# THE IMPACTS OF AGGLOMERATION ON THE IMMEDIATE ENVIRONMENT, USING THE LAGOS REGION AS A STUDY CASE

***Fagbohunka. A***

Department of geography and planning sciences, Adekunle Ajasin University

Akungba Akoko, Ondo State

## Abstract

Scholars who are interested in the geography of innovation have emphasized the idea that firms that cluster in geographic space benefit from external economies and grow faster than do isolated firms. In contrast, the possible negative effects of industrial agglomeration on the immediate environment have not received attention, thereby leaving a crucial lacuna in understanding of the spatial organization of production. In the light of this, the paper underscores the impacts of agglomeration on the immediate environment. Data for this research was collected from both primary and secondary sources. The first stage in the collection of primary data involves the reconnaissance survey of the study area, while the second stage involves administration of questionnaires in twelve industrial estates. Ten questionnaires were administered on heads of household living closes to each of the industrial estates, making a total of one hundred and twenty. While the secondary data were collected from various sources such as; Journals, textbooks, monographs and the internet.The paper has found out that industrial agglomeration has impacted negatively on the immediate environment, in form of pollution, traffic problems, over crowding and increase crime rate. The research also reveals that the firms have not done enough to curtail these environmental problems. The paper recommends that government should enforce environmental laws strictly on these firms, in order to annihilate or reduced these negative impacts on the environment. These firms should also be educated on the needs to accept innovation and replace obsolete equipments.

**Keywords:** Agglomeration, environment, Lagos region

## Introduction

Industrial agglomeration refers to the concentration of several industries in a given place or area. Such a concentration takes place because the area in question has the greatest location advantage over other areas, including the advantage of proximity to related industries. Agglomerative activity can take many forms (Eaton and Giaratan 1998) and is often considered to result in either “localization or “urbanization ”(external) economies dependent upon the industrial composition of the cluster or complex. Localization economies

involved economies amongst similar firms, while economies amongst unlike firms are known as urbanization economies. The latter form of agglomeration has received greater attention in the literature, often providing a mechanism for analyses of differential urban growth and optimal city size.

The implied agglomeration, externalities or economies across firms in an industry or sector may be due to various forces, including a conglomeration of specialized inputs and informational or knowledge spillovers. Externalities are costs and benefits of transactions that are not reflected in prices. Pollution is the most commonly used example of a negative externality. Scitovsky (1954) first developed a conceptual framework to distinguish two different types of externalities according to how they are mediated. First technological externalities arise from non-market interactions among firms in proximity and affect the production sets of firms. Shared knowledge and expertise are the most common sources of externalities. In contrast, pecuniary externalities are purely based on market interactions. Therefore, this type of externalities influences firms only in so far as they are involved in activities that affect price mechanism (Wieg, 1997).

Studies on agglomeration economies amongst firms have largely focused on the advantage of geographical proximity of industries, the existence of externalities and increasing returns to scale in production and its ability to affect productivity levels of local firms and boost the economic performance of a region (see for instance Porter, 1990; Feser, 2001; Forgarty and Garofalo, 1988; Herderson, 1986; Moomaw, 1988; Wheeler and Mody, 1992; Storper and Walker, 1989; Maskell and Malmberg, 1999; Wiig and Wood, 1997; 1987, Grossman and Helpman, 1991a; 1991b; Aghion and Howitt, 1997; Lucas, 1988. Our knowledge of agglomeration economies amongst firms in relation to location impacts of different types of externalities on the immediate environment demand attention. Empirical research therefore has a vital role to play in filling such a crucial lacuna in understanding of the spatial organization of production.

**Conceptual framework/literature rewiew**

No doubt, business firms find it profitable to cluster together spatially with firms in their own and other industries. The metropolitan area contains not only a large number of different industries, but also has a final product market (because the threshold requirement is obtained in the city), a labour pool, good communication and a variety of specialized services. Simmie,N, (2000). The concentration of industries with functional linkages in

industrial agglomerations as earlier stated brings about financial savings on the part of the industries concerned. Such savings are achieved because agglomerated firms can and do share common services such as water, communication facilities, security, transport facilities, communication facilities, diffusion of know-how, research and rapid circulation of capital commodities and labour. Individual industries are thus saved from the cost of providing these services for themselves. Such financial savings are referred to as external economies of scale. Agglomeration also has the advantage of concentrating labour, managerial skill, capital and customers in specific places, thereby making such places still more attractive to industries, Grossman (2001). This is one reason why agglomeration tends to grow once they come into being. A new industry attracts related industries as well as social services which in turn make the area more attractive for more industries in a chain reaction referred to as the multiplier effect.

