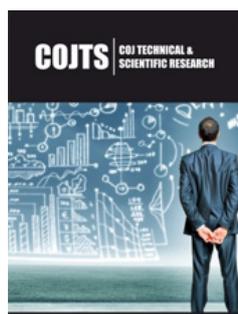


Agglomeration Benefits of Transport Investment: A Brief Review

Hamza Zubair*

Department of Transportation Engineering, Asian Institute of Technology, Pathum Thani, Thailand



Abstract

This review article discusses the agglomeration benefits of transport investment, the agglomeration economies, and their types; urbanization and localization economies which were explained in numerous ways. The general background and literature review related to agglomeration benefits of transport improvements, and the relation of agglomeration and cities were shown with the help of the Venables model. This article discussed the case studies that shows the comparison of agglomeration benefit with user benefit. The results revealed that agglomeration benefits are associated with transportation investments and the transport improvements will help people to communicate with each other and established their business in easily accessible locations. Moreover, the productivity of firms is linked with improved transport structure.

Keywords: Agglomeration; Agglomeration Benefits; Urbanization Economies; Localization Economies; Venables Model

History

An observation was made centuries ago in 1776 by Smith that large metropolitan regions are the main source of producing economic growth. Later on, another researcher Marshall in 1890 reveals that we can make sharing knowledge, resources, and common labours by clustering a large number of workers and firms together [1]. There are two levels of agglomeration economies such as sub-metropolitan and metropolitan regions. These levels are based on the region of the area [2]. In 1909, Alfred Weber introduces the concept of agglomeration economies. This concept still holds a place in economic and urban geography. The agglomeration shows both intraurban and interurban advantages due to the manufacturing of goods and selling of goods [3]. The transportation investment can also help to improve the existing transport facilities and attract the firm own to those places where they can establish their firm and transport their product easily and with cheaper transport charges. The Agglomeration economies include the external benefits received by the firms due to their presence in a common location. This may result in positive as well negative agglomeration. The positive agglomeration means that the external benefits which we get from agglomeration are much higher than the cost of wages, high rents, and transport cost. This scenario will attract more industries to establish their business in this region. The negative agglomeration is that the cost of production is higher than benefits due to which most firms will move to another place to get the benefit. Agglomeration economies have positive externalities induced through the spatial concentration of economic activity. Typically, a distinction is made between effects that arise from the scale or density of activity within a particular industry and from urban scale or city size. Economies of industry concentration are different from economies of the urban area [4,5]. Most positive agglomerations are induced as a result of the high concentration of numerous economic activities. The effects of agglomeration may arise due to either scale of activity or density of activity within a specific urban area. The external benefits increase as a result of an increase in scale and density of industrial and urban agglomeration. The term localized economies are considered as internal to the industry while external to the firm.

***Corresponding author:** Hamza Zubair, Department of Transportation Engineering, School of Engineering and Technology, Asian Institute of Technology, Pathum Thani, Thailand

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The urbanized agglomeration economies mean to have large dense cities cluster with industries. The benefits and productivity, in this case, maybe high and the cost of production may be lower. The main sources of both urbanized and localized agglomeration economies are knowledge interactions, labour pool, sharing of inputs and outputs for further manufacturing. The magnitude of externalities of agglomeration is dependent on different circumstances which are closely linked with the use of sources [6,7].

The road networking linking between these industries plays an important role. If we have well-developed roads which provide easy movement of goods from one industry to another, then it will attract more firms. Sometimes we need to improve road infrastructure to facilitate the transport of goods and reduce the cost of transport of goods from one place to another place. According to this concept, it can be seen that the agglomeration benefit is linked with the transport structure investment and improvement of infrastructure. The firm which is located in an agglomerated area will produce more products as compared to a firm located in an isolated area [8]. When the travel time from the sources will increase then the manufacturing price as well as economic mass will reduce [9]. So, we need to provide easy accessibility and a reduction in travel time from the resources. The agglomeration benefit of transportation investment can be assessed by using some spatial scale. The accessibility of the consumers and labour market to the industrial area can help to enhance the production of that industry. The accessibility to workplaces for labour is completely depending on the provision of transport infrastructure. The transport investment can also help to access other areas and can change the urban density of an area [10]. If firms think that they can shift or establish a new industry due to the transport improvement and other firms observe the same, then this can shift industrial density from one particular location into another location. The provision of a proper transport structure can help in the reduction of travel time between two cities and provide the labour pool market [11]. Let us consider an example of two cities which are quite apart from each other due to poor transport structure but the workforce in both cities is about one million people. If we provide the better infrastructure that will help them to travel from one city to another in around one hour, then we can increase the labour market up to two million.

