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Illegal Factories in Mukim Parit Bakar, Muar: Implications to Residential Properties

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Abstract: In Malaysia, generally under the National Land Code 1965, land use can be divided into three categories, which are building, agriculture and industrial. Non-compliance of land use such as misuse of residential or agricultural land for industrial activity would bring problems to the residents in the vicinity. In Parit Bakar, Muar, Johor there are a number of illegal factories that operate on agricultural land that is not gazetted for industrial activities. It is a common belief that the existence of industrial activity nearby would cause environmental pollution and lower the demand and property price of that surrounding area. Hence, objectives of this research are to study the effects of the existence of illegal factories towards the housing price and to study the relationship of illegal factories location and housing distribution in Mukim Parit Bakar. The objective of this study is achieved by using Multiple Regression Analysis (MRA) and distance analysis. Transaction data of residential properties in the research area provided by the Valuation and Property Service Department (JPPH) Muar were analyzed using Statistical Package for the Social Science (SPSS) software. MRA results indicated that distance to illegal factories significantly affect the property price in the surrounding area and the relationship between housing price and illegal factories varies geographically in a positive and negative way. Distance to illegal factories, which are located at the center region, has a positive impact on housing price and thus give benefit to housing schemes nearby.

Keywords: Residential, Illegal Factories, Land Use, Industrial Land.

1. Introduction

In Malaysia, there are illegal factories misusing the land for industrial activity and as these illegal factories are not registered, local authorities are unable to identify the trend of illegal establishment in the local and take legal action. According to the report of the Department of Statistic Malaysia (2009), there is no specific survey on the informal sector carried out and the numbers are estimated using indirect methods. It is also noted that many developing countries are facing difficulties in control of urban land use and equal access to legal status (Rully Damayanti, 2011).

Although industrial activity contributes to local and national economy, externalities on land use such as noise and dust produced from manufacturing industries change the existing way of life of people and the surrounding property value (Kemiki OA, 2014). The situation is worsened when the industry activity is carried out illegally without undergoing proper assessment. Planned industrial zone with centralized treatment facilities reduce negative environmental impacts (Soytong and Perera, 2014). Residential land use mixed with industrial activities may bring a lot of unnecessary environmental impact (Sofer *et al.*, 2012).

1.1 Research Background

Based on a census report of the Department of Town and Country Planning (JPBD) Johor in 2008, there are a total of 711 industries that operated outside the industrial zone. In Muar, there are a total of 162 industries and most industries involved operate on agricultural zones (84 units), residential zones (69 units) and commercial zones (9 units) and the numbers of informal industrial sectors are still increasing every year. According to the officer of Land Office Muar, there is no gazetted industrial zone or industrial land use in the study area and most of the land status in Parit Bakar area are still in agricultural land form.

Illegal factories issue in Mukim Parit Bakar, Muar is supported by a statement from the officer of Muar Municipal Council, En Hamim Samuri in Berita Harian (2003) where illegal furniture manufacturing factories in Parit Bakar operating on the agricultural land near to residential areas causes environmental pollution to the vicinity. Hence, this study will focus on the issue of the existence of illegal factories which misuse of agricultural land affecting the life of the residents and residential properties price in Parit Bakar sub-district area.

1.2 Problem Statements

In Malaysia, there are precedents regarding these illegal factories that operate in residential zones. According to Jade Chan in The Star (2014), there is a case where there are illegal factories and workshops that operate in residential areas of Kampung Baru Sungai Buloh. The residents there hope that the illegal factories can be relocated or demolished. According to the villagers, they estimate that 50 units out of 500 houses in the residential area turned to illegal factories for furniture, metal works, epoxy production and other related businesses. Another similar article written by Yip Yoke Teng in The Star (2010) demonstrates that there are authorities finally cracked down on factories which misusing Temporary Occupation Licence (TOL) land for recycling plastic business in Sungai Buloh. He states that nearby residents had complained that the business of recycling plastic caused worrying pollution.

There is also another recent article on the illegal factory issue which occurs in Subang, Selangor written by Merizarani T. Selva and published on 15 Jan 2016 in The Star. This article illustrates an eight-year-old illegal warehouse in Taman Seri Aman Hilir, Puchong that has been torn down by Subang Jaya Municipal Council (MPSJ). MPSJ corporate communications officer Azli Muhammad Azli Miswan said the structure was built on residential land without approval and the factory was raided and torn down under Section 13 of the Town and Country Planning Act 172.

This illegal building which occupied on a one hectare land was used to act as a storage warehouse for construction equipment such as forklifts, cranes and steam rollers. Yusmizal Dolah Aling also wrote

an article on a factory located on agricultural land in Taman Sri Indah, Balakong on 14 January 2011 published in Utusan Malaysia. The article reflected the problems faced by local residents such as heavy vehicles in and out the main road to Taman Sri Indah, Balakong and also noise pollution affecting residents nearby. It is also to believe that there are illegal workers from Myanmar, Vietnam and Bangladesh staying at the factory. All these cases demonstrate that illegal factories issue is not new in Malaysia and there is a need to solve these illegal establishment issues for the sake of residents nearby. Illegal factories that are operating in a residential area would make the area unfavorable for nearby residents.

