

INFILL DEVELOPMENT AND ITS ATTENDANT CONSEQUENCES ON NEIGHBOURHOOD PROPERTY VALUE: EVIDENCE FROM GWARINPA, ABUJA, NIGERIA

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ABSTRACT

This paper examines the impact of infill developments, which involve developing vacant or under-used parcels within existing urban areas that are largely developed, on local housing prices. Infill developments are encouraged because it helps in curbing urban sprawl and because the newer and more expensive buildings, which are constructed in place of old buildings or vacant sites, increase the city's tax base. However, infill developments may impose externality effects on nearby properties and thereby affect their values. It is not uncommon for existing residents to resist new developments within their neighbourhood for reasons such as visual pollution, increased traffic noise, disruption to local traffic patterns, or loss of neighbourhood's character. Nevertheless, a new development tends to have a positive net effect, since the new building, by virtue that it is cleaner and more attractively designed, adds to the overall appeal of the neighbourhood. This, in turn, attracts more desirable inhabitants, such as higher income occupants or homeowners, to live in the area. The study made use of questionnaires for data collection. A total of 106 questionnaires were distributed, 50 to estate surveyors and values and 56 to the residents of the housing units. The percentage of the retrieval rate is 68 % and 70 % respectively from the ESVs and the residents, which was used for the analysis. The study deployed descriptive statistics such as frequency distribution table, maximum, minimum, mean, standard deviation, mean weighted score (MWS), relative importance index (RII), and inferential statistics of t-test for the analysis. The findings showed that infill development has both positive and negative impacts on the study area. Many of the respondents agreed that the most significant positive impact of infill development in the area is that it has helped in increasing level of patronage and reduction in cost and travel time in accessing goods and services within the area, as well as the creation of employment opportunities for residents, amongst other positive impacts. Concerning the negative externalities of infill development on the area, those with a strong impact within the neighbourhood include pressure on existing facilities and amenities, traffic congestions and inadequate parking space around the community. On the relationship between the effects of infill development on the adjoining property value, the result of the t-statistics showed that all the effects exhibit positive and significant (p -values < 0.05) relationship with the property value in the area. However, the infill development in Gwarinpa influences the property values at varying degrees.

KEYWORDS: *Infill Development, Property Value, Consequences, Gwarinpa*

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1. INTRODUCTION

The relative acute shortage in supply of land due to its fixity and localised nature is a prevalent phenomenon experienced in the major cities of developed and developing economies. The uncontrollable rate of urbanisation

coupled with population explosion and tilted rural-urban drift among others also contributes to shortage. It is strengthening the competitive power of urban land as a commodity. The increasing demand for urban land for different purposes has created a healthy bidding environment among the users and posed new challenges to land regulators/administrators for effective policy formulation.

Many studies have proffered solutions to the administration, control, and management of supply-gap of urban land use; which include the use of technology, land use conversion and the recent approach of the flexible principle of infill-development among others. Conceptually, infill development was described in the study of Municipal Research Services Centre (2018) as the introduction of new construction on scattered vacant, irregularly shaped or underutilized parcels of land in already established neighborhoods and business districts of a community. Freilich and Popowitz (2010) and Murray and Koehring (2019) both added that these areas are already provided with public amenities and infrastructure such as energy supply, water, transportation, wastewater, and other utilities.

Infill development takes different forms ranging from developing new structures on an undeveloped or underutilized site, subdividing an existing plot of land, redevelopment of an existing structure to add additional accommodation unit (Wheeler, 2002). Ooi and Lee (2011) posited that cities around the world have turned to infill development in addressing the challenges of town planning and control of land uses. Sambo and Ahmed (2012) argued that if the approach is appropriately adopted, it could encourage optimal use of land, cut-cost of services and infrastructure provision; curb urban sprawl, and explore the highest and best use of land.

Generally, Newell (2010) opined that the principle of infill development contributes to the economic growth and development of the community. In recent times, there has been increasing cases of infill development especially for commercial property type across Nigerian districts in which Gwarinpa neighbourhood of Abuja is not in isolation. In the Gwarinpa district, the infill development is associated with the new construction on vacant land, redevelopment of dilapidated structures (formerly residential) predominantly for commercial uses now. However, despite the veritable benefits of infill development, studies have noted its accompanied externalities (Ahvenniemi et al., 2018).

For instance, In New Zealand, Sharpin (2006) examined the social and environmental impacts of residential infill development. The study discovered negative impacts, which include loss of quality open space, threat to eco-friendly environment and pressure on existing social and infrastructural facilities. Similarly, Syme et al. (2005) added loss of community identity, rising pollution, land fragmentation and segregation; and disparity in land use complementarity. The findings corroborated with the study of Biddle et al. (2006) on the social cost of infill development in Sydney, Australia and the work of Vallance et al. (2010) on the assessment of Christchurch City neighbourhood in England. A study also reported that Washington DC in the United States is in the process of rapid infill housing redevelopment (Howell, 2016).

According to Chiroma et al., (2017), the infill development experience in Nigeria can be classified as residential (Ayotamuno et al., 2010; Imam and Rostam, 2011), commercial (Arimah and Adeagbo, 2000; Isah et al., 2015), industrial (Orekan, 2014; Barau et al., 2015) and illegal infill (Opoko and Oluwatayo, 2014; Bununu et al., 2015). Current research on the application of infill development in Nigeria was discussed extensively in Chiroma et al, (2018).

There are also extant studies on related issues which include: Ayotamuno et al. (2010) who focused on land use conversion. Omoogun (2006) and Iroham et al. (2011) both examined locational factors influencing residential property

value, Olayiwola et al. (2015) analysed land value determinants while (Oni and Ajayi, 2011; Oloke et al. 2013; Matthews, 2015) investigated into factors that could be responsible for variations in the prices of landed properties in Lagos State. However, there is a dearth of literature in this aspect of research that seems to impact infill developments in the surrounding neighbourhood, especially in the Nigerian context. Therefore, addressing the infill development related issues with major focus on Gwarinpa District; Abuja is stimulating for the fact that, Gwarinpa District Abuja has witnessed changes as a result of prevalent commercial infill developments in the residential neighbourhood which could in one way or another affect the surrounding neighbourhood as well as the values of pre-existing properties (Peter et al., 2018). Furthermore, while urgent attention is needed to be given to the emerging conflicting interest which may arise between residential and commercial land uses, there is a need to investigate the spillover effects of the emerging land use pattern on its surrounding residential property values in the neighbourhood.