Despite all the advantages that are enjoyed as a result of agglomeration economies, it also has negative effects. Agglomeration cause overcrowding, pollution, high cost of land and traffic congestion. Despite the difficulties in quantifying the costs to health or property arising from air pollution impacts generated by different distributions of industry relative to the surrounding population, there is evidence that general planning strategies for the location of industry have been formulated in several countries upon the basis of intuitive judgments regarding the balance of social costs and benefits arising from further development in existing agglomerations as compared with policies of dispersal (Porter, 1980). Physical planning policies which incorporate such judgments have been introduced in the Netherlands (Nijkamp, 1977), Scotland (Diamond, 1979) and Sweden (O.E.C.D., 1979a),. Although such policies are usually concerned with the distribution of population and economic activity in general, there is also evidence of an awareness of the potentially undesirable social and environmental consequences of the uncontrolled growth of agglomeration of specific types of manufacturing industry.

The negative effects of agglomeration especially that of congestion, may reach a point where industries start moving away, a process referred to as deglomeration. No matter how bad the situation is, some industries can not move away because of industrial inertia. Such industries cannot move because of fixed capital in the form of land, factory buildings and machinery. In such a situation, the cost of moving may be far more than the financial savings that may be obtained at a new location.

**Study area and methods**

The Lagos region covers metropolitan Lagos made up of fifty-seven local government areas among which were, Ikeja, Apapa, Mushin, Ikorodu, Epe and Badagry to mention just a few. This region which is situated along the south west of Nigeria, approximately between latitudes $6^0$27' and $6^0$37' north of the equator and longitudes $3^0$15' and $3^0$47' east of Greenwich meridian, with a territorial land area of about 1,088km$^2$, cover about 32 percent of the land area of Lagos state. About 20 percent of this area is made up of Lagoons and mangrove swamps.

The growth and development of the manufacturing industry in Lagos state has proved to be a challenging area of research, particularly along the broad line of benefits and consequences of industrial development. Given the unquestionable role of Lagos state as the industrial and commercial nerve centre of the entire country, the manufacturing sector of the Lagos economy has continued to attract a lot of attention by successive government, in military or civilian at both state and federal levels, even at the local government level. Private investors both indigenous and foreign, as well as researchers are not left out behind in this respect.

According to the post-independence census in 1963, a population of 1,122,733 was recorded for metropolitan Lagos while a population of 665,246 was recorded for the city of Lagos and 457,487 for the settlements outside Lagos. The population of the Lagos region was 5,525,261 in 1991. The Lagos state population figure for the 2006 national population census is 8,048,430 the provisional result released generated much controversy, Lagos state government believed that the result needs to be authenticated.

The first stage in the collection of primary data involves the reconnaissance of the study area. The reconnaissance covered all the twelve industrial estates/areas and the immediate environment. This visit informed a design of the questionnaire because, the information gathered during the reconnaissance survey served as an important guide in framing the questionnaire and the subsequent data collection.

The second stage in the collection of primary data involves the administration of questionnaire which elicited information on the agglomeration impacts on the immediate environment. On the whole a total of 120 questionnaires were administered; ten in each estate. These questionnaires were administered on heads of households living closes to the industrial estates. The reason for this is based on the distant decay effect and Friedman's (1965) Core- Periphery model which indicates that a phenomenon close to the centre of an

activity is most affected by such (centre). Only one household was selected for interview per building. Such a person was the owner of the building or a household head selected randomly among others in each house. Buildings within the radius of 3km. to the firms where sampled, the sampling was systematic, in the sense that 2 buildings were considered at the interval of 300metre radius until a distance of 3km.was covered. This sample was chosen to portray the relationship between firms distance and environmental problems perception. The questionnaire sought information, on the socio-economic characteristics, the effects of the firms operations, and the notion about the firm doing enough to curtail the negative impacts. However, Distances of the residences to the firms were personally measured.

