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EXTERNAL ECONOMIES OF THE URBAN CORE

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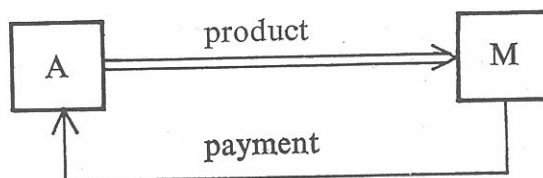
This paper is based on a forthcoming study, "Regional External Economies". After a short introduction, the paper is devoted to potential applications of the concept to urban core problems.

THE MECHANISM OF EXTERNAL ECONOMIES

The concept was introduced by Alfred Marshall (1895-1920) as a counterpart to internal economies (scale economies within an organization). They could be created for instance through "the growth of related branches of industry which mutually assist one another, perhaps being located in the same localities". (p. 317)¹⁾

To illustrate the mechanism of external economies, the following simplified model used:

We start with an activity A, trying to produce and sell products to the market M at a market price.



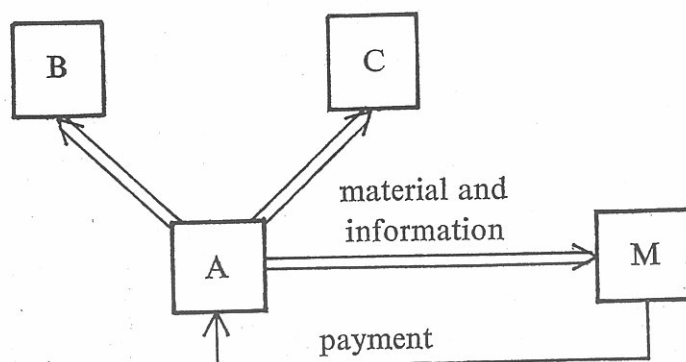
During this process, the activity cannot avoid producing *also* some 'side-effects', which have no specific recipient. These side-effects can take the form of for instance:

- a) Labor trained by the activity leaves it for other activities, benefiting from experience gained.
- b) 'Know-How' used in the production process will become common knowledge.
- c) Resources provided by public authorities (ports, roads, etc.) are used jointly with other activities, giving rise to increased profitability of public investments (at least in the long run).

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¹⁾ Marshall's original intention was to use the concept for making diminishing average costs and perfect competition compatible with one another when economies of scale were prevalent. The concept of external economies has also been used for the study of growth problems in developing countries, the divergence between social and private productivity, and in many other contexts by authors such as Pigou (1920), Viner (1931), Bator (1958), Rosenstein-Rodan (1943), Scitovsky (1960), Bohm (1963).

- d) Other resources (labor, transport services) are also shared with others through renting—or short time employment. This reduces the cost for storing resources which are not permanently efficiently used. This productivity gain can be viewed as a side-effect due to the sharing of indivisible resources.
- e) Negative side-effects may occur: smoke, noise, etc.

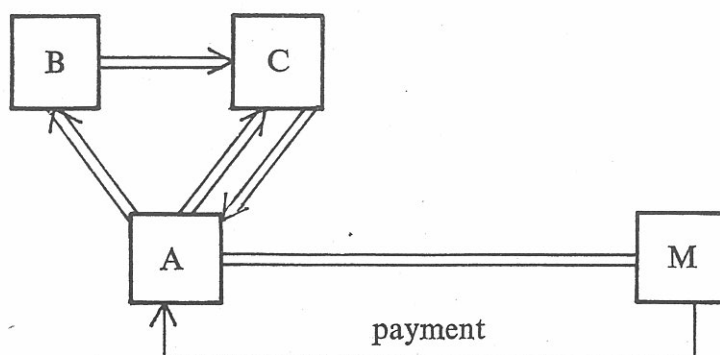


These side-effects often reach a limited area only. Since A, the generator of the external economies, cannot prevent their use by 'non-paying receivers', adjacent activities (B and C), having the technological and organizational potential to benefit from them, do so without *direct* payment¹).