2. LITERATURE REVIEW

Urban residential expansion according to Wu et al. (2019) can be outlying, edge, renewal or infill. The debate on issues relating to infill development phenomena has occupied the central place in literature in recent times. The study of infill development has received huge attention especially in all fields of built environment professions but in different perceptions. For instance, in the construction industry, Plew (2001) conceived infill development to mean new construction which occurs within an existing environment that is already built up. Spencer Homes (2010) added that the new construction is situated in a defined area of an existing city. Similarly, Ooi and Le (2011) have noted that the construction of new structures is usually put-upon a vacant or under-utilized plot of land within existing urban areas that are largely developed.

As viewed by town planners, Dixon and Dupuis (2003) simply described infill development as increasing building density in suburban areas. Similarly, Sambo and Ahmed (2012) identified infill development as the insertion of additional building units into an already approved layout, subdivision or a neighbourhood. McConnell and Wiley (2010) in a paper on the perspectives and evidence of infill development from economics and planning, posited that infill development serves as a tool that provides urban planning solutions to uncontrolled expansion of urban areas. The infill strategy is one of the policies developed to provide housing for people living in the Ulaanbaatar, capital of Mongolia (Park et al., 2019).

Wheeler (2002) study highlighted various forms in which infill development can occur. It ranges from developing one or more new structures on an undeveloped or underutilized site within established neighbourhood; subdividing an existing piece of land into smaller building lots and constructing houses on the newly created lots and demolishing an existing structure on a parcel of land and building a bigger one incorporating an additional accommodation unit. However, literatures have documented reasons why vacant or underutilize spaces exist in the urban neighbourhood for infill development, despite the fact that housing in urban cities are often in high demand (Rose, 2019) and infill development provides opportunities for developers to respond to the market demand of available houses (Ehlenz et al., 2019).

For instance, Pagano and Bowman (2000) investigated the existence of vacant land in ninety-nine cities across the United States of America. Questionnaires were administered to city officials and town planners. The study found that publicly owned vacant land is proposed for the future development of recreational land uses such as parks, leisure parks, athletic fields, and forest reserves. In the same vein, Friedman (2003) identified fall in size of population and jobs as the key factors responsible for vacant and under-utilized properties across Baltimore, USA. Wilkinson (2011) also added that other factors that contribute to abandoned property include: a weak economy, increasing unemployment rates, loss in

purchasing power, rampant incidences of foreclosures, mortgage crisis, federal programmes, and policies, among others.

Eppig and Lavea (2014) examined the redevelopment of vacant properties in urban cities in Ohio, the USA with a major focus on commercial property types. Abandoning of properties were attributed to economic or demographic shift that tends to have adverse effects on the socioeconomic growth and development. Other factors identified by the study include sprawling developments, change in preferences of purchasers, and fall in purchasing power, a shift in business trends, legal conflicts and bankruptcy, poor infrastructure, amongst others.

Some other studies have also identified negative implications of infill development. For example, Syme et al. (2005) examined the social implications of housing intensification through infill development process in Auckland, New Zealand. The study deployed interview and survey approach and found the problem of loss of community identity and increasing level of pollution (air and noise) as the negative effect of infill development. A similar study in Sydney, Australia, carried out by Biddle et al. (2006) identified greenhouse emissions, traffic congestion, mental health costs, parking needs and insufficient supply of public transport services as the negative impact of infill development. The environmental concern arising from unplanned infilling continues to discourage its approval by relevant authorities in urban areas of some countries (Duckworth-Smith, 2015). In the same vein, infill has been noted to not necessarily ensure social sustainability (Kim and Larsen, 2017). Reduction of space for gardens is also one of the established consequences of unplanned and indiscriminate use of infill in urban residential development (Tahvonen and Airaksinen, 2018). Reduction of spaces for gardens contributes to the climate change challenge. Apart from gardens, infill development reduces parking spaces and residents, therefore, causing congestion and traffic problems (Thigpen, 2018).

In England, Vallance et al. (2010) added that there is an adverse effect of access to sunlight, privacy, the quality of housing and greenery environment as the negative effects infill development has on the immediate environments and surrounding buildings. However, the study by Jenks et al. (2000) dwelt more on the accompanying benefits of infill development and urban consolidation. Using a descriptive approach in the study, the author posited the acceptance of infill development in the neighbourhood. Nevertheless, the emphasis was made on the need to manage the process properly to avoid potential negative effects such as parking, traffic, air pollution, noise, reduced quality of open spaces, privacy, local character, and reduced neighbourliness. This was further corroborated with the findings of Preval et al. (2016). The serious health concerns caused by air pollution emanating from infill sites were discussed extensively by (Manzhilevskaya et al., 2019).

Furthermore, some studies have examined the positive effects of introducing new property into the neighbourhood as regards to the impact on property value, especially in neighbourhood where residential homes (Kurvinen and Tyvima, 2016) or multi-storey buildings are in high demand (Kurvinen and Vihola, 2016). The study carried out by Newell (2010) in Durham, England, established that new residential development will create positive externalities on the neighbourhood property values especially when the property is constructed with good construction materials and skilled workmen (Ooi et al., 2014). The study found that there are positive contributions in improving nearby home values which corroborated the findings of (Tang and Wong, 2018). In the United States, Loyer (2010) examined the effect of introducing a new Wal-Mart store, on residential and commercial property values in New Jersey. The study deployed regression analysis and the result showed that the contributory effect of the Wal-Mart store was significant. Ooi and Le (2011) used the hedonic price model to analyse the contagion effect that infill developments have on local housing prices in Singapore. The study found a significant effect and concluded that new development will induce rising prices of the neighbourhood properties.

