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► To cite this version:

Francis Aubert, Carl Gagné, . Core. Center For Operations Research And Econometrics. Industrial location and labour demand: a history of change between agglomeration and dispersion. Workshop Cities and globalization. CORE 40 years, Jun 2006, Louvain la Neuve, Belgium. 8 p. hal-02820086

HAL Id: hal-02820086

<https://hal.inrae.fr/hal-02820086>

Submitted on 6 Jun 2020

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Workshop
"Cities and Globalization"
13 - 14 June 2006

**Industrial location and labour demand:
a history of change between agglomeration and dispersion**

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This communication sets out the highlights in the changing features of industrial location, with a special attention to the town-country relationship, as established by historical research. More precisely, we suggest a simplified pattern based on the labour factor and more particularly on the labour demand. We attempt to periodize the long-term changing of industrial locations, since the « pre-industrial period ».

This is not an overview of the main stages of urban and rural development, as in Bairoch or Hoehenberg & Lees. The history of change may contribute to clarify the following question, in relation with Fujita & Thisse « fundamental question »: « why don't **all** economic activities tend to agglomerate in a small number of places –typically cities? ».

After presenting the spatial dimension of the labour demand, we propose 3 main periods to account the spatial dynamics of industry over the last two centuries on the basis of changes in the labour demand.

Labour demand and spatial differentiation

We want to show how labour demand plays an important role in allocating industry between urban and rural areas. This approach is complementary to the labour supply approach, which is closely related to demographic analysis (for example Hoehenberg's cyclical model based on population growth rate).

The spatial allocation of industrial activities is influenced by:

► *cost of labour*

The wage cost is the first factor of spatial differentiation, the most trivial. But the different wage levels have to be compared with the productivity. For a given productivity level, different wages may reflect different living costs, such as housing and commuting costs.

Besides wages, adjustment costs involved in labour costs – these are mostly costs for recruitment, adaptation to the position, training, redundancy. They may vary with location depending on the specific characteristics of labour demand and supply, but also on the conditions in which they are related. So, significant different costs may result of ensuring appropriate skill levels and of managing flexibility.

► *production technology*

It influences the level and the structure of labour demand in relation with the endowments in labour prevailing in different labour market areas.

Labour demand depends also on the mobility of labour between activities and localities: the less mobile the labour is, the less it adjusts to firms demand and consequently the greater the impact on their location. It also depends on skill levels, on whether skilled and unskilled workers are substitutes or complements.

An other point that is technology-specific with a major effect on industrial locations: fixed costs. They are an important factor in agglomeration, but it alters the extent of the market area, both for the commercialisation of outputs and for the recruitment of work-force.

► *Access to demand for goods*

The location of demand for goods, its level and nature, influence the labour demand of the firm and its location. For the same product using the same technology, its demand varies with the distance to the market, due to trade costs raising prices. So producers and consumers of final goods, makers and users of intermediate goods have an incentive to cluster.

So, the different factors affecting labour demand and its spatial variability provide a perspective from which to interpret the long-term of industry locations change. This we apply to historical works that are well established. Despite the diversity of regional situations, features common to most European countries can be identified. Emphasis is placed on shifts and swings between rural and urban locations to the detriment of activities that are not very sensitive to labour demand or comparatively stable (residential activities, permanent specialist sites, etc.).

1- The pre-industrial period (18th) – wage costs and flexibility matter -

Let us note a first general point: movement between cities and rural areas is neither all one-way oriented nor is it irreversible, but different sequences of reciprocating motion between the two types of location, in which labour plays an important part. A second point: the evolution didn't occur so much by any sudden changes in location than as differential of rate growth.

The pre-industrial period was characterised by substantial dispersion of industrial production, with a high degree of « ruralization ». The « cottage industry » flourished early in the eighteenth century, as a result of:

- growing labour demand in the manufacturing sector, driven by growing demand for goods, which often grew unevenly (long distance, overseas trade) ;
- manufacturing processes and capital structure (neither technology nor much equipment) allowed production to be divided up into many small, scattered units. The skills required are available on a large labour market.
- labour supply is available, docile and stable in the countryside, while it was unelastic in the cities (corporations and urban guilds, cost of living).

« Flexibility in the social organisation of production was not only an advantage, it was a necessity » (René Leboutte).

Such a mobilization of rural labour in loco, and its coordination by urban merchant-manufacturers was one part of the « proto-industrialisation » system, *id est* the putting out system. Another part is to take account to design a complete stage of the industrialisation process: the production of goods requiring skilled labour, technical capital or supervision remained located in cities.

2 – Industrialisation and urbanisation

From the late 18th century, the development of industry and agriculture radically changed the form of industrialisation and overturned its relation with geography. Initially there were mainly developments in technology. Technologies implied high fixed costs which tended to favour agglomerations where a large labour pool could be drawn on.

In addition, capital became more a substitute for skilled labour and more a complement for unskilled labour. Consequently, demand for unskilled labour grew. Meanwhile, because of the agricultural crisis, large numbers of rural workers were leaving agriculture and creating a surplus of unskilled labour. Thus everything was set for industrialisation to occur along with economic and geographical concentration, but in an ambiguous connection with urbanisation, so we divided this long period (early nineteenthth to early twentiethth) into 2 sub-periods characterized by the relations uniting industrial and urban concentrations : i) industry makes the city, ii) the old cities accommodate industrial activities.

21 - Industry makes the city – adjustment costs matter -

Initially, the main factor in terms of industrial location was the adoption by a few leading sectors of new production technologies involving high fixed costs. This fostered the concentration of production in a few plants, linked to the spatial distribution of raw materials, outside of historical cities.