The individual decision unit has to choose between different levels of internalization (self-sufficiency). It could, for example, choose between relying on the local police (external), hiring the service of a guard company (conventional economic transaction), or employing a guard force itself (internal). Similarly, it can choose between its own research staff (internal), buying licences and patents (economic transaction), or relying on the general technological development as reflected in literature and papers (external). The choice of any of these alternatives (or a combination) involves an appreciation of costs and benefits and the possibility of guiding the activities. Obviously, there is a systematic interaction between organizational structure and the potentials of the local environment. Thus a less central location requires a higher degree of internalization and vice versa.

If nearness is a necessary condition and the external economies are attractive, there will be competition for land with these advantages. This will increase the land rent, frequently also the wages of specialized type of labor.

¹) We can now replace the word side-effect with external economies which with a slight oversimplification can be defined as 'things that are not free but which you do not *pay for*'. More strictly external economies are produced by the existence of input and output, which a decision unit cannot manipulate or control, e.g. their form and quantity are the result of decisions and actions outside the decision unit.



We can now replace the one-sided relations with more complex ones. B could for example generate side-effects for C, which in turn generates side-effects for A, etc. The higher the density of activities in a given area, the higher the probability that such chains are created. This probability is, of course, still higher if the 'structural mix' could adjust to the potential external relationships.

It seems reasonable to assume that such a productive structural mix will result 'automatically', because many activities, which do not derive any substantial benefits from their surroundings, will be driven out from the area by rising land rents and wages. This could apply, for instance, to standardized production and to some large activities for which the external relationships are of minor importance.

Another solution is the creation of new specialized activities with the ability to collect external relations in its surroundings, amplify them and channel them to other activities as economic services and goods. Advertising agencies, car hire firms, consultants, and accountants exemplify this type of 'amplifier' units ¹⁾.

Summarizing, we have tried to describe a cumulative process where un-intentional 'side-effects' flow between adjacent activities, thereby creating productivity gains and new structural specialization, which in turn produces new economies, etc.

This virtuous circle could, however, be broken in at least three ways:

- 1) The nearness can give rise not only to positive but also to negative effects, smoke, noise, etc. The gains from the positive effects could, however, be used to compensate for the negative effects.
- 2) The exploitation of positive effects may exceed a given capacity level, e.g. a port or a road may become too crowded, which would create a short run external diseconomy situation. In the long run this type of situation could be solved by new public investments, which normally have a high profitability.

¹⁾ This process could formally be described as a transition of so called 'technological external economies' to 'pecuniary external economies' which could be channelled through the price system by conventional transactions.

- 3) Imperfections in land-use exemplified by the activity occupying space in order to benefit from external relationships but without positive effects on its surroundings can also break the virtuous circle. Large central offices accompanied by space demanding routine functions might occupy this position in the urban core.

THE URBAN STRUCTURE

We shall return to this question later and first bring in the specific forms of external relations that might be found on the micro-level, within the inner core:

1. Information relations (the possibility of face-to-face contact or other forms of unformalized communication within a given time-distance).
2. Labor force relations (the possibility of tapping a pool of labor within a given time-distance).
3. Service relations (the possibility of letting the personnel tap a pool of personal service within a given time-distance).
4. Resource relations (the possibility of tapping a pool of other material and organizational service within a given time-distance).

The totality of relations in a given area form an assortment to which can be attributed depth, measured as the number of units of a specific kind, and range, measured as the number of variants.

In principle it is therefore possible to characterize a certain area in terms of its potential range and depth with respect to selected forms of external relations. Such a characterization, preferably in the form of actual material and information flows, could be related to the activities within the area.

Using this distinction, we could divide the metropolitan area into three principal subareas, namely:

Area A

This area, in principle corresponding to the urban core, is marked by a deep but above all a wide assortment of relations for information, labor, and service. Within this area the maximum ranges can be found, while other subareas may have higher values for depth pertaining to certain relations, for instance access to a certain type of skilled labor or a certain type of information.