Introduction

Agglomeration can be defined as “the clustering of various productive or industrial activities associated with one another to generate the cost benefits” the agglomeration result in the formation of an industrial park [12]. The industries which are in the same location can share their cost linked with resources such as roads, water supply, electric lines, gas lines, and pollution costs.

Agglomeration economies

Agglomeration economies are the branch of the economics of

scale which occurs when the production of goods becomes cheaper due to the linkage of activities. This will help to reduce the cost for consumers. They can take advantage and can buy things easily. Agglomeration economies can be achieved in four different ways such as

- i. Sharing of intermediate input producers among industries.
- ii. Sharing of knowledge.
- iii. Sharing of the common labour pool.
- iv. Improving skills for performing different work in a factory.

Positive impacts of agglomeration economies: There are some positive impacts of agglomeration economies such as

- i. Inter-plant transport saving.
- ii. Access to a common pool of skilled labour.
- iii. Presence of special training institutions.
- iv. Presence of ancillary services.
- v. Research and development of collective facilities.
- vi. Share cost of certain operations.

Negative impacts of agglomeration economies: There are some negative impacts of agglomeration economies such as

- i. The clustering of the firm and the workforce give rise to congestion.
- ii. Clustering of industrial areas results in a high rate of air, water, and noise pollution.
- iii. A place located near an industrial area will have high rent rates.
- iv. The harmful emission of gases from factories and industries may cause diseases to those living near them.

Examples of agglomeration economies: Industrials districts such as Alexandria, Sydney Paramatta and Tai Po Industrial state. Industrial cities such as Detroit and Nagaya/Toyota are popular as car-making city, Shanghai is a textile industrial city. Industrial regions for example Silicon Valley in California popular for electronics and PRD in South China is popular for toy making.

Types of agglomeration economies: There are two types

- a) Localization economies: Agglomeration economics result when we have many industries close to one another and these industries share their basic resources.
- b) Urbanization economies: Agglomeration economics results when many people are living in a particular area and share their basic resources or when we have factories in an urban area.

Difference between localization and urbanization economies

The difference between localization economies and urbanization economies is that localization economies act as an external for the firm while they act as an internal in the case of industry. In contrast to this urbanization, economies act as external for firms as well as an industry but act as an internal to the city in which benefits are arising concerning the local public goods. The source in localization economies is sharing of the common labour market, sharing of knowledge, and sharing of inputs while the sources of urbanization economies are the proximity of input and output sharing, the scale of markets, and inter-industry interactions (Figure 1).

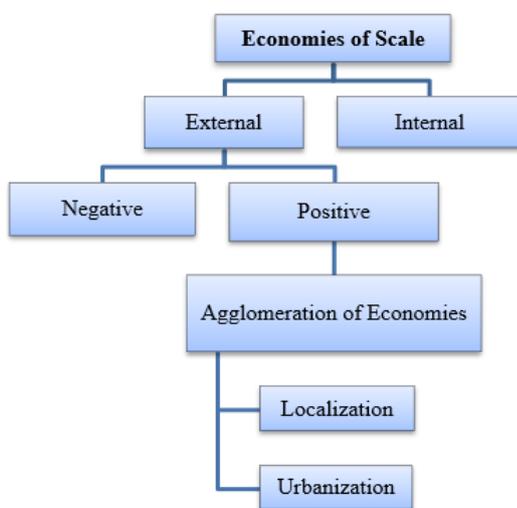


Figure 1: Flow Chart for Economic of Scale.

Research Review

Agglomeration economy always become a point of focus for different researchers. For the last 15 years, researchers are trying to find out the economic reason behind the agglomeration of businesses and workers [13]. In the case of urban agglomeration, the researcher thinks that city is highly expensive to establish businesses, but the firm still accepts the high rates of rents, wages, and other costs. The reason of the firm may be accessed to the highly populated area, good road infrastructure and less transport cost, workers living close to industry [11]. More agglomeration benefits can occur as a result of an increase in economic agglomeration [14]. The size of a city can be increased if a policy maker’s availability of agglomeration economies. This improvement enhances the productivity of the firms [15]. The increasing size of the city does not mean that increasing physical size of a city but it is increasing in the density of firms and people so they can move quickly within a less travel time. This can be achieved primarily by providing a better transport structure.