In Parit Bakar, Muar, Johor there are a number of illegal factories that operate on agricultural land located near to residential zones that are not gazetted for industrial activities. According to the Muar District Local Plan 2002-2015, there are plans to relocate these illegal factories into the industrial zones. Poor environmental conditions due to informal sector activities greatly threaten the health and well-being of urban life (Nwaka, 2005). In order for cities and towns to remain economically and environmentally sustainable, it is important to take legal actions on informal sectors which can cause environmental degradation (Adeyinka, Omisore, Olawuni, and Abegunde, 2006).

Streimikiene (2015) noted that the quality of housing environment as living in noisy areas or exposure to environmental problems has a direct impact on human health and living conditions. Sedaghatnia *et al.*, (2013) also point out that the neighborhood environment is the most fundamental base of life as people spend the majority of their lives in the neighborhoods which affect their economic and social life. Environmental pollution which negatively affects the community can be taken into account in real estate transactions dealings (Iman, Hamidi and Liew, 2009). Hence, this study will study the existence of illegal factories toward housing price and the relationship of illegal factory location and housing distribution.

1.3 Research Questions

Given the research issues and discussed in the preceding section, the following are the research questions:

(i)   What is the effect of the existence of illegal factories toward housing price?
(ii)   What is the relationship of illegal factories location and housing distribution?

1.4 Research Objectives

This study consists of two main objectives, which are:

(i)   To study the effect of the existence of illegal factories towards housing prices.
(ii)   To study the relationship of illegal factories location and housing distribution.

1.5 Significance of the Study

The research carried out is to determine whether distance to illegal factories affecting property price in their vicinity and how is the relationship between illegal factories and housing distribution. Hence, this study is believe to give benefits to these respective parties:

(i)   Prospective house buyers/ tenants

It can act as a reference for those potential house buyers or tenants to live in Parit Bakar area or buying property for investment purpose as the relevant property price of the surrounding area around mukim Parit Bakar will be analyzed.

(ii)   Local council and related authorities

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It can help the local authorities in the planning of strategies and policies to improve quality of life of the residents in Parit Bakar sub-district. This study can serve as a guide for related authorities to understand the phenomena of the illegal factoriesissue and take legal action.

(iii)   Valuers

This study would help give an insight to valuers in determining residential property price in Parit Bakar sub-district by having understanding on problems faced by the residents nearby.

(iv)   Housing developers

The study can help housing developers to allocate appropriate place for housing development projects. Housing development projects which located near to an industrial sites may devalue the housing price. As people reject to buy houses near to an industrial site, it may directly affect the number of sales and company profits.

1.6 Scope of the Study

There are two aspects in this study which are the effects of existence of illegal factories towards residential property price in the surrounding area and to study the relationship of illegal factories location and housing distribution through mapping analysis. The study is focusing on location within the jurisdiction of Muar Municipal Council, Parit Bakar sub-district. The study looks into whether residential property price will be affected in terms of proximity to illegal factories in the Parit Bakar area. Types of residential property chosen for this research are semi-detached house and terrace housing. The study will investigate whether the illegal factories cause any impacts to the residents nearby. The study will be carried out in the Parit Bakar area as there is quite a significant number of the illegal factories located within the area and willingness of local authorities to provide relevant data.

2.   Literature Review

Lack of development plan and compliance are some factors that contribute to non-compliance of land use issue Goh (2000). He describes that lack of development plans, particularly local plans, causes problems in regulating urban land use. He explained that legal local and structure plans act as a reference on what type of development ought to take place in future. Local plans enable local residents to have a good idea of what type of development to be expected in their neighbourhood.

He also pointed out non-compliance with municipal rules and regulations are due to ignorance of rules too restrictive rules or too high standards as to make compliance too costly process too difficult to comply with, such as having for two years to get a simple permit zero or low cost of transgression and contingent consent", meaning that one would not comply if he or she believes others are not complying.

It is also noted that non-compliance of land use such presence of illegal factories in residential areas can be due to disregard of policies and spatial planning prevents proper zoning to separate between the residential area and industrial area (Johan Bentinck and Shilpa Chikara, 2001).

2.1 Impacts of Industrial Land Use

Land use has the ability to affect the well–being of people in daily life (Kweon *et al.*, 2010). Industrial activity has a positive effect on economic development as it provides employment opportunities and reduces poverty, but there are some undesirable impacts associated with the environment (Kemiki, 2014; Sujoy Das and Niranjan Roy, 2014) which may affect the residential

satisfaction of households living close to these factories. Residents staying close to industrial sites may be affected in terms of congestion, traffic, noise, air pollution and obstruction of view (Vor and Groot, 2011). Informal or illegal industrial activity worsen the environment situation as they are poorly managed and developed in violation of zoning regulations, planning standards, government approval and standard rule (Yahaya Ubale *et al.*, 2013). The level of influence of these negative effects on households" neighborhood satisfaction significantly depend on the distance between the site and the location of a house (Vor and Groot, 2011; Ijasan *et al.*, 2012). Meanwhile, Vor and Groot (2011) also took into consideration the size of the industrial site concerned. Externalities on land use such as unwanted noise and dust resulting from manufacturing industries change the existing way of life of local communities and surrounding property value (Kemiki, 2014). Informal sector enterprises, particularly those located in residential areas constitute a major threat to the well-being of urban life (Nwaka, 2005).