The result of the reconnaissance survey, shown in Table 1 indicates that 103 firms exist in the estates. The distribution of these firms varies from one industrial estate/ to another. There are 13(12.6%) firms in Apapa, 3(2.9) firms in Matori, 7(6.8%) firms in Agbara, 24 (23%) in Ikeja, 14(13.6%) in Ilupeju, 3(2.9%) firms in Ijora, 7(6.8%) firms in Iganmu, 10(9.7%) firms in Oshodi/Isolo, 2(1.94%) firms in Ogba, 4(3.94%) firms in Ikorodu, 9(8.7%) firms in Oregun, 7(6.8%) firms in Surulere/Mushin. This analysis shows that the number of agglomeration firms varies in each of the estates; however, there were none in Gbagada, Agidingbi, Oyediran/Yaba, Ilasamaja, Lagos South-West, Akowonjo, Kirikiri, Abesan /Ipaja. The twelve industrial estates covered were the core areas of industrial activities in Lagos states.

**Table 1**

**Distribution of agglomeration firms**

| S/No | Industrial Estate/Area | Number of Agglomeration | Percentage Firms |
|---|---|---|---|
| 1 | Apapa | 13 | 12.6 |
| 2 | Matori | 03 | 2.9 |
| 3 | Agbara | 07 | 6.8 |
| 4 | Ikeja | 24 | 23 |
| 5 | Ilupeju | 14 | 13.6 |
| 6 | Ijora | 03 | 2.9 |
| 7 | Iganmu | 07 | 6.8 |
| 8 | Oshodi/Isolo | 10 | 9.7 |
| 9 | Ogba | 02 | 1.94 |
| 10 | Ikorodu | 04 | 3.94 |
| 11 | Oregun | 09 | 8.7 |
| 12 | Surulere/Mushin | 07 | 6.8 |
| **Total** | | **103** | **100** |

Field Survey, 2011.

## Analysis and discussion

**Table 2**

**Immediate Residents Affected by the Operations of the Firm(s)**

| | Frequency | Percentage |
|---|---|---|
| Affected | 95 | 79.2 |
| Not affected | 25 | 20.8 |
| Total | 120 | 100 |

**Source:** Author's analysis, 2011.

Table 2 shows that 85 (85%) of the respondents are affected by the operations of the firms, while 15 (15%) are not affected by the operation of the firms. This connotes that majority of the respondents are affected by the firms operation.

**Table 3**

**The Effect of the Firm(s) Operations on the Immediate environment.**

| Effects | Frequency | Percentage |
|---|---|---|
| Land pollution | 15 | 12.5 |
| Heavy traffics | 10 | 8.3 |
| Vibration | 10 | 8.3 |
| Air pollution | 24 | 20 |
| Water pollution | 7 | 5.8 |
| Irritating fumes | 10 | 8.3 |
| Noise pollution | 24 | 20 |
| Over crowding | 9 | 7.5 |
| Increase in house rent | 5 | 4.2 |
| Crime rate increase | 6 | 5 |
| Total | 120 | 100 |

**Source:** Author's analysis, 2011.

Table 3 reveals that 15 (12.5%) respondents were affected by the firms operation through land pollution, 10(8.3%) are being affected by heavy traffics, 10 (8.3%) affected by vibration, 24 (20%) are affected by air pollution, 7(5.8%) affected by water pollution, 10 (8.3%) affected by irritating fumes, while, 24 (20%) are being affected by noise pollution, 9 (7.5%) affected by over crowding, 5 (4.2%) are affected by increase in house rent, also 6 (5.9%) are affected by increased crime rate.

It must be noted that all these negative impacts of agglomeration industries are caused solely by the industrial activities; noise and pollution poses the greatest impact.

**Sex and the Effects of Firms Operation**

Table 4 shows the effect of firms operation on the respondents. Out of 120 (100%) respondents, 6(5%) males and 4(3%) females were affected by land pollution, 20(16.7%) males and 3(2.5%) females were affected by noise pollution. Also, 18(15%) Males and 1(9.2%) females attested to being affected by the firms operation, 9(7.5%) each opined to be affected by irritating fumes and vibration. Another, 5(4%) males and 94(7.5%) females were affected by over crowding, while 4(3%) males and 3(2.5%) females opined heavy traffics. Furthermore, 3(2.5%) males and 3(2.5%) females believed they are affected by increase in crime rate. Only 2(1.7%) males and 4(3%) females were affected by increase in house rent. It is obvious that both sexes were more affected by air and noise pollution.

