-1 (CBD), Link-2, or Kota Iskandar is an important determinant factor of the property prices in the real estate market of the Iskandar region.

At the 38 target project level:

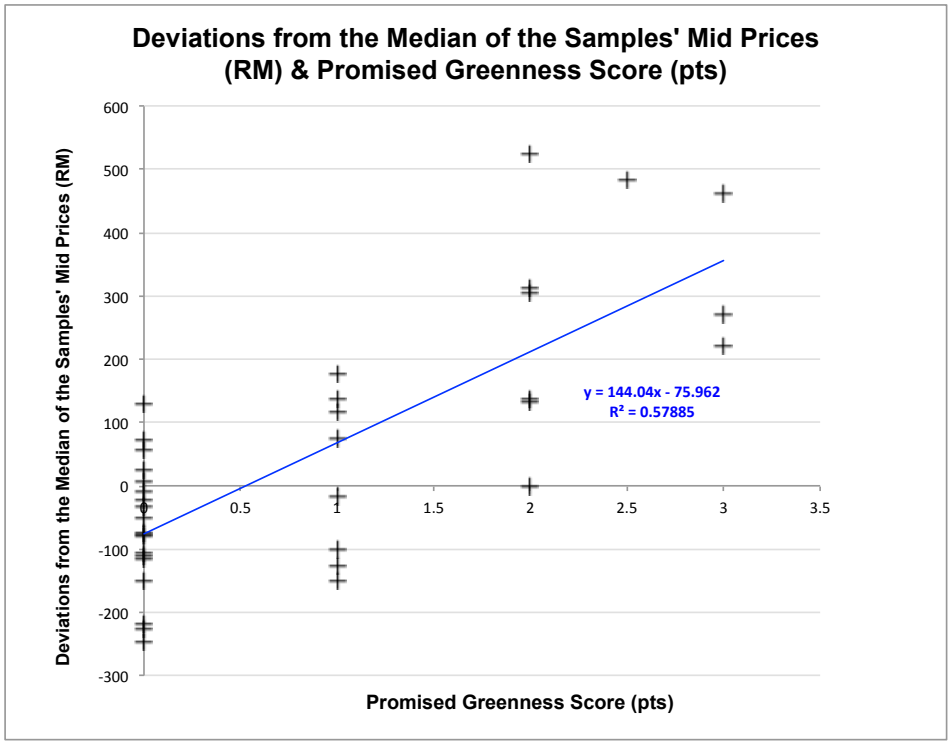
Figure 22 below shows a spatial distribution of *middle* prices of the target Iskandar housing projects. Note that one project has no official price data (indicated on the map as "No Data"). Thus, a total number of samples for this analysis is 37. The actual source date of this map and of the following analyses is shown in **Appendix. C**. Relative to the property price levels shown previously, the Iskandar-related projects within and around Nusajaya zone show outstandingly expensive price levels (337 RM / sf ~ 914 RM / sf). Nusajaya zone contains many new green-field projects that plan to supply a large number of properties to the market in the near future. It can be explained that such an oversupply[39] of properties (as some news articles mentioned in the section 4.1 point out) and a convenient access to Kota Iskandar and Link-2 (as pointed out in the previous section) make Nusajaya property market very *competitive*.



[Fig 22] Spatial distribution of middle prices of the target Iskandar housing projects

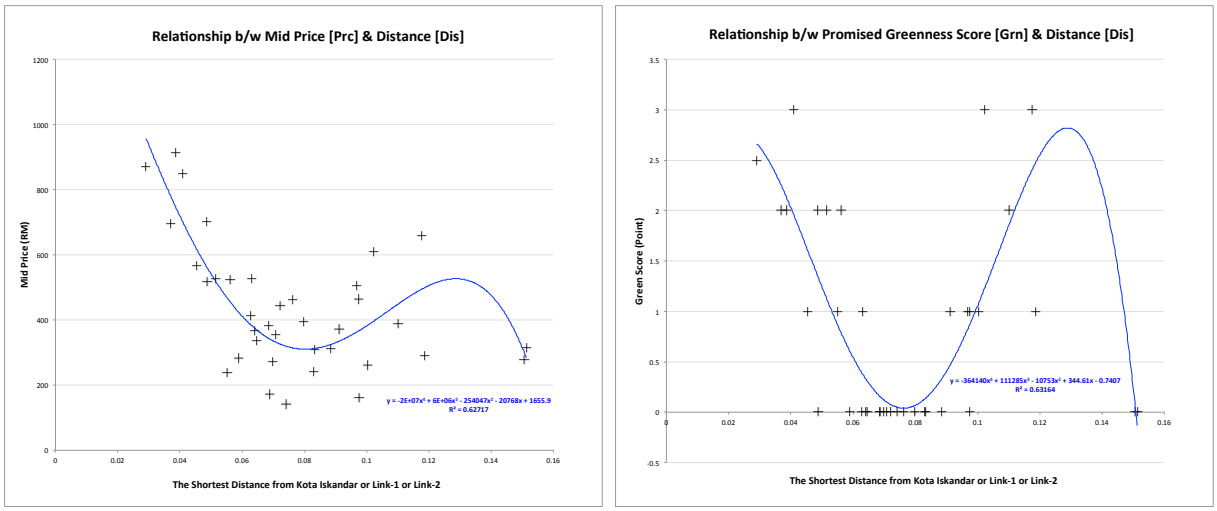
[39] Generally speaking, the oversupply of a certain type of product makes an average price of such product lower. However, in the Iskandar case, the property bubble is still barley keeping its shape (as of 2015 April), and the higher price level of new properties may be supported by the (so-far) continuous flow of speculative capital.