It seems the wage level was no longer a decisive variable in terms of location: wage differentials between regions tended to reflect productivity differentials (Clark). The most important challenge was to reduce adjustment costs. The mobilization of the work-force in these new firms became fundamental in this stage of industrialisation. Mass hiring of workers was made possible by the many movements of population to these new industrial concentrations. The higher the fixed costs, the more important it became to keep workers at their jobs. So, to keep the work-force in place and to reduce adjustment costs, the masters of these factory towns had an incentive to take care of all aspects of their workers' life, from housing to welfare – adjustment costs matter.

Alongside, the industrial sectors where craftsmanship and the commercial function were decisive sustained activity in traditional towns; rural industries continued their activities whether, with small plants using scattered natural resources or highly specialized clusters. However, many historical activities were exposed to direct competition and were eliminated by the new forms of large scale production.

22 – The city makes the industry – access to skilled workers matters -

From the mid nineteenth century, following the downward trend of transport costs, firms were less and less constrained in their choice of location by the spatial distribution of raw materials. So, the urban demand for commodities led the historical towns to take in a growing share of production activity.

The use of mechanical processes spread to just about every sector, but now capital became more a complement for skilled labour. Access to non-material inputs and to skilled workers was combined with the advantages of market presence, in which case urban sites were preferred. These knowledge-based activities were conducted by small firms which recruited mostly on the large and increasing urban labour markets.

Different moments could be identified during the period with successive generations of driving sectors and of industrial towns. The overall result can be characterized across industrial Europe of the late nineteenth century by spatial concentration of production activity. This gathering occurred on a large scale in a context where people and information moved more readily than goods. The twentieth century extended this trend, bolstering the role of the urban labour market as the movement of people amplified.

3 – Industry on the urban periphery - relax the wage competition-

The relations between towns and industry were still very close, but for this period the spatial distribution of production plants was determined from urban centres. The historical advantages of urban locations were consolidated by agglomeration and urbanization economies but altered on the other hand by increasing competition on the labour market and the land market.

Urban growth was less and less related to industrial growth: the dynamic was carried by the tertiary sector and directed at high skill levels. At the same time, the substantial fall in the transport cost of goods meant new areas could be opened up for possible industrial locations.

Two sub-periods are to be identified to take into account the changing pattern of industry during the twentieth century : i) industry developed on the fringe of cities, ii) industry moved away from towns, giving new impetus to rural locations.

31 – Suburbanization – access to less skilled workers -

This period was one of industrial growth that structured the twentieth century, based on the development of automation and scale effects. The extension and intensification of capital

labour substitution transformed the labour demand, towards the more skilled categories, but the growth in industrial products demand and the complementarity of productive capital-operational labour sustained the demand for unskilled labour.

During the first part of the twentieth century, the transformation of labour demand, in the face of intra-urban competition, largely influenced the pattern of industrial settlement which moved from the urban cores to the fringe, but within the same labour market.

The more intense competition for land, with both effects on production and residential uses, pushed industrial plants and working-class housing further out. So the increasing social and functional diversity of the town went along with a spatial differentiation.

After 1950 (eighteen fifty), continued technical division of labour within firms opened up the possibility of locating plants in different areas –and different labour markets- according to their functional speciality. Some functions required a central location because of the technical and financial advantages of the major centres; it may concern manufacturing if the central location improved labour productivity more than the additional cost of labour in the central area. Most of firms took the opportunity of increasing capacity to reorganize their production process in relation to the establishment of plants. Labour supply in the rural areas was the most suited to this demand, in terms of availability and remuneration, but also for the adjustment costs.

32 – Periurbanization and rural revival - flexibility matters -

Agglomeration economies are proving more and more decisive for many activities; it's not true for manufacturing plants, *i.e.* industrial activities in the strict sense (after distinguishing front office/back office, production/services, outsourcing).

The slow-down in productivity gains has prompted firms to look again for lower labour costs. Insofar as the spatial variability of wages has tended to fall, adjustment costs have taken on more importance in defining the respective advantages of the different locations. In this respect, urban markets stand out for the density and the variety of skills they offer, but also for their high turn-over. By contrast, rural markets cannot offer the same labour supply nor the same matching, but the stability of the workers allowed on-the-job-training and may reduce total non-wage costs.

This possibility refers back to the technological question. The current period is marked by the availability of a large range of technical solutions for production processes. The less capital intensive technologies require high numbers of unskilled workers, and the production of specific human capital; they are better suited to the non-urban labour markets.

Finally, something happens when the level of fixed costs becomes such that the corresponding areas are no longer on the scale of a single city, because the optimal location may be between several urban markets.

The distribution of industrial activities between urban and rural areas is tending to change, with greater concentration in the second. While manufacturing is increasingly implanted in outlying areas, new activities and front office activities are located in large urban centres. This tends to sharpen the spatial division of labour, with something new by extending the possibilities of technological combinations and labour skills.

Conclusion

We aim to relate rural development to the unfolding of large-scale social and economic processes. Our analysis reveals the existence of a long-run pattern of dispersion, agglomeration and re-dispersion of manufacturing activities from the pre-industrial period to the present day. Something similar relation has been proposed as a theoretical result of the agglomeration of mobile activities and decreasing transport costs (Fujita & Thisse).

The urban-rural swings were phased with respect to the evolution of labour demand. Here we have attempted to show that the labour factor has been a permanent feature in the spatial distribution of industrial plants throughout the course of history.

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