Still, more on studies with the impact of infill development, Pokorna (2012) examined the impact of Mirage Shopping Centre and Aupark Shopping centre in Slovakia on the neighbourhood property value. The results showed that there was a significant impact on the neighbourhood property value with more influence on available gross lettable space of commercial properties within the neighbourhood. Similarly, the study of Northgate Mall in Durham, United States of America, Seago (2013) revealed a positive impact of the mall on the prices of residential property in the neighbourhood. However, a notable fall in the price of dwelling units located half a kilometre away from the mall was also observed. The same positive result was obtained in the study done in Singapore (Ooi and Le, 2013). In England also, Whitehead et al. (2015) observed that newly developed residential apartments had an impact on the property values of adjoining properties. Secondary data of house price index (HPI) was used for the study and the findings were a fall in property prices of surrounding properties in the neighbourhood. The decline in property value was attributed to extant high amenity, services, and facilities.

Other benefits of infill development includes alleviation of special segregation (Kim, 2016), reduction of fuel poverty (Power, 2008), provision of affordable housing which reduces the incidence of poverty (Hanlon and Airgood-Obyrcki, 2018) and generation of employment (Loo et al., 2017). Land owners are often the first partakers of financial benefits derived from infill development activities (Puustinen et al., 2017), especially in converting tiny houses to more spacious buildings to house more tenants (Shearer et al., 2018). Although, price disparities generally exists between redevelopment and infill of which extant studies suggests, the dichotomy depends on the prevailing economic climate of the study area (Barlindhaug and Nordahl, 2018). Infill development helps in replacing urban dis-amenities with newer structures thereby extending amenities to new areas (Tang and Wong, 2018).

From the foregoing discussion, extant studies have shown mixed results on the impacts of infill development on the neighbourhood property value. Infill development has failed to be the best strategy for providing sufficient houses needed in a rapidly urbanizing world. Hence, exurban areas need to be developed to curb increasing affordable housing demands (Tilt and Cerveny, 2013), even though it remains a viable policy in many developing (Adhvaryu and Rathod, 2019) and few developed countries. The reason is that most cities in developed countries follow a carefully stated plan where deviations from city plans are highly prohibited. Reconfiguration of city plan is necessary to incorporate infill development in cities of developed countries as seen in the case of Finland (Laine et al., 2018). The common denomination is infill is as a response to massive pressure on land as a result of an increase in population (Minami, 2015; Borth and Summers, 2018).

In addition, Farris (2001) listed some factors that hinder a smooth implementation or adoption of infill development of which many of the factors are dependent on the environment. Cultural variables have also been singled out as one of such stumbling blocks as discussed in Imam (2013). Infill models must be innovative and incorporate cultural values to be acceptable (Lehmann, 2012). The instances where properties are owned by common holds make infill development herculean tasks as the developer must secure the consent of all the owners which is often difficult to secure cooperation among the owners (Puustinen et al., 2018). However, empirical studies on the implication of infill development on the host community property values have received little attention in emerging economies like Nigeria. Therefore, the alarming rate of property development across the States of the Country demands urgent attention on the issues bordering on land use control measures, regulations, specifications, approval and its accompanying spill over effects on the property market.

3. RESEARCH METHOD

3.1 The Study Area

The Federal Capital Territory, Abuja, is the current capital of Nigeria and a rapidly growing hub of commercial activities and real estate transactions. Abuja is geographically located at the center of Nigeria. It shares boundary on the north with Kaduna State, on the south-east with Nasarawa State, shares border on the south-west with Kogi State and the west with Niger State. The Federal Capital Territory, Abuja, has a landmass of approximately 7,315 km². The land is characterised with mixed use with residential, commercial and public uses as the predominant land uses. Gwarinpa is one of the districts in Abuja Municipal Area Council. One of the landmarks or the physical development in the districts is Gwarinpa Housing Estate. The housing estates provide houses for the majority of the civil servants in Federal Ministries and Government Parastatals as well as other individuals who are privately employed. However, today, Gwarinpa is characterized by diverse and rapidly growing economic activities like banking, retail and wholesale trading, commercial outlets and other services, and a good portion of its residential land uses have been converted to institutional, recreational and commercial land uses. Figure 1 shows the map of the study area.



Figure 1: Map of FCT Showing the Study Area.

Source: Google Maps, 2017.

3.2 Method

The study made use of primary data through questionnaire distribution. The study sampled estate surveyors and valuers (ESVs) practicing in FCT, Abuja and the residents of housing units located in Gwarinpa. Two different questionnaires were designed and administered to the ESVs and the residents of Gwarinpa housing estate (see Table 1). The study deployed descriptive statistics such as frequency distribution table, maximum, minimum, mean, standard deviation, mean weighted score (MWS), relative importance index (RII), and inferential statistics using T-test.

4. RESULTS AND DISCUSSIONS

Table 1 presents the result of the response rate of the respondents. A total of 106 questionnaires were distributed, 50 to estate surveyors and valuers and 56 to the residents of the housing units. The percentage of the retrieval rate is 68 % and 70 % respectively from the ESVs and the residents which was used for the analysis. The relatively high response rate could be attributed to the interest of the respondents to participate in the research process while the few that were excluded (not returned or properly filled) could be as a result of difficulties involved in accessing neither such respondents nor the willingness to supply relevance information due to personal reasons.

Analysis in Table 2 presents the statistical distributions of the respondents' gender, age, educational background and marital status of the Estate Surveyors and Valuers (ESVs) and the residents of Gwarinpa housing estate, F.C.T., Abuja. The analysis of the ESVs showed that, for gender distribution, 73.5 % of the estate surveyors and valuers in the firms within the study area were males while 26.5 % were female. This appears to be the situation in most firms across the country with male dominance in the profession. Furthermore, the age distribution of the respondents showed that 35 % of the ESVs fall between the age gap of 21-29 years, 52.9 % fall within the age gap of 30-39 years while 5.9 % were within the age gap of 40-49 years and 2.9 % were above 50 years old. Furthermore, on the academic qualification of the respondents, the table reveals that 70.6 % of the respondents have either a B.Sc. or an HND degree, this is because B.Sc. and HND are the preferred minimum qualifications an Estate Surveyor should possess to be able to work in estate surveying and firms and other real estate related organisations. The marital status of the sampled Estate surveyors showed that (52.9 %) were single while 44.1 % were married. For the residents, analysis on gender showed that 53.8 % of the residents were male while the remaining 46.2 % were female. The prevailing age bracket falls between 13-39 years with a total percentage of 89.8 %. A greater portion of the residents also has a B.Sc. or HND 79.4 %, while their marital status showed that 64.1 % of the residents are married with 35.9 % being single.