Figure 23 below shows a relationship between [Grn] and [Prc], more specifically, deviations from the median of the mid prices of 37 samples and [Grn] of 37 target projects. As Figure 23 shows there is a **strong positive relationship** between [Grn] and [Prc]. Accordingly, this outcome supports a positive relation of [Grn]↑∧ [Prc]↑.



[Fig 23] Relationship between [Grn] and [Prc] of each target project

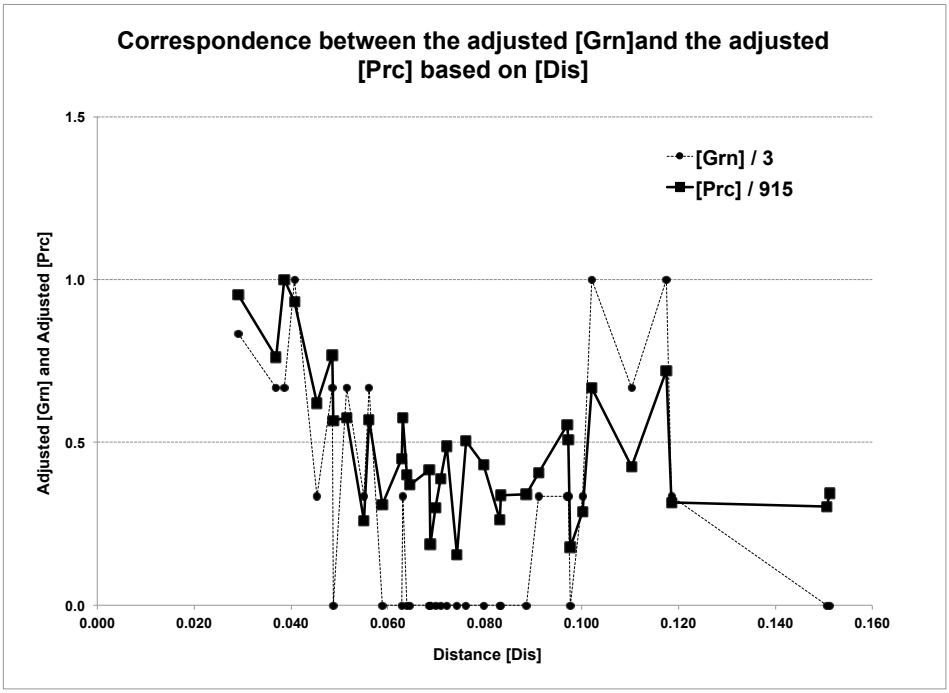
As we have seen in the "general tendency" section, the shortest distance of each project from important geographical points (Link-1, Link-2, or Kota Iskandar) is an influential determinant factor of the price level. As it was shown, there is also a positive relationship between [Prc] and [Grn]. Thus, it is worthwhile to analyze a relationship between [Grn], [Dis], and [Prc] in order to think about a causal relation between these three variables. Figure 24.1 and 24.2 below show the results of this analysis.



[Fig 24.1: Left panel] Relationship between [Dis] and [Prc] of each target project
[Fig 24.2: left panel] Relationship between [Dis] and [Grn] of each target project

Figure 24.1 shows combinations of [Prc] the mid prices and [Dis] the shortest distance of each target project. The plot pattern on the figure shows that the mid price of each target project follows the bid-rent curve that I have discussed in the previous section. Based on this result, I can safely say that the shortest distance from the important points is a strong determinant factor of the price levels of the 37 targets.