2.2 Measuring the Effects of Environmental Pollution to Residential Property Price

Environment has been introduced as the sum total of physical, economic and social features of residential urban areas (Das, 2007). There are many previous studies that indicate residential property value or housing price is negatively related to environmental nuisances such as air pollution, noise pollution and water pollution as noted in Table 2.2. It is noted that the consumer"s willingness to pay (WTP) to different levels of pollution is the general way to measure the effects of environmental disamenities (Iman *et al.*, 2009). When people realize that environmental disabilities are able to give negative effects on health and property investment value, this may cause a drop in residential property value located near such unfavorable living places. Consequently, residential property in that area will have lower demand. This is because there is a linear relationship between the demand and the price. Theoretically, higher demand results in higher property price.

Iman *et al.* (2009) illustrate that the relationship between distance to a polluted site and reduction in property price can be defined by certain profiles that may represent some undesirable elements such as sub-market area and type of environmental pollution. Hence, different profiles (noise, water and air pollution) will show different effects of environmental nuisance on property prices based on distance from a polluted site as in Figure 1. His study explains that the further the distance to disamenities or polluted sites, the lower will be the reduction in property price.

2.3 Land Use Planning

Land use planning is to regulate the growth of cities to attain higher levels of productivity, quality of life and sustainable development and also answer citizens' requirements (Tilaki *et al.,* 2013). Planning authorities have a duty to supervise, regulate and solve the issue of non-compliance (Yakob, Yusof, & Hamdan, 2012). According to Goh (2000), lack of local plan is one of the drawbacks in controlling urban land use. He further explains that lack of local plan is due to local plans that were prepared by the local authorities are not gazetted as legal documents. He emphasizes that a legalized local plan is important to ensure that existing residents know what to be expected in their neighborhood. In short, land use planning is important as the way land uses and landscaped components are arranged may bring about an improvement on the well-being of residents and their neighborhood satisfaction (Kweon *et al.,* 2010).

2.4 Land Use in Mukim Parit Bakar

Mukim Parit Bakar is divided into 5 regions. According to the local plan of whole mukim Parit Bakar, land use in the study area can be categorized into 16 types which includes existing residential, proposed residential, existing commercial, proposed commercial, existing industrial, proposed industrial, institutional, cemetery, religious facilities, health facilities, community facilities, open space and recreational facilities, infrastructure and utilities, government reserves and water body as shown in

the figures below. According to the officer of Muar Municipal Council, the proposed industrial zone can be considered as a way to legalise those illegal factories which operate on the non-industrial land zone.
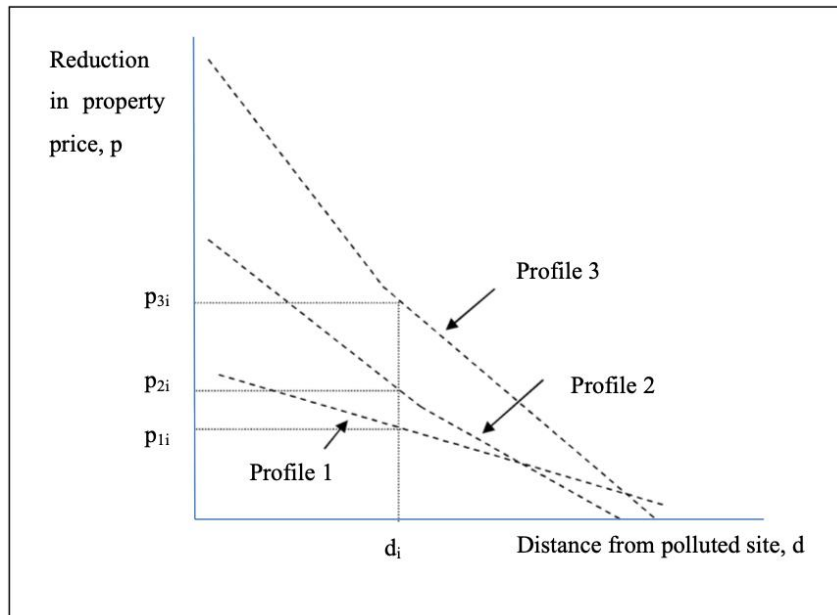

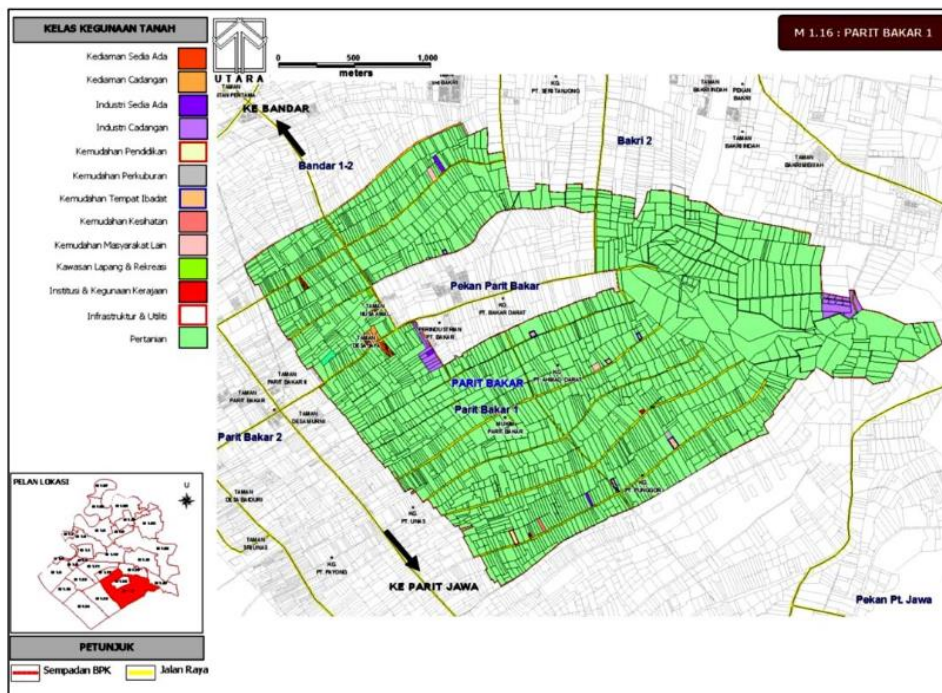**Figure 1: Proximity to polluted site and house price (Iman *et al.*, 2009)**