Table 3 shows the work experience and professional qualifications of the sampled estate surveyors. The table indicates that 35 % had been working between 1 and 5 years, while 50 % have a work experience of 6-10 years. Those that have worked for over 10 years are a total of 5 comprising 14.7 %. Further probe to the professional qualification of the surveyors revealed that 41.2 % were Graduate/Probationers member of the Institution, 38.2 %, and 17.7 % were Associate 'below' and 'above' 10 years of membership with the Institution respectively. Only one, constituting 2.9 % of the respondents was a Fellow of the Institution. One can deduce that Graduate/Probationers comprised most of the sampled estate surveyors which appears to also be what obtains in many estate surveying and valuation firms across the country. However, the number of Associate members sampled were also high even higher than that of the probationers with a total of 55.9 %. They also appear to be increasing in estate surveying and valuation firms across the country. This implies that the respondents have wealth of experience and an adequate understanding of the subject matter to make a meaningful contribution to the study.

Table 4 reveals the employment status of the sampled residents. According to the table, 25.6 % of the sampled residents are self-employed, 23.1 % fell under private workers and students undergoing a degree programme respectively, 15.4 % were civil servants while 12.8 % were unemployed. This is probably because of the nature of the study area. Gwarinpa contains a mixed class of people, some of which are low-income earners, middle-income earners, and high-income earners respectively.

Analysis in Table 5 shows the nature of residence occupied, type of property occupied and number of years they have resided in the study area. The result of the analysis reveals that most of the respondents live in their houses, which comprise a total of 56.4 % while 43.6 % were tenants. This can largely be attributed to the fact that Gwarinpa was originally designed and built by the military government to house public civil servants. Over time, most of the public estates were sold out to individuals some of whom rented out their apartments. Concerning the type of property occupied, the Table revealed that 35.9 % of the respondents were living in flats, while those living in Detached houses, Bungalow, and Semi-detached houses respectively in the area, comprised 28.2 %, 20.5 % and 12.8 % of the respondents respectively.

Only one of the respondents comprising, 2.6 % stays in tenement apartments. The number of years that the residents have spent in the area showed that 38.5 % have stayed for only 3 to 6 years, 12.8 % have stayed between 7 and 10 years while 35.9 % have spent more than 10 years in the area. One can conclude from this analysis that the residents should be well familiar with the emerging and trending issues surrounding the study area.

In Table 6, the closeness of the residential properties to the infill development was investigated. The analysis showed that 87.2 % live very close to some of the infill developments experiencing the effects of such developments on them, while 12.8 % of the residents live further away. Engagement in discussion with some of the residents that live close to infill development especially those that have stayed long in the estate revealed that the major reasons for the proximity are not limited to redevelopment and conversion of property, but to other uses such as changing the master plan and layout of the area in a bid to attract investors and maximise the land use potentials in the area.

In Table 7, analysis was done on the implications of infill development on the immediate neighbourhood in Gwarinpa, Abuja. The implications were categorised as “Positive” and “Negative” implications. The submissions of the ESVs and the residents were analysed through the use of mean weighted score (MWS). Concerning the positive implications, six of them were identified by the study. The residents were of the opinion that increasing the level of patronage and reduction in cost and travel time in accessing goods and services ranked 1st and 2nd position with MWS of 4.23 and 3.74 respectively. This result agreed with the threshold theory that expressed that people tend to travel within a reasonable distance to get their immediate needs. In most cases especially for consumable goods within a workable distance, residents prefer to patronise stores closer to them. This will reduce the transport cost of shopping by the residents on the one hand and on the other hand, will increase the level of patronage in the vicinity. The ESVs had a different opinion with increasing patronage of goods and services ranking 1st position while creation of employment opportunities for residents coming 2nd position with MWS of 4.03 and 3.94 respectively.

Usually, infill development tends to bring more people into the community who will need accommodation either for business or housing; and this will lead to a boost in the level of demand for accommodation and spaces for other uses and activities. Invariably, some job opportunities will open up due to the commercialization such as shops, stores, malls, office buildings, business outlets, amongst others, residential and other activities within the area where the infill development is experienced.

Analysis of the negative consequences of infill development to the surrounding neighbourhood was also investigated in Table 7. Five negative impacts were identified. The residents opined that adverse effects of increasing level of pollution and increase pressure on existing community infrastructure and amenities were more felt in the community as indicated by their 1st and 2nd position with MWS rank of 4.10 and 3.79 respectively. On the part of the ESVs, they opined that negative externalities such as pressure on existing facilities and amenities, and traffic congestions/inadequate parking space had a stronger impact within the neighbourhood taking 1st and 2nd position with MWS of 4.32 and 4.26 respectively.

It is obvious that areas with increasing occupants, visitors and costumers will experience congestion in terms of traffic, parking lots and overcrowding population especially during the peak period of the day time. Conclusively, infill development comes with inherent benefits to socio-economic growth and development but with its attendant adverse consequences as well.

Table 8 Shows examines the relationship between the effects of infill development on the adjoining property value. The result of the t-statistics showed that all the effects exhibit positive and significant (p-values <0.05) relationships with the property value in the area. However, the infill development in Gwaripa influences the property values but at varying degrees. For instance, the t-stats of influences on rental/sales prices of the adjoining properties (11.346) and the fluctuations of prices in the local property market (10.011) all are results of infill development in the neighbourhood which were noted to be relatively higher as indicated in the Table. By implications, one can say that infill development especially the one that is well planned, structured and complement with the surrounding land use(s) contributes to the appreciation of property market in the vicinity and at large, the quality of life of the host community.