On the other hand, Figure 24.2 shows combinations of the shortest distance [Dis] ***and the promised greenness score [Grn]***. Intriguingly, the distribution of plots is similar to the [Prc]-[Dis] curve of the target projects (compare the left and the right distributions of plots). Figure 25 below shows that **to what extent each plot on the two different graphs corresponds to each other**. This figure clearly shows that [Prc] and [Grn] values of each target urban project are distributed very similarly when they are aligned based on [Dis]. This implies a causal relationship between [Dis]-[Prc]-[Grn].



[Fig 25] Correspondence between the adjusted [Grn] and the adjusted [Prc] based on [Dis]
Note: [Grn] and [Prc] values were adjusted so that the maximum value of them will be 1, namely all [Grn]s divided by the maximum [Grn] value 3 and all [Prc]s divided by the maximum [Prc] 915.

How can this correspondence be explained? A possibility is that [Dis] affects both [Prc] and [Grn]. Based on the bid-rent theory, it is reasonable to think of [Dis]→[Prc] (means [Dis] *determines or affects* [Prc]). However, it sounds not so plausible to think of [Dis]→[Grn]. There is another logical possibility that the shortest distance from the important points is a determinant factor of vegetation loss [EnvD], and thus [Dis] affects [Grn] via [EnvD]. The rational of this is that an area in close proximity to, say, the Link-1, is likely subjected to more frequent developments due to its convenient accessibility to the Link-1. However, this also sounds not so plausible because the areas close to the important points *not necessarily* have intense vegetation. Figure 16 shows that there are several projects that indicate a high level of [Ab-EnvD] and [%-EnvD] while their "shortest distance" is much longer than that of other projects. Then, the most plausible explanation of this similarity of pattern is to imagine a causal chain of [Dis]→[Prc]→[Grn], which means that *a distance determines or affects a*

price, and then the price determines or affects a promised greenness score of a target project. ***This suggests that the higher a property price becomes, the higher the promised greenness score may become***.

How can this conclusion be interpreted? As discussed in the very beginning of this section, the real estate market in and around Nusajaya is highly likely very competitive. This fierce competition imposes the real estate developers to make their projects as attractive as possible to the latent consumers in order to win such a harsh competition. Some projects may emphasize "water-front" and "super-luxurious" (based on my observation, condominiums in Iskandar tend to employ such strategies), and large-scale housing projects, where a *naturalized* (in the Baudrillard's sense[40]) nature remains, tend to emphasize their greenness. Namely, the promised greenness of such projects is a mere tool to keep projects attractive, and thus market competitiveness, and to justify their higher pricing in the intense market.

Summary of Empirical Findings:

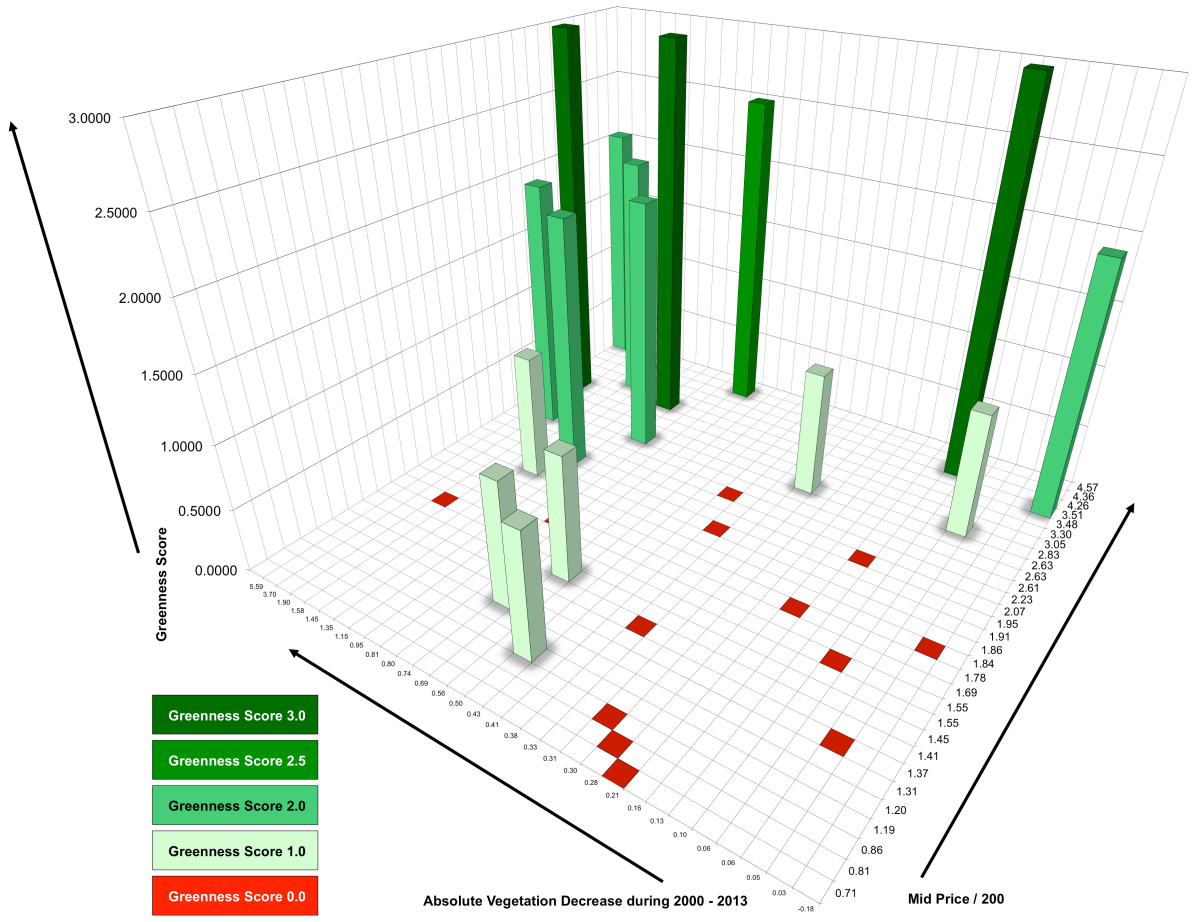
- **A strong positive relationship,** namely [Grn]↑∧ [Prc]↑was observed.
- [Dis]-[Prc] and [Dis]-[Grn] show a plot pattern similar to each other. According to the bid-rent theory, we assumed [Dis]→[Prc]. Thus, the most plausible explanation of this similarity is to think a causal chain of ([Dis] →) [Prc]→[Grn], which suggests that the higher a property price may become, the higher a promised greenness score of a project becomes. This implies that promised greenness is used for keeping the price-competitiveness of a project within a harsh market like Nusajaya.
- These empirical outcomes support urban greenwashing function (2): *keeping or increasing the market competitiveness, and thus, exchange value, of a capitalist urban project*.