Some techniques such as conventional appraisal are used for capturing the agglomeration benefits of transport investment.

Similarly, some of the economic growth due to reduction of travel time is already shown in Government’s New Approach to Transport Appraisal (NATA) system [11]. The agglomeration benefits of a transport investment mean that we achieve the gain in productivity from above those which we capture by conventional methods. The Figure 2 shows the benefits which we get due to transport investment. It indicates benefits captured through commuting users as well as the conventional appraisal (Figure 2). New techniques are introduced to measure the impact of agglomeration economies due to transport investment or schemes and they provide results up to an acceptable accuracy. In the same way, a technique was set up in Eddington Transport Study [16], proposed to place a greater weightage on the wider benefits such as social, economic, and environmental which are delivered by transport schemes. The scientist is still working to introduce a new technique that will provide highly accurate results showing the agglomeration benefits of transport investment. The classical location theory considers the transport cost as the main cause of economic activities [17]. The macroeconomic theory of endogenous growth draws a framework in which transport infrastructure is defined as a source of economic growth. The New Economic Geography (NEG) considers the role of transport in terms of location factor as it helps in the transport of the labour force from one place to another [3]. The reduction in travel cost results in a reduction of industry input cost which in response increases the productivity of the firm [18]. Some states and countries are trying to invest in their transport structure to enhance their economy. For example, Chancellor George Osborne announced a 30-billion-euro transport investment program which includes railway and road schemes. The main of this investment is to boost the poor economic performance of Britain (BBC News, 2011). The agglomeration economies have sources such as matching, sharing, and learning. Sharing includes sharing of intermediate suppliers, consumers, indivisible facilities, and workers. Matching means different employers can find different types of workers for specific tasks easily. Learning means the transferring of skills, knowledge, and information from one person to another. In agglomeration economies, all these are easy and faster to achieve [6].

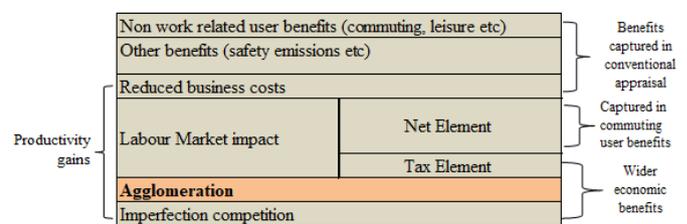


Figure 2: Relationship between conventional benefit and wider economic benefit.

Transport investment and agglomeration

There exists a relationship between agglomeration externalities and transport investment. The transportation investment helps

us to reduce the interaction cost or cost of travel between firms, between firms and workers, and between workers under the fixed distribution of people and firms in a specific area. This type of agglomeration is sometimes created static effects because the workers and firms are not changing their place. It also helps to increase the concentration of firms and workers in a specific area. Transportation investment can increase the value of some areas by making them more attractive to the firms and people as compared to the other places. Firms prefer to establish their business in that area to get more benefits. The firm will also be relocated to that area and the situation of that area goes on changing these agglomeration effects are referred to as dynamic agglomeration [19]. The agglomeration benefit will occur when one individual is near to the other one and use the common sources. Physical proximity is involved by nearness, but the transport infrastructure plays a vital role because the low cost and high-speed result in the provision of direct physical proximity. The production agglomeration economics also need to know in this stage which means that the productivity of one firm increases when the productivity of another nearby firm increases. The agglomeration economies enhance due to the benefits of the firm which is closely connected to the other firm. For example, firm A uses the output product of firm B as input for its final production. So, if firm A produces more products, then definitely it will use the products of firm A. this can only be possible if both firms are located nearby or the transport cost of products from firm B to firm A is cheaper as compared to another production cost for manufacturing firm A product. Agglomeration benefits of transport investment are based on the connectivity between firms and workers, between one firm and other firms, and between firms and consumers. The transport investment is necessary to

allow the movement of people and goods with lower travel time and cost. These are the theoretical background of agglomeration productivity and transport investment. However, the production of the firm can be measured wages, labour productivity, and total factor productivity.