Table 1: Response Rate of Respondents

Subject	Questionnaires Distributed	Questionnaires Retrieved	Percentage %
ESVs	50	34	68
Residents	56	39	70
Total	106	73	69

Table 2: Socio-Economic Distribution of Respondents in Estate Surveying Firms and Residents of the Study Area

Characteristics	Category	ESFs		Residents	
		Freq	%	Freq.	%
Gender	Male	25	73.5	21	53.8
	Female	9	26.5	18	46.2
	Total	34	100.0	39	100.0
Age	Below 20 years	1	2.9	3	7.7
	21-29 years	12	35.3	20	51.3
	30-39 years	18	52.9	12	30.8
	41-49 years	2	5.9	2	5.1
	Above 50 years	1	2.9	2	5.1
	Total	34	100.0	39	100.0
Educational Qualification	SSCE	-	-	3	7.7
	OND	-	-	-	-
	HND	12	35.3	7	17.9
	B.Sc.	12	35.3	24	61.5
	M.Sc.	10	29.4	5	12.8
	Ph.D.	-	-	-	-
	Total	34	100	39	100.0
Marital Status	Single	18	52.9	14	35.9
	Married	15	44.1	25	64.1
	Divorced	-	-	-	-
	Widow(er)	1	2.9	-	-
	Total	34	100.0	39	100.0

Table 3: Work Experience and Professional Qualification of the Estate Surveyors and Valuers

Category	Frequency	Percentage	
Work Experience	1 - 5 years	12	35.3
	6 - 10 years	17	50.0
	11 - 15 years	3	8.8
	16 years and above	2	5.9
	Total	34	100.0
Professional Qualification	Graduate / Probationer	14	41.2
	ANIVS (< 10yrs)	13	38.2
	ANIVS (≥ 10yrs)	6	17.7
	FNIVS	1	2.9
	Total	34	100.0

Table 4: Employment Status of the Residents of Gwarinpa, Abuja

	Category	Frequency	Percentage
Employment Status	Civil Servant	6	15.4
	Private Worker	9	23.1
	Unemployed	5	12.8
	Self-employed	10	25.6
	Student	9	23.1
	Total	39	100.0

Table 5: Details of the Residency in Gwarinpa

	Category	Frequency	Percentage
Nature of Residence Occupied	Owner Occupied	22	56.4
	Tenant	17	43.6
	Total	39	100.0
Type of Property Occupied	Flat	14	35.9
	Bungalow	8	20.5
	Detached	11	28.2
	Semi-detached	5	12.8
	Tenement	1	2.6
	Total	39	100.0
Years Residing in Gwarinpa	Up to 2 years	5	12.8
	3-6 years	15	38.5
	7-10 years	5	12.8
	11 years and Above	14	35.9
	Total	39	100.0

Table 6: Proximity of Infill Developments to Property Occupied by Residents

Parameters	Category	Frequency	Percentage
Proximity	Yes	34	87.2
	No	5	12.8
	Total	39	100.0

Table 7: Impacts of Infill Development on the Neighborhood Characteristics

Impacts	ESVs			Residents		
	TWS	MWS	Ranking	TWS	MWS	Ranking
Positive Implications						
Increasing patronage of services and goods in the neighborhood	137	4.03	1 th	146	3.74	2 nd
Reduction in cost and travel time for residents in accessing goods and services	130	3.82	4 th	167	4.23	1 th
Improved security and personal safety for residents	121	3.56	5 th	117	3.00	5 th
Create employment opportunities for residents	134	3.94	2 nd	139	3.56	3 rd
Enhance the aesthetic value of the neighborhood	131	3.85	3 rd	130	3.33	4 th
Aids the conservation of resources as opposed to urban sprawl	105	3.09	6 th	110	2.82	6 th
Negative Implications						
Traffic congestions/inadequate parking space	145	4.26	2 nd	138	3.54	3 rd
Reduces privacy for surrounding properties	124	3.65	4 th	124	3.18	5 th
Distortion of community identity and layout	121	3.56	5 th	139	3.49	4 th

Increased pressure on existing community infrastructure and amenities	147	4.32	1 st	148	3.79	2 nd
Increasing level of pollution in the neighborhood	129	3.70	3 rd	160	4.10	1 st

TWS-Total Weighted Score; MWS-Mean Weighted Score;

Table 8: Relationship between the Effects of Infill Development and Adjoining Property Value

Effects	T-Stats	Sig. @ 5 %	Mean Difference	95 % Confidence Interval Difference	
				Lower	Upper
It stimulates lessor / buyer attitudes in purchasing the neighbourhood properties	7.721	.0332	1.212	1.10	1.43
It influences the level of patronage in the neighbourhood property market	9.363	.0186	1.307	1.04	1.31
It influences the investment potential of the nearby properties	6.019	.0401	1.060	1.02	1.42
It influences the sale / rental prices of neighbourhood properties	11.346	.0245	1.015	1.13	1.53
It influences the valuation estimates of the property.	7.928	.026	1.546	1.07	1.35
It leads to fluctuations in nearby property values	10.011	.0173	1.025	1.23	1.47

Dependent Variable: Property value; Independent variable: Inland Development Effects; Significant level @ 5 %

CONCLUSION

The paper examined whether the wealth, health and peace of existing homeowners actually decrease or increases when an infill housing development is built in the same neighbourhood. Literature has traditionally focused on two possible channels on how a new development may affect local property values. The first channel is the positive effect, in which the new development removes an eyesore and refreshes the neighbourhood. This makes housing in the neighbourhood more desirable and expensive. The study discovered that infill development in Gwarinpa has helped increased the level of patronage and reduced cost and travel time in accessing goods and services within the area, as well as in the creation of employment opportunities for residents. Thus, the new development has led to price appreciation in the local market. There are also negative externalities of infill development on the area. Those having a strong impact within the neighbourhood include: pressure on existing facilities and amenities, traffic congestions and inadequate parking space around the community. On the relationship between the effects of infill development on the adjoining property value, the result of the t-statistics showed that all the effects exhibit positive and significant (p-values <0.05) relationship with the property value in the area. The empirical results showed that infill developments have a positive price effect on nearby houses. The study has an important policy implication on infill developments, which commonly face neighbourhood oppositions. The results have shown that infill developments generate a positive impact on local property values, and hence the wealth of the existing homeowners is increased.