[40] Baudrillard wrote that "'naturalization' effect we constantly meet in the environment – the effect which consists in restoring nature as sign after it has been eliminated in reality. Thus, for example, a forest is cut down to build a group of buildings, which then given the name 'Park Estate' and a few trees are planted to create a 'natural' feel" (1998:89).

5.5. Final synthesis between [EnvD], [Prc], and [Grn]

A critical reader will make an argument on this project that the relationship between [Grn] and [Prc] *does not necessarily have* something to do with urban greenwashing. According to our definition in this thesis, the environmental performance of properties (new residential projects) is evaluated by [EnvD], and thus, it makes sense to consider (within our framework) that a project having a high [EnvD] and a high [Grn] as an urban-greenwashing project. However, in order to conclude that *a high value of [Grn]* of an expensive project (namely a high-[Prc] project) is related to urban greenwashing, we must confirm that that project *also has a high value of [EnvD]*. In other words, in order to logically connect the relation between [EnvD]-[Grn] with the relation between [Grn]-[Prc], we must analyze a relation between *all three variables* we analyzed, namely [EnvD], [Grn], and [Prc]. The outcome of such an analysis is displayed in Figure 26 below.

As the figure clearly shows a positive relationship between all three variables, namely, [EnvD] ↑∧[Grn]↑∧[Prc]↑. Although, as I noted several times, it is not safe to definitively conclude the casual relation between these three variables, based on all empirical analyses made by this thesis, I can safely conclude that there are urban greenwashing function (1) confirmed by the observed positive relation between [EnvD] ↑∧[Grn]↑; urban greenwashing function (2) confirmed by the observed positive relation between [Grn]↑∧[Prc]↑; and these two functions (relations) are logically related with each other: an urban project showing low-environmental performance tends to have higher [Grn] *and* [Prc].



[Fig 26] Synthesized relationships between [Av-EnvD], [Grn], and [Prc] of each target project
Note: The source data of this graph is shown in Appendix.D.

Part. III: Conclusions and Further Possibilities

6. Summary and Conclusions:

Throughout the theoretical considerations and analyses presented in this thesis, the potential and real functions of urban greenwashing in capitalist production of urban space have been theoretically and empirically scrutinized. Green-field urban development projects are an indispensable component of capitalism in order to sustain capital accumulation and cope with over-accumulation crises. However, as the concern for eco-climatic issues grows within capitalist societies, capitalist urban projects, especially green-field ones, are exposed to green

pressures and demands due to their associated eco-climatic impacts. One possible pathway for capitalists to cope with such green pressures and demands is to reconcile capital accumulation (through production of urban space) with sustainability by techno-fixes. However, the feasibility and the effectiveness of such sustainable capitalist cities that rely heavily on techno-fixes are quite questionable. This is because of (1) a possibility of the Jevons paradox, (2) the socio-politico nature of modern technology, (3) unequal availability of cutting-edge technology, and (4) a fundamental conflict between conceptions of true sustainability and the logic of capitalist accumulation. Various scholars even argue that sustainable "capitalist cities" are an oxymoron or a myth. Thus, I assumed that an effective (and more pragmatic) strategy for capitalists to manage both green pressures and demands is to greenwash their urban projects.