Venables model: A model was developed by [20] to show the relationship between agglomeration and transport improvement. He reveals that transportation investment can produce productivity benefits through agglomeration economies. He also reveals that these benefits are in addition to the DUBs of conventional CBA. Finally, he also gives a simple way to make calculations to quantify the impacts of agglomeration within the standard framework of CBA. The model presented by Venables is a combination of the model of two cities such as the Alonso-Muth-Mills monocentric city model and Henderson's (1974) city size model. In his model, he assumes an improvement that will reduce the cost of travelling from one city to another city. The city area edge is defined by the city population or by the distance at which the cost of travelling offsets the wage offered by the jobs in the central area of the city. When travelling cost is reduced people living outside the city edge will prefer to work outside the city. If the jobs are highly paid in the central of the city, then they will travel inside the city, and this will increase the employment in the central area of the city. The wages of people working in the central city will increase if there is high productivity of products. Venables analysis shows that the transportation improvement gives rise to cost saving for both new and existing commuters. This cost-saving is considered as a user benefit (Figure 3). The Figure 3 elaborates the Venables' model [20].

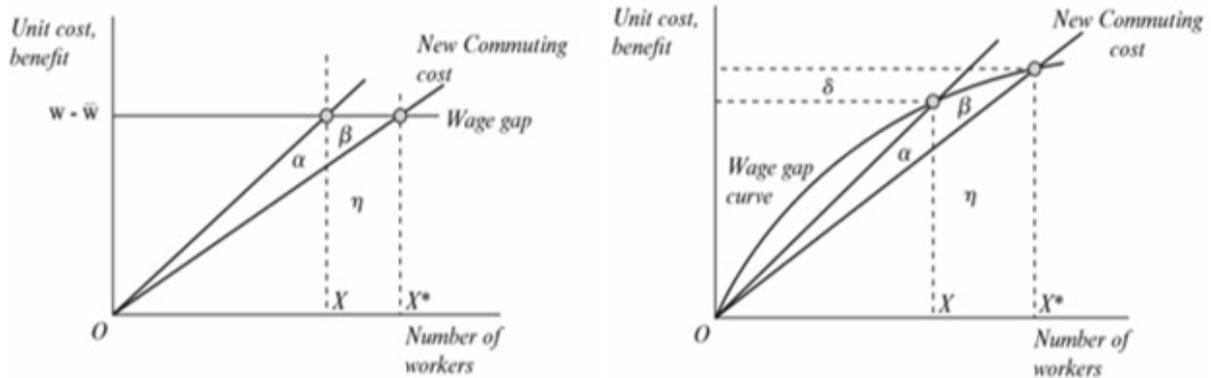


Figure 3: Net gain from transport investment with and without agglomeration effects [19].

The horizontal axis indicates the city size while the vertical axis indicates the benefits and measure costs. The difference between non-urban and urban wages is represented by the wage gap. The figure on the left side indicates the absence of agglomeration economies. At city size X an urban equilibrium is established in which the gap in wages between non-city and city workers is

completely dissipated by the travel costs of the city workers that are living at a longer distance from CBD. According to analysis, when transportation investment is made the cost of traveling will reduce and the city will expand to point X^* . We will get the net benefit from transportation investment ($\alpha + \beta$) by subtracting sources used in travelling ($\eta - \alpha$) from the change in output ($\beta + \eta$).

The figure on the right side assumes the urbanized agglomeration economies. From this figure, we can notice from the wage gap curve that productivity increases with the increase in city size. The slope of the curve indicates the measure of labour productivity or wages concerning the size of the city. In the case of a natural log graph chart, the slope between wages and city will indicate the elasticity of wages concerning the city. Elasticity is another variable which is used to measure the agglomeration economies in most of the research projects. Hence, in this way, he shows that there are external benefits from transportation improvements that are closely related to the agglomeration economies. The above model can be interpreted in another way if we assume that x-axis represents the workers or firms which are arranged uniformly over a certain distance from a particular location. A decrease in the cost of travel per unit distance will increase the number of workers or firms which can go to that location easily to achieve the benefits. Now, if there are agglomeration economies due to the movement of workers or firms in that area then we can consider that transportation investment helps us to reduce the cost of travel and increase the productivity gains.

Direct user benefits and wider economic impacts: There are direct and wider and direct impacts of transportation investments both are linked with agglomeration effects. The transport improvements benefits can be classified into two broad categories based on current cost-benefit analysis practices in the UK [21].

Direct user benefits: Direct user benefits consider the impacts that are produced for both existing and new users of the transportation system. These benefits arise due to changes in the quality of services. The direct user benefit is the largest component in cost-benefit analysis calculations. The better transport quality due to investments will attract people and firms to move to that area which will directly increase the user benefits.