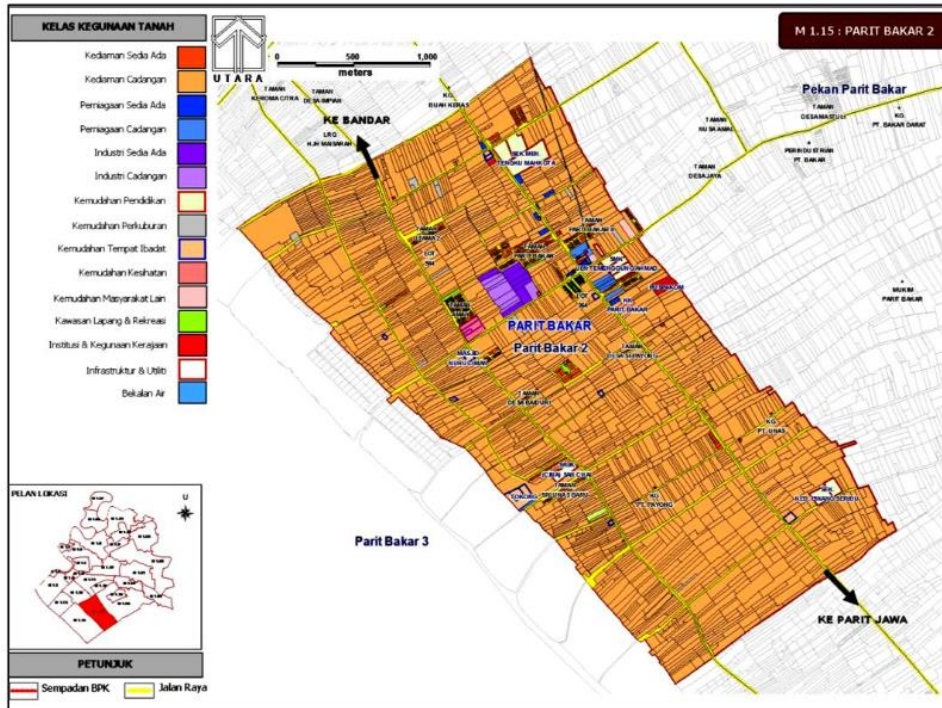**Figure 2: Parit Bakar (I) (Muar District Local Plan, 2002-2015)**

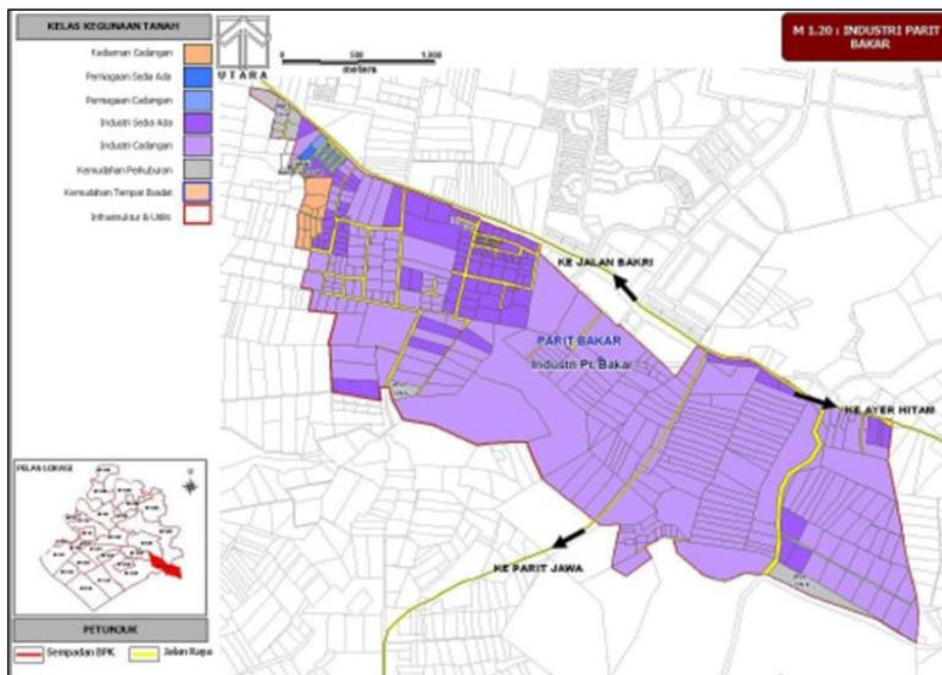**Figure 3: Parit Bakar (II) (Muar District Local Plan, 2002-2015)**

Figure 4: Industry Parit Bakar (Muar District Local Plan, 2002-2015)

Non-compliance of land use which has the ability to influence quality of life in terms of social, economic and environmental aspects is the most debatable issue in achieving sustainability (Yakob *et al.*, 2012). The degree or extent of that impact is dependent upon such factors as the extent of type of land use in that area. Basically, illegal factories would result in significant visual impacts upon a site and its surrounding in terms of quality of life. Amao (2014) notes that housing is an important part or element of quality of life. Property value or housing price can be influenced by the environment quality attribute (Iman *et al.*, 2009; Oloke *et al.*, 2013). Poor housing environment quality will result in

homebuyers avoiding buying houses that are located in that area especially those located close to the informal industrial site or factories as it may affect their quality of life. Hence, it will lower the demand on the housing market in that area and also the property price in the surrounding area as the potential buyer will consider the environment or neighborhood factor during buying property and also resell problems.