Based on Delmas and Burbano's greenwashing framework, I theorized that, disseminating 'promised' greenness, a capitalist (green-field) urban project is able not only to avoid or mitigate green pressures but also to maintain market competitiveness and increase the exchange values of its produced space by appealing to green demands. Based on this argument, I constructed a framework of urban greenwashing that has two major functions: (1) obscuring environmental damages caused by a project; (2) maintaining or increasing exchange values of that project. These two functionalities were translated into two empirically testable relations: (1') higher level of environmental destruction and higher promised greenness in the marketing tools of capitalist urban projects ([EnvD]↑∧ [Grn]↑); and (2') higher promised greenness and higher price levels of the projects ([Grn]↑∧ [Prc]↑). These two relations were empirically detected in this study of the Iskandar Malaysia project.

As for (1'), our empirical analyses detected that there is a moderate positive relationship between [Ab-EnvD]↑∧ [Grn]↑. In addition, a clear positive relationship, namely [%-EnvD]↑∧ [Grn]↑, was observed. These empirical outcomes support urban greenwashing function (1). Furthermore, I empirically observed clear examples of 'greenwashed' urban projects in terms of our definition. As for (2'), our empirical analyses detected that there is a strong positive relationship between [Grn]↑∧ [Prc]↑. In addition, [Dis]-[Prc] and [Dis]-[Grn] scatter plots show similar patterns. Because our analyses revealed that, both regional (the entire Iskandar) and local (target projects) trends of property prices roughly follow the bid rent theory (which suggests [Dis]→[Prc]), the most plausible explanation of this similarity is to imagine a causal chain of ([Dis]→) [Prc]→[Grn], which means that a property price determines or affects the promised greenness score. This implies that promised greenness serves to enhance price-competitiveness of a project (or, to justify expensive prices of the project) within an intense market like Nusajaya. These empirical outcomes support urban greenwashing function (2). Finally, a positive relationship between all three variables, namely, [EnvD] ↑∧[Grn]↑∧[Prc]↑, was observed. In other words, the stronger the positive relationship between [EnvD] and [Grn] becomes, the stronger the positive relationship between [Grn] and [Prc] becomes. This outcome supports that a project whose environmental performance is low (relative to other competitors) tends to have a higher promised greenness level, and, at the same time, this project also tends to have a higher price level compared to other competitors.

7. Further Possibilities:

In section 4.2, I discussed that a crucial methodological weakness of this study is the spatial-numerical reductionism of urban greenwashing phenomenon, which ignores the fact that urban greenwashing is, in reality, developed and implemented by a group of project

stakeholders within a web of complex social interactions. Thus, this study cannot reveal the actual ‘intentions’ of those who are engaging in urban greenwashing (e.g., real estate developers), which is one of the key elements to understand the causality of [Grn]-[EnvD] and [Grn]-[Prc] positive relations. In order to improve this weak point, as a further study, it is desirable to conduct interviews with real estate developers and other beneficiaries in order to know whether or not they intentionally utilize urban greenwashing strategies.

Other possible studies are to analyze other sustainable “capitalist” urban projects within the urban greenwashing framework developed by this study, and compare the outcomes. Because this study is exclusively about Iskandar Malaysia project, the empirical outcomes of this study cannot be generalized potentially due to geographical, historical, cultural, social, and economic contexts unique to the Iskandar region. In order to improve such a point, it should be confirmed whether we could attain similar empirical outcomes in several case studies different from the Iskandar Malaysia in terms of geographical, historical, cultural, social, and economic factors.