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REFERENCES

1. Adhvaryu, B. & Rathod, V. (2019). *Estimating Housing Infill Potential: Developing a Case for Floor space pooling in Ahmedabad, India. Planning Practice and Research, 34(3), 305-317.*

2. Ahvenniemi, H, Pennanen, K., Knuuti, A., Arvola, A. & Viitanen, K. (2018). *Impact of infill development on prices of existing apartments in finish urban neighbourhoods. International Journal of Strategic Property Management*, 22(3), 157-167.
3. Arimah, B.C & Adeagbo, D. (2000). *Compliance with urban development and planning regulations in Ibadan, Nigeria. Habitat International*, 24(3), 279-294.
4. Ayotamuno, A., Gobo, A., & Owei, O. (2010). *The Impact of Land Use Conversion on a Residential District in Port-Harcourt, Nigeria. International Institute for Environment and Development*, 22(1), 259-265.
5. Ayotamuno, A., Gobo, A.E. & Owei, O.B. (2010). *The impact of land use conversion on a residential district in Port Harcourt, Nigeria. Environment and Urbanization*, 22(1), 259-65.
6. Barau A.S., Maconachie, R., Ludin, A.N. & Abdulhamid, A. (2015). *Urban morphology dynamics and environmental change in Kano, Nigeria. Land Use Policy*, 42:307-17.
7. Barlindhaug, R. & Nordahl, B.I. (2018). *Developers' price setting behavior in urban residential redevelopment projects. Journal of European Real Estate Research*, 11(1), 71-86.
8. Biddle, T., Bertoia, I., Greaves, S., & Stopher, P. (2006). *The Costs of Infill versus Greenfield Development. Australasian Transport Research Forum*.29, pp. 1-15. Gold Coast: Australasian Transport Research Forum.
9. Borth, K. & Summers, R. (2018). *Segmentation of Homebuyers by Location Choice Preferences. Housing Policy Debate*, 28(3), 428-442.
10. Bununu, Y.A., Ludin, A.N. & Hosni, N. (2015). *City profile: Kaduna. Cities*, 49, 53-65.
11. Chiroma, M.A., Isa, A.H., Gana, B.A., & Bogoro, A.G. (2017). *A review of infill development strategies in Nigeria. Journal of Applied Sciences in Environmental Sanitation*, 3(8), 46-59.
12. Chiroma, M.A., Shah, M.Z., Isa, A.H., Usman, A.S., Kagu, A. & Ijafiya, I. (2018). *Impacts of Infill Development on Land Use in Ibrahim Taiwo Housing Estate, Maiduguri, Nigeria. Advanced Science Letters*, 24(5), 3758-3764.
13. Dixon, J. & Dupuis, A. (2003). *Urban Intensification in Auckland, New Zealand: A Challenge for New Urbanism. Housing Studies*, 18(3), 353–368.
14. Duckworth-Smith, A. (2015). *Backyard bonanza: improving the quality of 'popular' suburban infill. Australian Planner*, 52(4), 297-313.
15. Ehlenz, M.M., Pfeiffer, D. & Pearthree, G. (2019). *Downtown revitalization in the era of millennials: how developer perceptions of millennial market demands are shaping urban landscapes. Urban Geography*, 10.1080/02723638.2019.1647062.
16. Eppig, M. & Lavae, B. (2014). *Redeveloping commercial vacant properties in legacy cities: A Guidebook to linking property reuse and economic revitalisation. Greater Ohio Policy Centre. The German Marshall Fund of the United State (GMF). Available at: www.gmfus.org/file/3369/download. Retrieved on 25/11/2019.*
17. Farris, J.T. (2001). *The barriers to using urban infill development to achieve smart growth. Housing Policy Debate*, 12(1), 1-30.
18. Freilich, R. H. and Popowitz, N. M. (2010). *The Umbrella of Sustainability: Smart Growth, New Urbanism, Renewable Energy and Green Development in the 21st Century. The Urban Lawyer*, 42(1), 1-39.
19. Friedman, E. (2003). *Vacant porperties in baltimore: Strategies for reuse. Abel Foundation Award in Urban Policy*, pp. 45-59.
20. Hanlon, B. & Air good-Obrycki, W. (2018). *Suburban revalorization: Residential infill and rehabilitation in Baltimore County's older suburbs. Environment and Planning A*, 50(4), 895-921.

21. Howell, K. (2016). *Preservation from the bottom-up: affordable housing, redevelopment, and negotiation in Washington, DC*. *Housing Studies*, 31(3), 305-323.
22. Imam M.Z. & Rostam, K. (2011). *The impacts of unauthorised subdivisions of residential plots in Gadon Kaya, Kano City, Nigeria*. *Geografia: Malaysian Journal of Society and Space*, 7(2), 1-10.
23. Imam, S. (2013). *Assessment and review of infill designs' guidelines for residential urban conservation areas*. *International Journal for Housing Science and Its Applications*, 37(3), 137-149.
24. Iroham, C.O., Oloyede, S., & Oluwunmi, A. (2011). *An analysis of the location of worship centers on residential property values in Ota, Nigeria*. *Journal of Sustainable Development in Africa*, 13(1), 13-22.
25. Isah, M.I., Chiroma, M.A. & Ishiyaku, A.I. (2015). *Water Pollution Sources for Hand-Dug Wells (HDW) in the Ancient City of Bauchi Metropolis, Nigeria*. *International Journal of Scientific and Research Publications*, 5(6), 2250-3153.
26. Jenks, M., Burton, E., & Williams, K. (2000). *Urban consolidation and the benefits of intensification*. *Compact Cities and Sustainable Urban Development*, 17-29.
27. Kim, J. & Larsen, K. (2017). *Can new urbanism infill development contribute to social sustainability? The case of Orlando, Florida*. *Urban Studies*, 54(16), 3843-3862.
28. Kim, J. (2016). *Achieving mixed income communities through infill? The effect of infill housing on neighborhood income diversity*. *Journal of Urban Affairs*, 38(2), 280-297.
29. Kurvinen, A.T. & Tyvimaa, T. (2016). *The impact of senior house developments on surrounding residential property values*. *Property Management*, 34(5), 415-433.
30. Kurvinen, A.T. & Vihola, J. (2016). *The impact of residential development on nearby housing prices*. *International Journal of Housing Markets and Analysis*, 9(4), 671-690.
31. Laine, M., Leino, H. & Santaoja, M. (2018). *Building Citizens' Trust in Urban Infill: A Dynamic Approach*. *Journal of Planning Education and Research*, 10.1177/0739456X18817089.
32. Lehmann, S. (2012). *Sustainable construction for urban infill development using engineered massive wood panel systems*. *Sustainability*, 4(10), 2707-2742.
33. Loo, B.P.Y., Cheng, A.H.T. & Nichols, S.L. (2017). *Transit-oriented development on Greenfield versus infill sites: Some lessons from Hong Kong*. *Landscape and Urban Planning*, 167, 37-48.
34. Loyer, J. (2010). *Business.page.tcnj.edu*. Available at: <https://business.pages.tcnj.edu:https://business.pages.tcnj.edu/files/2011/07/F10Loyer.Thesis.pdf>. Retrieved 20/7/2017.
35. Manzhilevskaya, S., Lihonosov, A. & Petrenko, L. (2019). *Fine dust atmospheric pollution from the objects of infill construction*. *E3S Web of Conferences*, 135, Article number 01020.
36. Mathews, J. (2015). *Retail proximity and residential values*. *Journal of American Planning Association*, 80(2), 94-104.
37. McConnell, V. and Wiley, K. (2010). *Infill Development: Perspectives and Evidence from Economics and Planning*. *Discussion Papers. Resources for the Future, RFF DP 10-13 Washington, DC*. Retrieved on 25/11/2019. Available at: <https://pdfs.semanticscholar.org/935e/10836c0d206e00b72d5570aa5c6e796180f1.pdf>.
38. Minami, K. (2015). *Infill renovation*. *Open House International*, 40(1), 43-47.
39. *Municipal Research Services Centre*, (2018). *Infill Development*. Available at: <http://mrsc.org/Home/Explore-Topics/Planning/Development-Types-and-Land-Uses/Infill-Development-Completing-the-Community-Fabric.aspx>. Retrieved on 25/11/2019.