**Table 4**

**Cross Tabulation of Sex with the Effect of Firms Operation**

| **Effects** | **Male** | | **Female** | |
|---|---|---|---|---|
| | No | % | No | % |
| Land Pollution | 6 | 5 | 4 | 3 |
| Heavy Traffics | 4 | 3 | 3 | 2.5 |
| Vibration | 9 | 7.5 | - | - |
| Air Pollution | 18 | 15 | 11 | 9.2 |
| Water Pollution | 5 | 4 | 2 | 1.7 |
| Irritating fumes | 9 | 7.5 | - | - |
| Noise Pollution | 20 | 16.7 | 3 | 2.5 |
| Over Crowding | 5 | 4 | 9 | 7.5 |
| Increase in house rent | 2 | 1.7 | 4 | 3 |
| Crime rate increase | 3 | 2.5 | 3 | 2.5 |
| Total | 81 | 67.5 | 39 | 32.5 |

**Source**: Author's Analysis, 2011

Table 5 shows the summary of the chi-square value between sex and the effect of firms operation on the environment. The cross tabulation carried out between the variables (Sex and the effect of firms operation) reveals the chi-square test.

Ho: There is no positive relationship between the distance and effect of firms of operation.

At 9 degree of freedom and 0.05 level of significance, the calculated value is 24.152, while the tabulated value is 16.919. Since the calculated value is greater than the tabulated value, Ho is rejected and H1 is accepted. This indicates that there is positive relationship between the distance and the effect of firms operation on the environment.

**Table 5**

**Summary of the Chi-Square value showing the Sex and Effects of firms Operations**

| Variables | df | α | Calculated Value | Tabulated Value | Decision |
|---|---|---|---|---|---|
| Sex | 9 | 0.05 | 24.152 | 16.919 | Accept $H_1$ |
| Effect of Firms Operation | | | | | |

Source: Author's Analysis, 2011.

**The Age and the Effects of Firms Operation**

Table 6 shows the cross tabulation of age with the effects of firms operation. Only 1(0.8%) respondents with less than 20 years, 3(2.5%) between the age of 21 and 30 years were affected by land pollution. Also 2(1.7%) respondents each between the age of 31 and 40, 41 and 50 years respectively were all affected by land pollution. 2(1.7%) respondents each between the age of 21 and 30, 41-50 years opined being affected by heavy traffics. Also 3(2.5%) respondents each between the ages of 31-40, 41-50 were affected by vibration. Furthermore, 7(5.8%) respondents each between the age of 21 and 30. 41 and 50 years opined being affected by air pollution, 8(6.7%) respondents between 31 and 40, while 5(4.2%) between the age 51 and 60 and 2(1.7%) respondents above 60 years also believed they are affected by air pollution. Another, 2(1.7%) respondents each, in the age of 31 and 40, 41 and 50 years opined they are affected by water pollution. Another, 3(2.5%) respondents in the age between 31 and 40, 41 and 50 years, each believed they are affected by irritating fumes. Furthermore, 11(9.2%) in the age between 41 and 50, 5(4.2%) in the age between 51-60, 5 (4.2) in the age above 60years opined over crowding, only 1(0.8%) respondents each in the age between 31 and 40, 51-60; 60 and above attested to being affected by increase in house rent. Also, 4(3%) respectively above 60 years and 2(1.7%) in the age between 51 and 60 were affected by increase in crime rate.

**Table 6**

**Cross Tabulation of Age with the Effects of Firms Operation**

| **Effects** | **<20** | | **21-30** | | **31-40** | | **41-50** | | **51-60** | | **60+** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No | % | No | % | No | % | No | % | No | % | No | % |
| Land Pollution | 1 | 0.8 | 3 | 2.5 | 2 | 1.7 | 2 | 1.7 | 1 | 0.8 | 1 | 0.8 |
| Heavy Traffics | - | | 2 | 1.7 | | | 2 | 1.7 | | | 3 | 2.5 |
| Vibration | 1 | 0.8 | 2 | 1.7 | 3 | 2.5 | 3 | 2.5 | | | | |
| Air Pollution | - | | 7 | 5.8 | 8 | 6.7 | 7 | 5.8 | 5 | 4.2 | 2 | 1.7 |
| Water Pollution | 1 | 0.8 | 1 | 0.8 | 2 | 1.7 | 2 | 1.7 | 1 | 0.8 | | |
| Irritating fumes | . | | - | | 3 | 2.5 | 3 | 2.5 | 2 | 1.7 | 1 | 0.8 |
| Noise Pollution | 2 | 2.7 | 3 | 2.5 | 5 | 4.2 | 11 | 9.2 | 2 | 1.7 | | |
| Over Crowding | . | | | | 2 | 1.7 | 1 | 0.8 | 6 | 5 | 5 | 4.2 |
| Increase in house rent | . | | | | 1 | 0.8 | 3 | 2.5 | 1 | 0.8 | 1 | 0.8 |
| Crime rate increase | . | | | | | | | | 2 | 1.7 | 4 | 3 |
| Total | 5 | 4.2 | 18 | 15 | 26 | 21.7 | 34 | 28 | 20 | 16.7 | 17 | 14.2 |

Source: Author's Analysis, 2011.