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Appendix. A

Data Source for the Promised Greenness Evaluation (Online-available official websites, a master plan, documents, brochures, and ads on the real estate information websites):

Property Name	Data Source for the Promised Greenness Evaluation
Setia Eco Gardens	• http://www.property.cc/Iskandar-360/Setia-Eco-Gardens • http://www.setiaecogardens.com.my/ • http://www.iproperty.com.my/propertylisting/2937833/setia-eco-garden-gelang-patah-semi-detached-house-forsale
Eco Botanic	• http://www.ecoworld.my/ecobotanic/ • http://www.propertywtf.com.my/johor-southern-region-f47/ecoworld-eco-botanic-nusajaya-johor-t2322.html • http://iskandarproperties.info/2013/09/22/eco-botanic-nusajaya-by-eco-world-balloting-session-22nd-sep-10am/ • http://property.malaysiamostwanted.com/projects/eco-botanic-the-coleshill-2-storey-cluster-house • http://www.thestar.com.my/Business/Business-News/2013/09/24/Eco-Worlds-Iskandar-gem-Its-maiden-project-EcoBotanic-gets-good-response/?style=biz • http://www.theborneopost.com/2014/10/05/ecoworld-holds-premium-property-exhibition-at-rh-hotel/
Setia Eco Cascadia @ Taman Setia Indah	• http://www.property.cc/Iskandar-360/Setia-Eco-Cascadia • http://www.cascadia.com.my/the-project.aspx
Avira Garden Terrace, Medini	• http://www.avira-medini.com.my/ • http://aviramedini.com.my/ • http://www.malaysiapropertynews.com.my/2014/09/avira-garden-terraces-medini-johor-eo-.htm • http://slpintl.com.sg/wp-content/uploads/2014/06/ebrochure_Avira-Product.pdf http://slpintl.com.sg/wp-content/uploads/2014/09/Avira-Factsheet-MT-amend-17-June-2014.pdf • http://property.malaysiamostwanted.com/projects/avira-medini-iskandar-garden-terraces
East Ledang	• http://www.property.cc/Iskandar-360/East-Ledang • http://www.eastledang.com/beta/this-is-how-living-space-should-be.html • http://www.nusajayacity.com/residential/res_east.html
Leisure Farm Resort Residence	• http://www.propwall.my/nusajaya/leisure_farm_resort_residence/5985 • http://leisurefarm.com.my/vlt/ • http://www.leisurefarm.com.my/flash/
Horizon Hills	• http://www.property.cc/Iskandar-360/Horizon-Hills • http://gamudaland.com.my/horizonhills/
Sunway Iskandar, Medini	• http://www.sunwayiskandar.com/projects_citrine.html • http://sunwayiskandar.com/pdf/citrine-ebrochure.pdf • http://www.iskandarinvestment.com/investment-opportunities/medini-projects/
Nusa Idaman	• http://www.property.cc/Iskandar-360/Nusa-Idaman • http://www.nusaidaman.com/
Bukit Indah 1 and 2	• http://www.property.cc/Iskandar-360/Bukit-Indah • http://www.bukitindahjohor.com.my/ • http://www.property.cc/Iskandar-360/D'Fronde-@-Bukit-Indah • http://thissit.com/Projects-Taman-Bukit-Indah-2-Project-41.aspx • http://www.propwall.my/nusajaya/bukit_indah • http://www.archicentre.com.my/work.php?id=andprojectid=20
Taman Kempas Utama	• http://www.property.cc/Iskandar-360/Oleander-@-Kempas-Utama • http://www.kempasutama.com/index.php • http://property.malaysiamostwanted.com/projects/kempas-utama-phase-2-serissa-twin-villa
Ledang Heights	• http://www.propwall.my/nusajaya/ledang_heights/2394 • http://my-home.com.sg/ledang-heights/