Wider economic impacts: The wider economic impacts of transportation investment are of different types. The most important one is the agglomeration economies. The investment or improvement in transportation network gives rise to the potential economies interaction among the firm which in response give rise to the agglomeration economies and firm experienced the relative level of agglomeration.

The direct user benefits and wider impacts seem conceptually clear in this diagrammatic analysis - the user benefits are due to transport cost reductions for transport users, the wider impacts are externalities from the interaction between agents that increase their productivity. We can clearly understand the user benefits and wider economic impacts from the above analysis. The user benefits are mainly due to the reduction in transportation cost for worker and firms while the wider economic impact is due to the interaction between firms which help firms in producing different products and

increase their productivity. If we think about the transport or travel demand our main goal is to evaluate the user benefits or consumer surplus which are commonly based on the value of travel time. The above figures also represent the employer or individual willingness to pay to reduce their travel time. In most cases, there is already more than one route is available for travelling from one place to another place and commuters are free to choose their route as well as the mode of travel. In such a case the travel time saving is not related to the transport investment and the productivity of the firm is also not related to the transport investment. The reason is that the firms are using a different route which they think can reduce their travel time and cost and they don't think that they need an improve transport structure to establish their business. In the case of a worker travelling from his place of living to a place of work, it depends whether his time spent during travelling is considered to a time counted in work or not. In case of time counted in work during travelling, the worker will get paid by the firm owner or employer. So, it means that work will not think about travel time while the employer will think about it. In this particular case, it will be better for the employer to hire people living close to a firm which will result in a reduction of productivity as compared to the investment case.

Productivity of the firm: If we think about the productivity of the firm, then there exists a relationship between the productivity of the firm and the density of the city. Productivity can be defined as "the quantity of output produced as a result of fixed inputs such as labours, input materials, and cost". The productivity of any firm is highly dependent on the workforce working in a firm. If we have a large number of workers working in a firm, then this will enhance the productivity of the firm, but this will be only possible if the worker finds it cheaper to travel to the workplace as compared to their wages. Similarly, the high-density areas mean that we will have high productivity with lower input costs. This will give rise to agglomeration economies. The density in the area can only be increased by providing such a transport structure which will reduce the travel time of people who want to travel from outside to the inside of city or area. The productivity effect and travel time saving will help us to find the wider benefits of transport investment.

Case Study or Evidence

Leeds city region

Transportation investment analysis was carried out in Leeds city. The main aim was to achieve the agglomeration benefits of transportation investments. The package approach is adopted in Leeds city for the analysis of a wide range of public transport improvements [11]. The impact of strategic investment over time is evaluated with the help of this approach. As packages approach is selected which helps them to analyze the impacts of different improvements in transportation across the city. We can test the agglomeration gains due to the investment in the city. We also

find the relative agglomeration between Leeds and Manchester. The packages of the scheme which they considered to assess the Leeds city consist of three packages. Package 1 included the access improvement to the Leeds city center employing Park and rides sites, rail improvements, and bus rapid transit system. Package 2 discussed improvement of the links between Leeds city center and employment centers, and it also include highway improvements, tram-train system, improvement of bus corridors, and rail

electrification scheme. Package 3 included the improvement of link for connectivity between Manchester and Leeds City through improving Calder Valley rail line joining Bradford, Halifax and Hebden Bridge to Manchester.

Predicted results by conventional method: The conventional approach method results reveal that package 3 offers more benefits than the other two packages (Table 1).

Table 1: User group conventional benefits and agglomeration benefits in proportion to user benefits (2016 values, £m 2002 prices).

Packages			
	Package 1	Package 2	Package 3
User Group Conventional Benefits (2016 values, £m 2002 prices)			
Business	23	6.1	12.2
Commuting	23.6	34.7	131.4
Other	7.4	19.7	57.5
Total	54	60.5	201.1
Agglomeration Benefits in Proportion to User Benefits (2016 values, £m 2002 prices)			
User Benefits (£m)	54	60.5	201.1
Agglomeration (£m)	13.7	9.8	24.5
Proportion	25.40%	16.20%	12.20%

Determination of agglomeration benefits: The next step is the determination of agglomeration benefits associated with these packages. As we know that different cities have different effective densities due to their geographical behaviours. Due to the different densities of cities or density within a city, it is important to assess the transportation schemes benefits. We will focus on the local responsiveness rather than generalizing one. For agglomeration measurement, we will think that each city is equally responsive. The four major steps will be included in this

- i. Assess the effective level of densities throughout the study area.
- ii. Analyze the firm and industrial structure.
- iii. Estimate the response of each economic sector towards the change in density.
- iv. Calculate the response of different locations within the study area.