Table 7 shows the summary of the Chi-Square value between the age and effect of firms operation. The cross tabulation carried out between the variables (age and effect of firms operation on the environment) further reveals the chi-square test.

Ho: The age did not significantly determine the effects of firms operation.

At 45 degree of freedom and 0.05 % level of significance the calculated value is 68.766 while the tabulated value is 43.77. Since the calculated value is greater than the tabulated the Ho is rejected and $H_1$ accepted. This means that the age significantly determine the effect of firms operation.

**Table 7**

**Summary of the Chi-Square value showing the Age and Effects of firms Operations**

| Variables | df | A | Calculated Value | Tabulated Value | Decision |
|---|---|---|---|---|---|
| Age | 45 | 0.05 | 68.766 | 43.77 | Accept $H_1$ |
| Effects of Firms Operation | | | | | |

Source: Author's Analysis, 2011

**Educational Qualification and the Effects on Firms Operation**

Table 8 shows the cross tabulation of educational qualification with effects of firms operation. Out of 120 (100%) respondents, 3(2.5%) respondents with no formal education and primary education, 4 (3.3%) with secondary education and 5(4.2%) with tertiary education agreed that they are being affected by land pollution. Another 4(3.3%) respondents with tertiary education, 3(2.5%) with secondary education and 2(1.7%) with primary education attested to being affected by heavy traffics. Also, 3(2.5%) respondents each with primary education and tertiary education believed they are affected by vibration. Also 2(1.7%) respondents each with no formal education opined affected by vibration.

Out of the 120 (100%) respondents 7(5.8%) and 6 (5%) respondents each with primary education and tertiary education opined they are being affected by air pollution. While 5(4.2%) respondents each with primary education, secondary education and tertiary education are affected by water pollution. Furthermore, 3(2.5%) respondents each with primary and secondary education and tertiary education are affected by irritating fumes, while 2(1.7%) respondents each with no formal education and tertiary education are also affected by irritating fumes.

Furthermore, 8(6.7%) respondents each with no formal education and primary education, 4(3.3%) respondents each with secondary and tertiary education attested to being affected by noise pollution. Another 3(2.5%) respondents each with primary and tertiary education 2(1.7%) with secondary education are affected by overcrowding. Whereas 2(1.7%) respondents each with primary and tertiary education are also affected by over crowding. Also 2(1.7%) respondents with no formal education and secondary education are affected by increased crime rate. While 1(0.8%) respondents each with primary education and tertiary education are affected by increased crime rate.

**Table 8**

**Cross Tabulation of Educational Qualification with Effects of Firms Operation**

| **Effects** | **No formal Education** | | **Primary Education** | | **Secondary Education** | | **Tertiary Education** | |
|---|---|---|---|---|---|---|---|---|
| | No | % | No | % | No | % | No | % |
| Land Pollution | 03 | 2.5 | 03 | 2.5 | 04 | 3.3 | 05 | 4.2 |
| Heavy Traffics | 01 | 0.8 | 02 | 1.7 | 03 | 2.5 | 04 | 3.3 |
| Vibration | 02 | 1.7 | 03 | 2.5 | 02 | 1.7 | 03 | 2.5 |
| Air Pollution | 07 | 5.8 | 06 | 5 | 05 | 4.2 | 06 | 5 |
| Water Pollution | 01 | 0.8 | 02 | 1.7 | 02 | 1.7 | 02 | 1.7 |
| Irritating fumes | 02 | 1.7 | 03 | 2.5 | 03 | 2.5 | 02 | 1.7 |
| Noise Pollution | 08 | 6.7 | 08 | 6.7 | 04 | 3.3 | 04 | 3.3 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Over Crowding | 01 | 0.8 | 03 | 2.5 | 02 | 1.7 | 03 | 2.5 |
| Increase in house rent | - | | 02 | 1.7 | 01 | 0.8 | 02 | 1.7 |
| Crime rate increase | 02 | 1.7 | 01 | 0.8 | 02 | 1.7 | 01 | 0.8 |
| Total | 27 | 22.5 | 33 | 27.5 | 28 | 23.3 | 32 | 26.7 |

Source: Author's Analysis, 2011.