	• http://www.iskandarinvestment.com/master-planned-development-projects/surrounding-developments/ • http://www.iproperty.com.my/property/searchresult.aspx?t=Sandgpt=ARandst=andct=andk=Ledang+Heightsandpt=andmp=andxp=andmbr=andxbr=andmbu=andxbu=andlo=andwp=andwv=andwa=andht=andau=andsby=apzandpg=1 • http://maritime.bernama.com/news.php?id=161170andlang=en
Nusa Sentral	• http://www.property.cc/Iskandar-360/Nusa-Sentral • http://www.countryview.com.my/projects-nusasentral.html
Taman Nusa Duta	• http://www.property.cc/Iskandar-360/Nusa-Duta • http://projects.ijmland.com/projectdetail.aspx?Proj_ID=17#.VQTVqoGG-vM • http://cdnprojects.ijmland.com/fileupload/property/2-Storey_Bungalow_House_-_Type_B/brochure/brochure.pdf
Mutiara Mas (OPAL ROYAL)	• http://www.scientex.com.my/web/property/sk-opal-royal • http://www.scientex.com.my/web/img/property/skudai/brochure_opalroyal.pdf
Mutiara Mas (OPAL IMPERIAL)	• http://www.scientex.com.my/web/property/sk-opal-royal • http://www.scientex.com.my/web/img/property/skudai/brochure_opalroyal.pdf
Taman Sutera Utama	• http://www.tanahsutera.com/residential-homes-in-taman-sutera-sutera-utama-7.aspx • http://www.propwall.my/classifieds/717429/taman-sutera-utama-skudai-house-for-sale-by-jeff-yap?tab=property
Phase 9D and 9E @ Taman Desa Tebrau	• http://www.property.cc/Iskandar-360/Phase-9D-%7C-9E-@-Taman-Desa-Tebrau • http://www.plenitude.com.my/mini/?option=com_contentandview=articleandid=9 • https://www.cloudhax.com/property/details/12708/Taman-Desa-Tebrau-%28Phase-9D-9E%29
Chantique Phase 2 @ Taman Pelangi Indah	• http://www.madabouthomes.my/properties.php?pid=12
Taman Nusantara	• http://www.property.cc/Iskandar-360/Nusantara • http://deniadevelopment.blogspot.se/ • http://www.propwall.my/nusajaya/taman_nusantara/3379
Taman Nusa Bayu	• http://www.property.cc/Iskandar-360/Nusa-Bayu • http://www.nusabayu.com/index.php • http://www.nusajayacity.com/residential/res_nb.html
Taman Nusa Perintis 1	• http://www.propwall.my/nusajaya/taman_nusa_perintis_1/3380?tab=classifieds
Taman Nusa Perintis 2	• http://www.propwall.my/classifieds/1262276/taman-nusa-perintis-2-nusajaya-house-for-sale-by-davis-dharma
Nusa Indah	• http://www.property.cc/Iskandar-360/Nusa-Indah • http://www.countryview.com.my/projects-nusaindah.html
Taman Tan Sri Yaacob	No Information
Taman Nusa Bestari 1	• http://www.propwall.my/nusajaya/taman_nusa_bestari_1?tab=property • http://www.iproperty.com.my/property/searchresult.aspx?t=Sandgpt=ARandst=andct=andk=Taman+Nusa+Bestariandpt=andmp=andxp=andmbr=andxbr=andmbu=andxbu=andlo=andwp=andwv=andwa=andht=andau=andsby=apandpg=1
Taman Nusa Bestari 2	• http://www.iproperty.com.my/property/searchresult.aspx?t=Sandgpt=ARandst=andct=andk=Taman+Nusa+Bestari+2andpt=andmp=andxp=andmbr=andxbr=andmbu=andxbu=andlo=andwp=andwv=andwa=andht=andau=andns=1andsby=apz
Taman Nusa Jaya	• http://www.propwall.my/nusajaya/taman_nusa_jaya
Casa Almyra	• http://www.propwall.my/nusajaya/casa_almyra • http://iskandarproperties.info/2014/09/06/casa-almyra-a-secretly-hidden-mediterranean-styled-treasure/
Taman Laguna	• http://www.property.cc/Iskandar-360/Laguna
Taman Perling	• http://www.propwall.my/nusajaya/taman_perling/2388?tab=property
Taman Sutera	• http://www.propwall.my/nusajaya/taman_sutera/2389 • http://www.keppelland.com.sg/RE-MY-Taman-Sutera-TS.asp
Rosa Terraces 2	• http://www.property.cc/Iskandar-360/Rosa-Terraces-2 • http://www.udaland.my/download/rosa.pdf
UDA Heights	• http://www.udaland.my/download/udaheights.pdf

Taman Seri Orkid	• http://www.glamo.my/seriorkid03.html • http://www.property.cc/Iskandar-360/Seri-Orkid
Taman Ungku Tun Aminah	• http://www.propwall.my/skudai/taman_ungku_tun_aminah/3216
Taman Scientex @ Pasir Gudang (PINE SIGNATURE 3)	• http://scientex.com.my/web/property/pg-pine-signature3.aspx
Taman Scientex @ Pasir Gudang (ASTANA 3)	• http://scientex.com.my/web/property/pg-astana3.aspx

Appendix. B

The source data of [EnvD]-[Grn] analyses

FID	Property_Name	Area (km2)	[Grn]	[Ab-EnvD]	[%-EnvD]
1	Taman Nusantara	0.83	0	0.5000	75.47
2	Taman Nusa Bayu	0.51	0	1.5800	94.74
3	Setia Eco Gardens	1.04	3	3.7000	86.80
4	Taman Nusa Perintis 1	1.12	0	0.3000	96.00
5	Taman Nusa Perintis 2	5.26	0	0.0300	100.00
6	East Ledang	1.51	2	1.4500	94.31
7	Ledang Heights	0.32	1	0.0600	20.00
8	Leisure Farm Resort Residence	6.87	2	-0.1800	0.00
9	Horizon Hills	1.05	2	5.5900	86.46
10	Eco Botanic	0.54	3	0.1000	88.89
11	Sunway Iskandar, Medini	0.27	2	0.9100	19.41
12	Avira Garden Terrace, Medini	0.47	2.5	0.7400	93.65
13	Nusa Sentral	0.30	1	0.4300	75.56
14	Nusa Idaman	1.31	2	0.8100	84.42
15	Nusa Indah	0.84	0	0.3300	100.00
16	Bukit Indah 1 and 2	1.13	2	1.9000	97.44
17	Taman Tan Sri Yaacob	3.92	0	0.2100	100.00
18	Taman Nusa Bestari 1	1.66	0	0.8000	95.52
19	Taman Nusa Bestari 2	4.11	0	0.1600	100.00
20	Taman Nusa Jaya	0.92	0	0.4100	100.00
22	Taman Nusa Duta	3.95	1	0.3100	100.00
23	Taman Laguna	0.33	0	0.1300	100.00