3. Research Methodology

This study employs an empirical approach to data analysis using secondary data sourcing from Valuation and Property Services Department (JPPH) Muar to evaluate the effects of existence of illegal factories on property price in the research area.

3.1 Multiple Regression Model

Formulation of multiple regression models can statistically test the correlation between property price (dependent variable) and other independent variables such as the distances to these illegal factories. Before determining the dependent variable and independent variables, data cleaning involves filtering out the outlier and also missing values are done to obtain appropriate data. This step is important to ensure the result is consistent. Presence of illegal factories in Parit Bakar sub-district more or less will bring some effects on the property price in the surrounding area. Below shows the example of equation that represents to study the relationship between property price and the distance to each illegal factory:

$\alpha + \beta1 (HT) + \beta2 (LS) + \beta3 (HS) + \beta4 (NB) + \beta5 (DV) + \beta6 (NF) + \beta7 (FA) + \beta8 (D1) + \beta9 (D2) + \beta10 (D3) + \beta11 (D4) + \beta12 (D5) + \varepsilon$

where:

α = Constant/ intercept

$\beta1, \beta2, \beta3, \beta4, \beta5, \beta6, \beta7, \beta8, \beta9, \beta10, \beta11, \beta12$ = Regression coefficient

HT = House Type

LS = Lot Size

HS = Housing Scheme

NB = No of Bedroom

DV = Date of Valuation

NF = No of Floor

FA = Floor Area

D1 = Distance to Illegal Factory 1

D2 = Distance to Illegal Factory 2

D3 = Distance to Illegal Factory 3

D4 = Distance to Illegal Factory 4

D5 = Distance to Illegal Factory 5

ε = Residuals or error term.

Dependent variables are the housing price while the independent variables are type of house (jenis kediaman), lot size (luas lot), number of floor (bilangan tingkat), number of bedroom (bilangan bilik tidur), date of valuation (tahun nilaian) , housing scheme (taman) and distances from each illegal factory to the residential area.

In order to achieve first objective, two regression models after testing and excluding insignificant independent variable is built for the two selected cases as below:

(i) Model 1 : Regression analysis without distances to illegal factories variables;

Housing price = -10853340.737 + 0.01 (DV) + 248.557 (LS) + 9444.113 (HT) + 33224.899 (NB) -1498.972 (HS) + 1273.604 (FA) + ε

(ii) Model 2 : Regression analysis with distances to illegal factories variables;

Housing price = -10349475.183 + 0.01 (DV) + 321.391 (LS) + 18222.739 (FA) - 7879.256 (HS) + 12448.296 (D1) + 10891.345 (D2) -15878.915 (D3) + 3758.425 (D5) + ε

Note:

HT = House Type

LS= Lot Size

HS= Housing Scheme

NB= No of Bedroom

DV= Date of Valuation

FA= Floor Area

D1= Distance to Illegal Factory 1

D2 = Distance to Illegal Factory 2

D3 = Distance to Illegal Factory 3

D5 = Distance to Illegal Factory 5

4. Data Analysis and Results

Based on Table 1, this model is statistically significant as $F_{(6, 280)} = 62.981$, $p < 0.001$, and $R^2 = 0.574$ implying that about 57.4 percent of the housing price can be explained by using the independent variables such as: date of valuation, floor area, lot size, number of bedroom, housing scheme and house type. The coefficient table provides us the necessary information to estimate price and other independent variables, as well as determine whether these independent variables contribute statistically significantly to the model (by looking at the "Sig" column).

Based on Table 2, these variables are significant (sig value less than 0.05). All independent variables show positive regression coefficient except housing scheme. For beta regression coefficient, if the beta regression coefficient is positive, it means that every one unit increased in the predictor variable, the dependent variable will increase by the unstandardized beta coefficient. All the independent variables in this regression model show positive coefficient except housing scheme.

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Table 1: Model summary 1 (Tay, 2016)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.758[a]	.574	.565	65115.86836	.574	62.981	6	280	.000

a. Predictors: (Constant), FLOOR.AREA, V.DATE, TAMAN, LOT.SIZE, NO.BEDROOM, HOUSE.TYPE

Table 2: Table of coefficient result of Model 1 (Tay, 2016)

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	T	Sig.	Correlations Zero-order	Correlations Partial	Correlations Part
1	(Constant)	-10853340.737	1074139.262		-10.104	.000			
	Date.V	.001	.000	.416	9.930	.000	.524	.510	.387
	Lot.Size	248.557	55.123	.246	4.509	.000	.174	.260	.176
	House.Type	9444.113	2988.333	.187	3.160	.002	-.106	.186	.123
	No.Bedroom	33224.899	8877.064	.208	3.743	.000	.487	.218	.146
	Housing Scheme	-1498.972	618.788	-.103	-2.422	.016	.067	-.143	-.094
	Floor.Area	1273.604	152.901	.409	8.330	.000	.584	.446	.325

a. Dependent Variable: PRICE

4.1 Regression result with Distance to Illegal Factories Variables

Based on Table 3, regression model 2 is statistically significant as $F(10, 276) = 49.839$, $p<0.001$, and $R^2 = 0.644$ implying that about 64.4 percent of the housing price can be explained by using all the independent variables such as: date of valuation, floor area, lot size, number of bedroom, number of floor, house type and distance to each illegal factory.