Table 9 shows the summary of the chi-square value between educational qualification and effects of firms operation on the environment. The cross tabulation carried out between the variables (education qualification and effect of firms operation) further reveals the chi-square test.

Ho: there is no relationship between educational qualification and effects of firms operation

At 27 degree of freedom and 0.05 significant levels, the calculated value is 20.702 while the tabulated value is 10.113. Since the calculated value is greater than the tabulated value, $H_1$ is therefore accepted and Ho is rejected. This indicates that there is relationship between educational status and effects of firms operation. Connoting that educational qualification has vital influence in consideration of the effects of firms operation on the environment.

**Table 9**

**Summary of the Chi-Square value showing the Educational Qualification and Effects of firms Operations**

| Variables | Df | α | Calculated Value | Tabulated Value | Decision |
|---|---|---|---|---|---|
| Educational Qualification | 27 | 0.05 | 20.702 | 10.113 | Accept $H_1$ |
| | | | | | |

Source : Author's Analysis, 2011.

**Distance and the Effects of Firms Operation**

Table 10 shows the Cross Tabulation of distance with the effects of firms operations. Out of the 120 respondents, 2(1.7%) respondents each with the distance of <0.5km, 0.6-1km,

1.1-1.5km attested to being affected by land pollution, while 1(0.8%) respondents each with distance of 1.6-2.0km 21.1-2.5km and 2.6-3.0km were also affected by vibration

Out of 120(100%) respondents, 7(5.8%) with a distance of <0.5km, 5(4.2%) respondents each with a distance of 0.6-1km, and 1.6-2.0km are affected by air pollution while 4(3.3%) respondents each with a distance of 1.1-1.5km, 2.1-2.5km and 2.6-3.0km are also affected with air pollution. Another, 2(1.7%) respondents each with distance 0.6km-1km, 1.1-1.5km, 2.1- 2.5km while only 1(0.8%) respondents with a distance 1.6-2.0km are affected by water pollution.

Furthermore, 2(1.7%) respondents each with a distance 0.6-1km, 1.6-2.0km, 2.1-2.5km are affected by irritating fumes whereas 1(0.8%) respondents each with a distance <0.5km, 1.1-1.5km and 2.6-3.0km are also affected by irritating fumes. Another 5(4.2%) respondents each with distance of <0.5km, 1.1-1.5km, 4(3.3%) respondents each with 0.6-1km, 2.1-2.5km are being affected by noise pollution. Moreover, 3(2.5%) respondents each with a distance 0.6-1km, 1.1-1.5km, 1.6-2.0km, 2(1.7%) respondents each with a distance of <0.5km, 2.1-2.5km are affected by overcrowding. While, 2(1.7%) respondents each with a distance of 1.1-1.5km, 2.1-2.5 are affected by increase house rent. Also 3(2.5%) respondents with distance of 1.1-1.5km; 1(0.8%) respondents each with a distance of 0.6-1km, 1.6-2.0km and 2.1-2.5km are affected by crime rate increase.