40. Murray, S. & Koehring, M. (2019). *The Economist Intelligence Unit Limited. The critical role of infrastructure for the Sustainable Development Goals. The Economist Intelligence Unit Limited, London, UK. Retrieved on 25/11/2019. Available at: https://content.unops.org/publications/The-critical-role-of-infrastructure-for-the-SDGs_EN.pdf?mtime=20190314130614.*
41. Newell, T. (2010). *Development and neighborhood revitalization: The effects of residential investment on property values in Durham. Michigan Journal of Business, 3(2), 97-120.*
42. Olayiwola, L., Adeleye, O. & Oduwaye, A. (2015). *Correlates of land value determinants in Lagos Metropolis, Nigeria. Journal of Human Ecology, 17(3), 183-189.*
43. Oloke, O., Simon, F., & Adesulu, A. (2013). *An examination of the factors affecting residential property values in Magodo Neighborhood, Lagos State. International Journal of Economy, Management and Social Sciences, 2(8), 639-643.*
44. Omoogun, C. B. (2006). *The centripetal effects of location on rental values of residential property in Metropolitan Lagos. The Built Environment: Innovation, Policy and Sustainable Development. (pp. 41-64). Lagos: The Built Environment: Innovation, Policy and Sustainable Development.*
45. Oni, A., & Ajayi, C. (2011). *Land value determinants and rental values of office spaces in Ikeja, Nigeria. Mediterranean Journal of Social Sciences, 2(2), 118-129.*
46. Ooi, J.T.L. & Le, T.T.T. (2013). *The spillover effects of infill developments on local housing prices. Regional Science and Urban Economics, 43(6), 850-861.*
47. Ooi, J.T.L., Le, T.T.T. & Lee, N.-J. (2014). *the impact of construction quality on house prices. Journal of Housing Economics, 26, 126-138.*
48. Ooi, T., & Le, T. (2011). *The contagion effect of infill developments on local housing prices. Institute of Real Estate Studies and Regional Science and Urban Economics, 43, 850-861.*
49. Opoko, A.P. & Oluwatayo, A. (2014). *Trends in Urbanisation: Implication for Planning and Low-Income Housing Delivery in Lagos, Nigeria. Architecture Research, 4(1A), 1526.*
50. Orekan, A.A. (2014). *An Assessment of the Impact of Plot Standard on Physical Development: The Case Study of Kano Metropolis, Nigeria, International Journal of Engineering and Science, 2(2), 46-52.*
51. Pagano, M. & Bowman, A. (2000). *www.brookings.edu. Available at: <https://www.brookings.edu/https://www.brookings.edu/wp-content/uploads/2016/06/paganofinal.pdf>. Retrieved on 16/06/2016.*
52. Park, H., Fan, P., John, R., Ouyang, Z. & Chen, J. (2019). *Spatiotemporal changes of informal settlements: Ger districts in Ulaanbaatar, Mongolia. Landscape and Urban Planning, 191, Article number 103630.*
53. Peter, N.J., Fateye, O.B., Oloke, C.O. and Praise, I. (2018). *Changing urban land use and neighborhood quality: evidence from Federal Capital Territory (FCT), Abuja, Nigeria. International Journal of Civil Engineering & Technology, 9(11), 23-36.*
54. Plew, E. (2001). *A Survey of Households Living in Modern Infill Housing in Christchurch City. Townhouse. New Zealand: Christchurch City Council.*
55. Pokorná, A. (2012). *Impact of recent shopping center developments on commercial real estate value in the city center of Zilina. Journal of Interdisciplinary Research, 91-94.*
56. Power, A. (2008). *Do demolition or refurbishment of old and inefficient homes help to increase our environmental, social and economic viability? Energy Policy, 36(12), 4487-4501.*