Table 3: Model summary 2 (Tay, 2016)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.802[a]	.644	.631	60017.82698	.644	49.839	10	276	.000

a. Predictors: (Constant), DISTANCE.5, FLOOR.AREA, V.DATE, TAMAN, LOT.SIZE, NO.BEDROOM, DISTANCE.2, HOUSE.TYPE, DISTANCE.1, DISTANCE.3

Based on Table 4, housing price was primarily predicted by date of valuation, lot size, house type, number of bedrooms, housing scheme, floor area, distance to illegal factory 1, distance to illegal factory 2 and distance to illegal factory 3. All independent variables are significant (sig value less than 0.05).

Addition of the distance variables signifies the housing scheme as independent variable. Most independent variables show positive beta regression coefficient except housing scheme and distance to illegal factory 3 show negative coefficient value.

Table 4: Table of coefficient result of Model 2 (Tay, 2016)

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	T	Sig.	Correlations Zero-order	Correlations Partial	Correlations Part
1	(Constant)	-10349475.183	1058071.598		-9.781	.000			
	Date.V	.001	.000	.395	9.572	.000	.524	.499	.344
	Lot.Size	321.391	53.418	.318	6.017	.000	.174	.341	.216
	House.Type	13653.265	2981.518	.270	4.579	.000	-.106	.266	.165
	No.Bedroom	18222.739	8835.667	.114	2.062	.040	.487	.123	.074
	Housing scheme	-7879.256	1227.543	-.541	-6.419	.000	.067	-.360	-.231
	Floor.Area	1137.519	143.653	.365	7.919	.000	.584	.430	.285
	Distance.1	12448.296	2202.806	.823	5.651	.000	.208	.322	.203
	Distance.2	10891.345	2296.550	.723	4.742	.000	.228	.274	.170
	Distance.3	-15878.915	2889.331	-1.108	-5.496	.000	.173	-.314	-.197
	Distance.5	3758.425	895.444	.219	4.197	.000	.150	.245	.151

a. Dependent Variable: PRICE

4.2   Discussion on Regression Analysis

According to both regression models, all significant independent variables (p-value < 0.05) show positive beta coefficient values which means that an increase in any of these independent variables will increase the housing price except housing scheme and "distance to illegal factory 3". This finding also corresponds with the finding in the correlation analysis which demonstrated that all of it shows a positive relationship.

It is noted that the most important factor influencing the housing price for both regression model is the number of bedrooms with $\beta = 33224.899$ in regression model 1 and $\beta = 18222.739$ in regression model 2. This shows that home buyers favour more bedrooms in housing options. People with many family members will demand a bigger housing area or space with many bedrooms. This finding is consistent with the home ownership study of Anthony (2012) who finds out that the number of bedrooms had a bigger influence in property value compared to the number of bathrooms in his study.

This finding also can be supported by Oloke *et al.* (2013) where number and size of bedrooms is the most significant attribute influence on property price. House type with $\beta = 9444.113$ in regression model 1 and $\beta = 13653.265$ in regression model 2 also highly contribute to the housing price. It is logical as a semi-detached house will have a higher property price than a terraced house. Lot size and floor area also significantly affect the property price as expected. The result correspond to Islam (2012) where he demonstrates that size of lot and area of the house greatly contribute to variation in house price. Positive coefficient also indicates that the larger the lot size or floor area, the higher the property price.

In regression model 2, "distance to illegal factory 1", "distance to illegal factory 2" and "distance to illegal factory 5" with (β =12448.296, 10891.345, 3758.425) are important factors that highly contribute to housing price. Positive beta coefficient also suggests that an increase in distance to these illegal factories will increase the housing price. These illegal factories significantly influence housing price in the surrounding area as observed p-value fall below significance level of 0.05. The result corresponds to previous studies as mentioned in chapter 2 that proximity to polluted sites can influence the property price and homebuyer tends to look into the surrounding environment when it comes to making a purchase decision.

However, distance to illegal factories 3 (β = -15878.915) is negatively significant to the property price. With respect to proximity to illegal factory 3, house price was expected to decrease for every kilometre away from illegal factories. The result does not correspond to the finding in correlation analysis and other previous studies. Normally, increasing distance to illegal factories should be moved in line with increase in property price. The anomaly may be due to demand of the market due to positive externalities in terms of location. Illegal factory 3 may also have some different aspects or characteristics that attract house buyers to buy houses near the area.

As shown in Table 5, the first regression model involves only housing structural attributes shows $R^2 = 0.574$ implying that about 57.4 per cent of the total variation of housing price can be explained using the housing structural attributes variables. While the second regression model after adding distance to illegal factory variables shows $R^2 = 0.644$ means that 64.4 per cent of total variation in housing price can be explained using given independent variables, respectively. Comparison of coefficient determinations, R^2 of both regression models shows that distances to illegal factories significantly affect housing price as it increases the explanatory power of R^2 from 0.574 to 0.644.