24	Taman Perling	4.27	0	0.3800	65.22
25	Taman Sutera	2.41	0	0.0500	33.33
30	Taman Seri Orkid	1.46	0	0.0600	50.00
31	Taman Sutera Utama	6.49	1	1.3500	83.08
32	Taman Ungku Tun Aminah	5.73	0	0.2800	100.00
35	Phase 9D and 9E @ Taman Desa Tebrau	0.51	1	0.6900	65.48
36	Chantique Phase 2 @ Taman Pelangi Indah	1.56	1	0.5600	83.33
37	Setia Eco Cascadia @ Taman Setia Indah	2.97	3	0.9500	100.00
38	Taman Kempas Utama	4.32	2	1.1500	78.63

Appendix. C

The source data of [EnvD]-[Grn] analyses

FID	Property_Name	[Grn]	[Dis]	Min (MR/sf)	DEV from MED	[Prc]	Max (MR/sf)
1	Taman Nusantara	0	0.083	149	-149	240	331
2	Taman Nusa Bayu	0	0.069	133	-217	172	210
3	**Setia Eco Gardens**	3	0.102	293	221	610	928
4	**Taman Nusa Perintis 1**	0	0.083	150	-80	309	469
5	**Taman Nusa Perintis 2**	0	0.064	328	-22	367	406
6	East Ledang	2	0.037	239	306	695	1152
7	**Ledang Heights**	1	0.045	550	177	567	583
8	Leisure Farm Resort Residence	2	0.049	418	313	703	988
9	Horizon Hills	2	0.039	333	525	915	1496
10	**Eco Botanic**	3	0.041	504	462	851	1198
12	Avira **Garden** Terrace, Medini	2.5	0.029	No data	482	871	No data
13	Nusa Sentral	1	0.055	164	-151	238	312
14	Nusa Idaman	2	0.051	281	137	526	771
15	Nusa Indah	0	0.059	320	-107	282	244
16	Bukit Indah 1 and 2	2	0.056	210	133	522	835
17	**Taman Tan Sri Yaacob**	0	0.074	142	-247	142	143
18	**Taman Nusa Bestari 1**	0	0.065	250	-52	338	425
19	**Taman Nusa Bestari 2**	0	0.071	226	-33	356	486
20	**Taman Nusa Jaya**	0	0.072	351	57	446	542
21	**Casa Almyra**	0	0.068	179	-8	381	583

22	Taman Nusa Duta	1	0.063	265	137	527	789
23	Taman Laguna	0	0.063	279	24	413	548
24	Taman Perling	0	0.049	381	129	518	656
25	Taman Sutera	0	0.070	92	-116	273	455
26	Rosa Terraces 2	0	0.080	322	7	396	471
27	UDA Heights	0	0.076	430	72	462	493
28	Mutiara Mas (OPAL ROYAL)	1	0.097	404	117	506	608
29	Mutiara Mas (OPAL IMPERIAL)	1	0.097	370	74	463	556
30	Taman Seri Orkid	0	0.089	167	-78	311	455
31	Taman Sutera Utama	1	0.091	212	-17	372	532
32	Taman Ungku Tun Aminah	0	0.098	147	-226	163	179
33	Taman Scientex @ Pasir Gudang (PINE SIGNATURE 3)	0	0.151	249	-75	315	380
34	Taman Scientex @ Pasir Gudang (ASTANA 3)	0	0.151	248	-111	278	308
35	Phase 9D and 9E @ Taman Desa Tebrau	1	0.100	221	-127	262	304
36	Chantique Phase 2 @ Taman Pelangi Indah	1	0.119	205	-100	290	374
37	**Setia Eco Cascadia @ Taman Setia Indah**	3	0.118	317	271	660	1004
38	Taman Kempas Utama	2	0.110	246	0	389	533

Appendix. D

The source data of the synthesis between[EnvD]-[Grn]-[Grn]