**Table 10**

**Cross Tabulation of Distance with effects of Firms Operation**

| | **Distance of the Respondents to the Firm.** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Effects of Firms Operation** | **<0.5km** | | **0.6-1km** | | **1.1-1.5** | | **1.6-2.0** | | **2.1-2.5** | | **2.6-3.0** | |
| | No | % | No | % | No | % | No | % | No | % | No | % |
| Land Pollution | 02 | 1.7 | 02 | 1.7 | 02 | 1.7 | 01 | 0.8 | 01 | 0.8 | 01 | 0.8 |
| Heavy Traffics | | | | | 02 | 1.7 | 02 | 1.7 | 02 | 1.7 | 01 | 0.8 |
| Vibration | 03 | 2.5 | 03 | 2.5 | 01 | 0.8 | | | 01 | 0.8 | 01 | 0.8 |
| Air Pollution | 07 | 5.8 | 05 | 4.2 | 04 | 3.3 | 05 | 4.2 | 04 | 3.3 | 04 | 3.3 |
| Water Pollution | | | 02 | 1.7 | 02 | 1.7 | 01 | 0.8 | 02 | 1.7 | | |
| Irritating fumes | 01 | 0.8 | 02 | 1.7 | 01 | 0.8 | 02 | 1.7 | 02 | 1.7 | 01 | 0.8 |
| Noise Pollution | 05 | 4.2 | 04 | 3.3 | 05 | 4.2 | 03 | 2.5 | 04 | 3.3 | 02 | 1.7 |
| Over Crowding | 02 | 1.7 | 03 | 2.5 | 03 | 2.5 | 03 | 2.5 | 02 | 1.7 | 01 | 0.8 |
| Increase in house rent | | | | | 02 | 1.7 | 01 | 0.8 | 02 | 1.7 | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Crime rate increase | | | 01 | 0.8 | 03 | 2.5 | 01 | 0.8 | 01 | 0.8 | | |
| Total | 20 | 6.7 | 22 | 18.3 | 25 | 20.8 | 19 | 15.8 | 21 | 17.5 | 11 | 9.2 |

Source: Author's Analysis, 2011.

Table 11 shows the summary of the chi-square value between distance and effects of firms operation. Cross tabulation of the variables (distance and effects of firms operation) carried out further reveals the chi-square test.

Ho: distance did not significantly determine the effects of firms operation on the environment

At 45 degree of freedom and 0.05 level of significance, the calculated value is 23.387 while the tabulated value is 43.77. Since the calculated value is lesser than the tabulated value the Ho is accepted and H1 rejected. This connote that the distance did not significantly determine the effects of firms operation on the environment.

**Table 11**

**Summary of the Chi-Square value showing the distance and Effects of firms Operation.**

| Variables | Df | α | Calculated Value | Tabulated Value | Decision |
|---|---|---|---|---|---|
| Distance | 45 | 0.05 | 23.387 | 43.77 | Accept Ho |
| Effects of Firms Operation | | | | | |

Source: Author's Analysis, 2011.

**Table 12**

**Notion about the Firms Doing Enough to Curtail the Negative Impacts**

| | **Frequency** | **Percentage** |
|---|---|---|
| Yes | 15 | 12.5 |
| No | 90 | 75 |
| Nil | 15 | 12.5 |
| Total | 120 | 100 |

**Source:** Author's analysis, 2011.

Table 12 reveals that out of 120(100%) respondents, 19 (12.5%) were of the opinion that the firms are doing enough to curtail the negative impacts, while 90 (75%) opined that the firms are not doing enough to curtail the negative impacts; there were no response from 15 (12.5%) respondents.

It is apparent that the firms are not doing enough to curtail the negative impacts of these environmental problems.

**Conclusion and recommendation**

Manufacturing firms' agglomerate in an industrial estate because of the infrastructural facilities like good roads, electricity and water supply, transport and communication well located industrial site with needed utilities, factory premises and other supportive facilities. The traditional location factors such as transportation and power have become more equally available among cities of various sizes, but the metropolis has retained its attraction, capitalizing on its role as a rich source of information and professional talent (Aghion, P. &Dewatripoint, 2010). Agglomeration tends to grow once they come into being. A new industry attracts related industries as well as social services, which in turn make the area more attractive for more industries in a chain reaction referred to as multiplier effect.

The cross tabulations carried out between some demographic characteristics of the respondents, such as; the sex, age, educational qualification, and the effects of the firms operation reveals that the immediate environment are largely affected by the firms operation. The chi-square tests carried out between the distance and the effects of firms operation shows that, distance did not significantly determine the effects of firms operation on the environment. It is important to emphasize that this paper has reveals that despite all the advantages that are enjoyed as a result of agglomeration economies, agglomeration has impacted negatively on the environment in form of, overcrowding, pollution, increase crime rate, traffic congestion and vibration. The paper also found out that the firms has not done enough to curtail these negative impacts.

Though, industrial agglomeration can lead to amazing technological development of a region, thereby facilitating diffusion and innovation creation which will immensely contributes to the economic welfare and improved standard of living. This paper recommends that the negative impacts of agglomeration should be adequately curtailed by government, through its laws (environmental) and regulations which need to be enforced on these firms, so that the immediate environment will not unnecessary suffer the consequences of the actions

of these firms. These firms should also be educated on the needs to accept innovation and replace obsolete equipments, in order to reduce occupational hazards and also reducing pollution.