Besides, it could be seen that distance to illegal factory 1, 2, 3 and 5 variables also show significantly higher coefficient value than lot size and floor area in regression model 2. Normally, when a developer sets a price for housing, floor area and lot size is emphasized by the developer. House buyers will also look at the total floor area and lot size in making purchase decisions. However, in this case, when comparing the beta coefficient value of distance to illegal factories 1 (β =12448.296), distance to illegal factory 2 (β=10891.345), distance to illegal factory 3 (β= -15878.915) and distance to illegal factory 5 (β=3758.425) with lot size (β=321.391) and floor area (β= 1137.519), it shows that property price are not highly influenced by lot size and floor area. Some homebuyers are more concerned on neighbourhood factors compared to other housing characteristics.

According to Farber (1998), impacts of unfavorable facility or land use on the observed property market may differ due to local conditions, such as the strength of economies and housing market, perspective or preferences of impacted communities and the real or perceived risk compared with the positive externalities nearby. In short, the regression results show that although distance to illegal factories is not the dominant variable affecting housing price, it does significantly affect the housing price in Parit Bakar sub-district.

4.3 Mapping Analysis of the Illegal Factories

The red dots in Figure 7, represent the location of illegal factories while the blue dots represent the residential area or housing scheme that is located nearby. Buffer zone of each radius of the circle is measured in 1 km. There are 4 illegal factories and 22 residential areas that have been marked in this map.

Table 5: Comparison between two regression model (Tay, 2016)

Variable	Without distances variables (Model 1)			All variables (Model 2)		
	Coefficient	t-value	Sig	Coefficient	t-value	Sig
(Constant)	-10853340.737	-10.104	0.000	-10349475.183	-9.781	0.000
Date.V	0.001	9.930	0.000	0.001	9.572	0.000
Lot.Size	248.557	4.509	0.000	321.391	6.017	0.000
House.Type	9447.113	3.160	0.002	13653.265	4.579	0.000
No.Bedroom	33224.899	3.743	0.000	18222.739	2.062	0.040
Taman	-1498.972	-2.422	0.016	-7879.256	-6.419	0.000
Floor Area	1273.604	8.330	0.000	1137.519	7.919	0.000
Distance.1				12448.296	5.651	0.000
Distance.2				10891.345	4.742	0.000
Distance.3				-15878.915	-5.496	0.000
Distance.5				3758.425	4.197	0.000
R square (R^2)	0.574			0.644		

Researchers had determined the distances between these residential areas and targeted illegal factories. Distance is measured linearly from each center point of residential area to the targeted illegal factories using Google Map. Table 6 shows the distance from each residential area (Taman) to the targeted illegal factories. Overall, the smallest proximity to illegal factories is 300m and furthest proximity is about 5.69 km.

From regression analysis, it is noted that illegal factory location not only brings negative impact to housing prices in the surrounding area, but positive impact as well. It is a norm that the further the distance to an illegal factory, the higher the property price. People tend to stay far away from undesirable facilities, such as factories and landfill. However, a surprise finding is that based on the negative beta coefficient of distance to illegal factory 3 (β = -15878.915) shows that an increase in the distance to illegal factory 3 would reduce the housing price in the surrounding area. This finding is in contrast with previous studies.

Hence, a mapping is done to relate the illegal factory location and housing distribution. Concentric circles in the mapping can help to understand the distribution of factories in Mukim Parit Bakar. Observation of housing data sets covers the whole Mukim Parit Bakar and 5 reported illegal factories scattered over the area. From the mapping, it can be clearly seen that the illegal factories are not physically isolated from the surrounding formal residential area. It is also noted that the further the distance to illegal factory 1, 2 and 5 resulted in less distance to illegal factory 3. Hence, it is logical that these housing nearer to illegal factory 3 shows a higher property price. The mapping also illustrated that illegal factory 3 is considered located at the center region which corresponds to Figure 8 where agglomeration economies occurred.
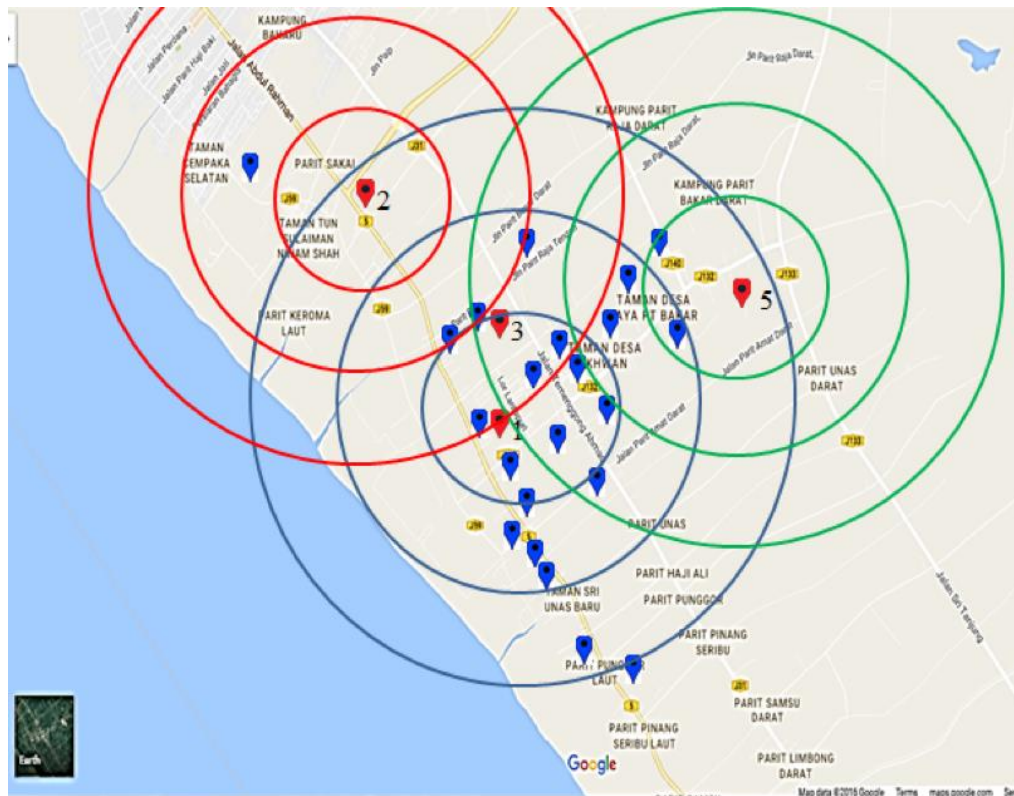
Figure 5: Mapping of illegal factories and residential area involved (Tay, 2016)