57. Preval, N., Randal, E., Chapman, R., Moores, J. & Howden-Chapman, P. (2016). Streamlining urban housing development: Are there environmental sustainability impacts? *Cities*, 55, 101-112.
58. Puustinen, T., Pennanen, K., Falkenbach, H. & Viitanen, K. (2018). The distribution of perceived advantages and disadvantages of infill development among owners of a commonhold and its' implications. *Land Use Policy*, 75, 303-313.
59. Puustinen, T., Pennanen, K., Falkenbach, H., Arvola, A. & Viitanen, K. (2017). Financing major repairs in apartment buildings through infill development: Exploring views and benefit requirements of the owner-occupiers. *Property Management*, 35(5), 508-527.
60. Rose, J. (2019). Creating the planning and infrastructure framework for mixed use mixed income transit-oriented and urban-infill development. *Green Community*, pp. 36-43, 978-135117883-9; 978-193236474-3; DOI: 10.4324/9781351179690-6.
61. Sambo, E., & Ahmed, A. (2012). Town Planning practices and the food security implication on the sustainability of urban settlements. *Journal of Sustainable Development and Environmental Protection*, 2(2), 78-89.
62. Seago, J. (2013). Northgate Mall's effect on surrounding property values. *Economics* 345. Paper of Urban Economics, Durham. Available at: www.sites.duke.edu/urbaneconomics/files/2014/04/Northgate-Mall%E2%80%99s-Effect-on-Surrounding-Property-Values.pdf.
63. Sharpin, A. B. (2006). The social and environmental effects of residential infill development in New Zealand: A literature review. Wellington, Wellington City Council, pp. 1-47.
64. Shearer, H., Bears, V., Pieters, R., Winkle, B. & Meathrel, K. (2018). Planning for tiny houses. *Australian Planner*, 55(3-4), 147-156.
65. Spencer Homes (2010). The Spencer's Inc. Mill Redevelopment Opportunity And its Potential Role in Meeting the Housing Needs of Mount Airy and Surry County. A Master's Project submitted to the faculty of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Master of Regional Planning in the Department of City and Regional Planning. Available at: https://www.mountairy.org/DocumentCenter/View/577/spencer_mill_redevelopment_opportunity_2010?bidId=. Retrieved on 25/11/2019.
66. Syme, C., McGregor, V., Mead, D. (2005). Social implications of housing intensification in the Auckland region: Analysis and review of media reports, surveys and literature. Retrieved on 25/11/2019. Available at: <https://pdfs.semanticscholar.org/c91f/727a226f3726ec44b4836d45e6bdde05f97d.pdf>.
67. Tahvonen, O. & Airaksinen, M. (2018). Low-density housing in sustainable urban planning – Scaling down to private gardens by using the green infrastructure concept. *Land Use Policy*, 75, 478-485.
68. Tang, B.-S. & Wong, K.T. (2018). Assessing externality: Successive event studies on market impacts of new housing development on an old residential neighbourhood. *Environment and Planning B: Urban Analytics and City Science*, 10.1177/2399808318774333.
69. Tang, B.-S. & Wong, K.T. (2018). Assessing externality: Successive event studies on market impacts of new housing development on an old residential neighbourhood. *Environment and Planning B: Urban Analytics and City Science*, 10.1177/2399808318774333.
70. Thigpen, C.G. (2018). Giving parking the time of day: A case study of a novel parking occupancy measure and an evaluation of infill development and car sharing as solutions to parking oversupply. *Research in Transportation Business and Management*, 29, 108-115.

71. Tilt, J.H. & Cervený, L. (2013). *Master-planned in exurbia: Examining the drivers and impacts of master-planned communities at the urban fringe. Landscape and Urban Planning, 114, 102-112.*
72. Vallance, S., Perkins, H., & Moore, K. (2010). *The Effects of Infill Housing on Neighbours in Christchurch. Christchurch City Council, Environment SOciety and Design Division. Canterbury: Lincol University.*
73. Wheeler, S. (2002). *Smart infill: Creating more livable communities in the Bay Area: A guide for Bay Area leaders. San Francisco. Retrieved 2004, from <http://www.Greenbelt.org:http://www.Greenbelt.org/downloads/resources/reportsmartinfill.pdf>.*
74. Whitehead, C., Sagor, E. Edge, A., & Walker, B. (2015). *Understanding the Local Impact of New Residential Development: a Pilot Study. The London School of Economics and Political Science. Available at: <http://www.lse.ac.uk/business-and-consultancy/consulting/consulting-reports/understanding-the-local-impact-of-new-residential-development>. Retrieved on 25/11/2019.*
75. Wilkinson, L. (2011). *Vacant Property: Strategies for Redevelopment in the Contemporary City.. Retrieved from https://smartech.gatech.edu:https://smartech.gatech.edu/bitstream/handle/1853/40778/LukeWilkinson_Vacant%20Property.pdf.*
76. Wu, J., Wu, Y., Yu, W., Lin, J. & He, Q. (2019). *Residential landscapes in suburban China from the perspective of growth coalitions: Evidence from Beijing. Journal of Cleaner Production, 223, 620-630.*
77. Elenwo, E., and V. A. Akujuru. "THE EXPERT VALUERS VIEWS ON THE CRITICAL VARIABLES INFLUENCING RESIDENTIAL PROPERTY VALUES IN PORT HARCOURT METROPOLIS." *International Journal of Humanities and Social Sciences (IJHSS) 7.4 (2018):193-204.*
78. Inoma-Abbey, Oliver Ibidough, and Iyenemi Ibimina Kakulu. "APPRAISING THE EFFECT OF VARIATION IN CRIME ON PROPERTY VALUES IN PORT HARCOURT, NIGERIA." *International Journal of Humanities and Social Sciences (IJHSS) 7.4 (2018):67-74.*
79. Ihuah, Paulinus Woka, and ABIYE MIEBAKA Benebo. "An assessment of the causes and effects of abandonment of development projects on real property values in Nigeria." *IMPACT: International Journal of Research in Applied, Natural and Social Sciences (IMPACT: IJRANSS) 2.5 (2014): 25-36.*
80. Ihuah, PAULINUS WOKA, C. H. U. K. W. U. E. M. E. K. A. Ekenta, and B. A. R. T. H. O. L. O. M. E. W. Nwokorie. "Impacts of inadequate infrastructures provision on real property value: a comparative study of Agbama and Ehimiri housing estate, Umuahia, Nigeria." *International Journal of Environment, Ecology, Family and Urban Studies (IJEEFUS) 4.4 (2014): 920.*
81. KOUJALAGI, ASHOK, SHWETA PATIL, and PRAVEEN AKKIMARADI. "THE WANNACRY RANSOMEWARE, A MEGA CYBER ATTACK AND THEIR CONSEQUENCES ON THE MODERN INDIA." *BEST: International Journal of Management Information Technology and Engineering (BEST: IJMITE) 6.4 (2018):14.*
82. Singh, Baljeet, and Yogesh C. Joshi. "Increased potato productivity, its consequences and sustainable production." *International Journal of Business and General Management (IJBGM), 5 3, (2016): 6580.*