**References**

Aghion, P &Howitt, P. (1992): A Model of Growth through creative destruction. *Econometric,* 60, 323-351.

Aghion,P; &Dewatripoint, P. (2010). "The Public and Private sectors in the process of Innovation: Theory and Evidence from the mouse Genetics Revolution. *" American Economic Review*: Papers and Proceedings, 100(2).PP.153-158.

Eaton, J. &Eckstein, Z. (1997): Cities and Growth: Theory and Evidence from France and Japan *Regional Science and Urban Economics, 27, 443-474.*

Eno,Okoko (2000). Quantitative Techniques in Urban Analysis. Kraft Books Limited. Benin City.

Feser, E. (2001): A flexible test for agglomeration economics in two US Manufacturing Industries. *Regional Science and Urban Economics, 31, 1-190*

Grossman, G.M. &Helpman, E. (1991A): Innovation and Growth in the Global Economy, Cmabridge, MA:MIT Press.

Grossman, G.M. &Helpman, E. (1991B): Quality Ladders in Theory of Growth. *Review of Economics and Statistics, 58, 43-61.*

Harrison, B., Kelley, M., and J. Grant (1996). "Specialization Versus Diversity in Local Economies: The Implications for Innovative Private Sector Behaviour". Cityscape: *A Journal of Policy Development and Research* 2(2), 61 – 93.

Henderson, V. (1986). "Efficiency of Resource Usage and City Size": *Journal of Urban Economics*. 19, 47 – 70.

Henderson, V. (2003). "Marshall's Scale Economies". *Journal of Urban Economics*, 53, 1 - 28.

Jeffrey, P. Cohen and Catherine, J. Morrison Paul 2004: Agglomeration Economies and Industry Location Decisions: The Impacts of Spatial and Industrial Spillovers (Reuerevfinal. Doc.)

Jeffrey, P., Cohen and Catherine, J., Morrison Paul 2001: Agglomeration Economies and Industrial Location Decisions: The Impact of Vertical and Horizontal Spillovers. Department of Agricultural and Resource Economies University of Califonial Davis.

Krugman, P. (1993): The Current case for Industrial Policy. In D. Salvatore (Eds); Protectionism and World Welfare Cambridge: Cambridge University Press.

Lucas, R.E. (1998): On the Mechanics of Economic Development. *Journal of Monetary Economics, 22, 3-42.*

Malmberg, A, O.Solvell, and Zander, I. (1996): Spatial Clustering, Local Accumulation of Knowledge and Firm Competitiveness, *GeografiskaAnnaler 78B: 85-97.*

Maskell, P and Melmberg, A. (1999) ‘’The Competitiveness of firms and regions : Ubiquitification’ and the importance of localized learning , *European urban and regional studies,* 6, pp. 9- 25.

Moomaw, R.L. (1998): Agglomeration Economies: Localization or Urbanization; *Urban Studies, 25, 150-161.*

Porter, M. (1998a): Clusters and the New Economics of Competition. Harvard Business Review, November- December: 77-90.

Porter, M. (1998B): Cluster and Competition: News Agendas for Companies, Government and Institutions. Boston: A Harvard Business Review Book (197-288)

Scitovsky, T. (1954): Two Concepts of external economies. *Journal of Political Economy,* 62, 143-151.

Simmie, J. (Ed.) (1997): Innovation, Networks and Learning Regions? London: Jessica Kingsley.

Storper , M. (2000), Regional Technology policies in Europe : A reflection on TSER Projects, 1998- 2000 and where to go from there . Paper prepared for the workshop on regional level of implementation of innovation and education and Training Policies. European Commission, Research Directorate – General. Brussels, November 23 – 14, 2000

Storper, Mand A..J. Scott (1992) ‘Production, work and territory: Contemporary ‘Realities and Theoretical tasks ‘’ In : Scott , A.J. and M. Storper (eds), *The Geographical Anatomy of Industrial Capitalism* . Allen and Unwin , PP3 -15

Wheeler, c. (2004) ‘’Productivity and the Geographic Concentration of Industry : The Role of Plant Scale ‘’ Federal Reserve Bank of St. Louis working paper No. 024A

Wheeler, D. &Mody, A. (1992): International Investment Location Decision: the case of U. S. Firms. *Journal of International Economics*, 33, 57-76.

Wiig, H., & Wood, M. (1997): What comprises a regional innovation system. In J. Simmie (ed.) Innovation, Networks, and Learning Regions? London. Jessica Kingsley.