By using Marshall (1890) agglomeration economies theory, there is an advantage when firms of the same industry clustered for their mutual productivity in terms of labor pooling and specialized input services. The center region where agglomeration economies occurred serves as an optimum location. People and firms often concentrate in this particular area, in this case, around illegal factory 3. Illegal factory 3 locations can benefit from agglomeration economies where three other economies activities (illegal factory 1, 2 and 5) having their respective locational constraints. Examples of advantages are in terms of agglomeration of population, common infrastructure and also diversity of labor and market size which may indirectly increase the demand and property price in that surrounding area. Industrial sector more or less strengthens and extends the local market as there is an inflow of people from one area to another, raises demand for goods and services and creates a good business environment (Sujoy Das and Niranjan Roy, 2014).

Besides, there is a possibility that people who are willing to buy residential property in that area due to nearby working locations or working at the illegal factory 3. It is noted in chapter 2 where proximity to the workplace is one of the factors that influences demand of residential properties in certain areas. It is also to believe that workers that work at the illegal factories region prefer to stay nearby their workplace in order to reduce cost and time of travel. Increased accessibility tends to reduce travel cost and improve economic opportunities (proximity to the workplace), especially for those low-income population (Litman, 2016). Sujoy Das and Niranjan Roy (2014) note that positive and negative impacts of industry influence house prices. They argue that industry provides job opportunities as positive impact and environmental pollution effect as negative impact. Job opportunities raised the demand for staying near to industrial sites, whereas environmental qualities go against the tendency to stay near industrial sites.
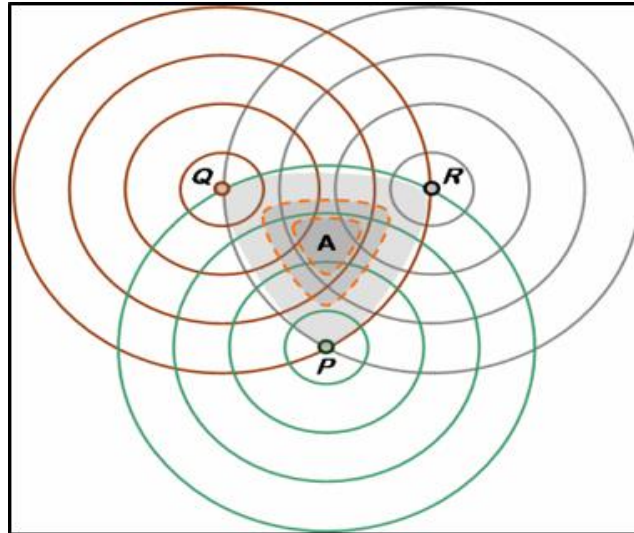
Figure 6: Agglomeration economies (Google, 2016)

Meanwhile, uncertainty on characteristics of illegal factory 3 may also influence the property price. Unforeseen condition, market situation, and interaction of the supply and demand factor can contribute to increasing housing price (Islam, 2012; Khoiry *et al.*, 2012). Characteristics of illegal factory issues can be left for future exploration. In short, an important result of the findings of the analysis is proximity to illegal factory sites has positive and negative significant effects on property price. From the locational analysis, it is noted that an optimum location is recognized.

5. Discussion and Conclusion

Based on the data analysis and results of this study, the research objectives had been achieved by using secondary data obtained from government agencies and also application of Google mapping. Total of 287 transactions data served as a sample to determine whether proximity to illegal factories influence property prices in the surrounding area.

The results show that property prices of residential properties located near to illegal factories being affected or not, actually depend on the preference of buyers and the location. As can be seen in the result of multiple regression analysis, distances to illegal factory variables is not the dominant factor that affects property price in the study area, however it did significantly affect property price located nearby. Normally, people will tend to stay far away from illegal factories as it has a negative aura. However, from the study, it shows that distances to informal sector activities in a planned residential area would positively and negatively affect the property price in the surrounding area.

The study also shows that homebuyers have different perspectives toward the criteria on the location of residential properties. Besides, an optimum location was also found based on the locational analysis (the mapping). Illegal factory 3 which is located in the center region has benefits in terms of agglomeration economies when people and firms concentrated in that particular area help to increase the demand and property price.

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