This process will help us to achieve details about the change in the level of responses in Leeds City. After that, we will predict the agglomeration gains related to our transportation improvement package. The last step was the modelling of the impact of each transport package based on the level of effective density. The response data which is calculated in earlier steps are then used to convert changes in productivity gain and monetary value.

Predicted results for agglomeration benefits: The finding from benefits analysis and agglomeration benefits is shown in a (Table 1) for all three improvement packages. The percentage in the

(Table 1) indicates the percentage of the total benefits through the agglomeration gains. User benefits are still high as compared to the agglomeration gains, but agglomeration benefits are still significant. The agglomeration gain also varies between cities. Some areas have high agglomeration benefits while some have low. As from the table package three has a high agglomeration gain while package two has a lower gain. This provides an important prediction for the future transport investment within Leeds City [22].

Eddington transport study

The Eddington Transport Study has modelled different types of wider economic benefits which also include agglomeration economies benefits [16]. These agglomeration benefits are linked with three different sets of transport investments.

Set 1: The first set involved improving the links between the main sectors of transport infrastructure such as ports and airports. These results indicated that the agglomeration benefits significantly vary with the scheme. The highest agglomeration gain can be achieved by the improvement of links to the Heathrow airport. In contrast, the lowest agglomeration benefits are shown by the improvement in the port of Felixstowe links (Table 2).

Set 2: The second set involved the investments for the improvement of links among the industrial clusters within the country for example aerospace in the Northeast and the finance sector in London. The results showed that we can achieve high agglomeration benefit by improving links to London's financial services as compared to other industrial clusters (Table 2).

Table 2: User benefits and agglomeration benefits rise.

Clusters With Evidence of Agglomeration	Agglomeration Benefits (£m)	Total User Benefits (£m)	Agglomeration Benefits as a % of User Benefits
Due to reduction in travel time to ports, airports and m4 motorway			
Airports			
Heathrow	0.3	2.1	13
Gatwick	0.2	2.4	7
Birmingham	0.2	3.4	6
Stansted	0.03	0.6	5
East Midlands	0.007	0.4	2
Seaports			
Tees & Hartlepool	0.1	2.5	3
Southampton	0.2	3.9	5
Felixstowe	0.01	0.5	1
M4	1.2	27.2	4
Due to reduction in travel time to specific business clusters			
Financial & Business Services (London)	45.3	23.5	193
Aerospace (NW)	1	6.8	14
Aerospace (SW)	0.3	3.1	10
Financial & Business Services (Leeds)	0.6	6.4	9
Metal	0.8	10.6	8
Other cluster			
R & D (S)	0.2	2.5	7
Parma & biotech	0.1	2.3	4
Ceramics	0.1	3.9	3
Due to reduction in travel time to london and england core cities			
London	56.9	183.9	31
Newcastle	1.3	16.9	7.5
Manchester	2.2	38.1	6.2
Leeds	1	16.7	6.1
Bristol	0.9	14.8	5.8
Birmingham	2.5	50.2	5.5
Liverpool	0.7	16.2	5.3
Sheffield	0.5	16.3	3.3

Set 3: The third set involved transportation connections improvement to the largest cities in England. The results indicated that if we improve the access to London then we gain more agglomeration benefit as compared to improving access to other larger cities of England (Table 2).

From all the three sets, it can be seen that we can arise the agglomeration economies when we provide an improved linkage between London and Eddington. There are two possible reasons. Firstly, London has an effective density and has a large industrial and finance sector cluster. Secondly, when we provide improve transport structure then it will help the workforce to travel from one place to another within less travel time.

Chicago

In Chicago, a study was conducted to show the agglomeration economies from 1850 to 1920. At the time when the meatpacking market or industry was heavily active in Chicago. On the other hand, urbanized economics is clustering with these activities. The agglomeration benefits which were observed at that time were due to sharing of transport infrastructure and other urban infrastructure. The agglomeration economies arise as a result of a reduction in the average cost of production which also helps to enhance productivity within the city (Table 3). The cost of inputs in urbanization economies is reduced due to the sharing of the infrastructure among the firm established in a city. As a result of this, more firm started their business in Chicago, and the density

of the city increases and give rise to the clustering of firms in a particular location resulting in the generation of agglomeration economies. The concept of agglomeration was observed in two developmental stages of Chicago such as localization economies

and urbanization economies. The localization economies were dominant in the earlier stages of development during the existence of meatpacking industries while urbanization economies are prominent in the current stage of the city (Figure 4).

Table 3: Percentage change in manufacturing output indexes.

Manufacturing Output Indexes	Percent Change From		
	1 month ago	3 month ago	1 Year ago
Chicago Fed Midwest Manufacturing Index (CFMMI)	-0.9	1.8	8.6
US Industrial Production Manufacturing (IPMFG)	-0.5	0.4	5

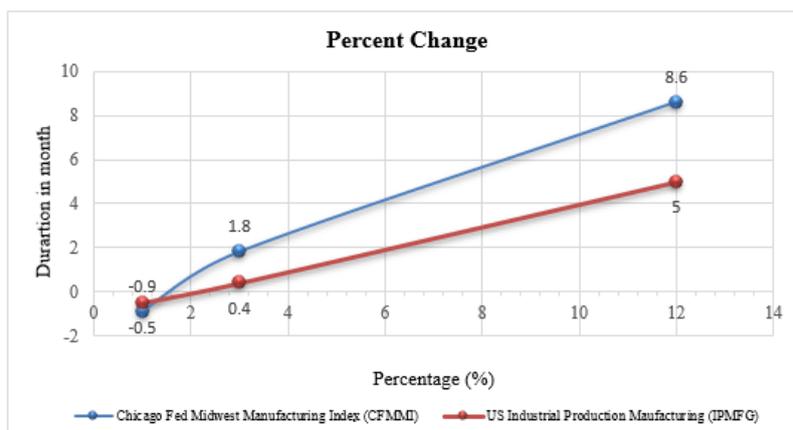


Figure 4: Percent change as a result of agglomeration economies.

UK by department for transport

An evaluation for the prediction of agglomeration economies was carried out by UK Department for Transport (Dft, 2005). The agglomeration is estimated by using the elasticity estimation of agglomeration. The Department for Transport reappraised the proposed London Rail scheme named Cross Rail. They want to know the investment is affected by the externalities and what is the effect of these externalities on the benefits of investment. The Table 4 indicates the results of this analysis. The result of this analysis reveals that the investments in transport infrastructure will give rise to the agglomeration benefits which directly increase the benefits of the rail project by 25%. This is maybe because transportation investments are considered as the main cause of enhancing the effective densities. In some projects, we get a decrease in effective densities and the agglomeration we get from elasticity will indicate agglomeration cost instead of agglomeration benefits in transport investments. For example, road pricing is considered as an agglomeration benefit because when we charge the road users for using the roads in an urban area then it will increase the cost for all journeys but reduces the congestion and travel time due to a smaller number of vehicles in an urban area. Now, there is a reduction in the travel time parameter of generalized cost but in contrast, the amount for making a trip is increased. Road users which are travel for business purposes will use the route

and pay the road pricing amount. The reason behind this is that they have a high value of time in contrast to other commuters. The worse condition is that commuter who has a low monetary value of time. Hence, the agglomeration effect created by road pricing may be different for different people and it depends on their monetary value of time while there are overall agglomeration benefits of congestion or road pricing. However, it is important to know that the transportation policies can serve both for lower and raising the urban densities. So, the agglomeration effects of any transportation investment policy can increase or reduce the agglomeration benefits of any scheme.

Table 4: Applying appraisal to cross rail (DfT Calculations).

Benefits	Welfare (£m)
Business Time Savings	4847
Commuting Time Savings	4152
Leisure Time Saving	3833
Total User Benefits (conventional)	12832
Agglomeration Benefits	3094
Total Benefits (new approach)	15926

Conclusion

From all the above discussion and case studies, it can be noticed that the agglomeration economies or agglomeration

benefits are linked with transportation investment to great extent. The transportation investment will help people to connect. Transportation improvements allow workers to move from their living to the working place. The improvement in the transportation system which will reduce the travel time and cost of travel will attract the employer to establish their firms in a specific location that is easily accessible to suppliers, consumers, other firms, and workers. It helps to increase the productivity of the firm which in response increase the agglomeration benefits of transportation investment. So, agglomeration economies, the productivity of firms both are linked with improved transport structure.

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