Area B

This area may have high values for depths and a sufficient range, e.g. the demand for access to certain specified variants up to a given amount might be met. The area could also have combinatorial characteristics, for example access to specified variants

up to a given value within a given time, say X minutes, and access to maximal depth and range within $3X$ minutes. The resource relations which often demand physical transportation may reach high values for range as well as for depth, even in comparison with area A. The area can be perceived as consisting of clusters with specified functions, which does *not* imply any form of the much discussed satellite cities.

Area C

Generally this area is characterized by a narrow assortment of relations but has certain potentials for deepening the access to certain types, peculiarly in respect to resource relations. The information and service relations can be brought up to a certain local depth through communications investment but will with necessity remain narrow.

THE PRICING PROBLEM

From this follows that almost all types of activities could derive advantages from a location in area A and that these advantages will be growing cumulatively if all external relations increase as fast as or faster than total activity. With such a development going on high scarcity prices in this area would not seriously diminish its attraction.

We can now return to the conflict situation already referred to. The reason for the area not being able to grow indefinitely is that external diseconomies tend to weaken certain of the positive effects of the close location. For example, if a group of activities F locates in the neighbourhood of another group of activities G in the hope of using their positive relations ("side-effects"), G may experience difficulties in maintaining some of its own relations, which in turn may diminish exactly those advantages that group F has expected to obtain. The fact that the activity group F pays for the scarcity value of the land does not affect the activity group G positively—on the contrary it meets increasing difficulties in expansion and requests for higher land rents without any compensation (if it does not own the land itself). In short we can conclude that to the extent that relations are not mutual there will exist the problem of competition for land, which cannot be solved by land rent payments of the traditional type. Furthermore, high land and building costs do not seem to be able decisively to affect the location tendencies of business activities. For many activities the costs for land and buildings represent only a minor part of the total costs, which is true especially of the central offices of large enterprises. The rent payments as such are able neither to increase the supply nor to diminish the demand for land in the core area. It seems more reasonable to assume that the shape of the building lots and the internal needs of the activities will be decisive.

Koopmans-Beckman (1957) have powerfully demonstrated these difficulties:

"It now seems better to present such largely negative results as we have obtained concerning the possibilities of pricing in the quadratic assignment problem, because this problem seems to be close to the core of location theory, and in the hope that an examination of this example of the apparent failure of the price system may ultimately lead to better insight into the possibilities and limitations of price systems as means of decentralizing the allocation of indivisible resources". (p. 71)

"..... the theory of the location of economic activities has no chance of explaining such interesting realities as large and small cities without recognizing indivisibilities in the processes of production and in human existence". (p. 53)

If a scarcity situation of this form exists there is reason to argue that the activities would profit from separating certain activities which could then be combined into groups with high internal interdependence. This solution is complicated by the tendency of most decision units to try to hold their subactivities together locally, which means that while each activity on the one hand tries to hold together all subactivities (internal interaction), on the other hand it puts its total activities in connection with a local concentration, preferably in area A.

MEASUREMENT OF INFORMATION FLOWS

The problems of information and its transmission deserve further attention. As Professor Kristensson has pointed out, the developments in telecommunications may lead to a higher degree of centralization as well as decentralization. An increased use of telecommunications may make an increasing number of production units geographically footloose, but could paradoxically lead to a higher degree of concentration of central offices and other high level information processing units. When these are released from the bounds of production units they will be free to choose location according to their own needs of rapid and often spontaneous face-to-face contact in the urban core.

This separation process is already under way, but it is quite difficult to observe it empirically. While relocation of factories is fairly clearcut and sometimes dramatic the separation process takes the form of 'natural' growth and the forming of new organizational structures, which in many cases are of greater importance than the conventional relocations.

New tools are needed to observe and quantify this phenomenon. One way is to find operational measures of the frequency, time, effort, purpose and effect of information flows through different media directed towards outside units. In this way it will be possible to elucidate important parts of the interorganizational information network knitting together organizations.

The methods of measurement must therefore be applicable in large-scale use. We

have just completed an extensive pilot study of the changes in the information flow of a central office directing several plants in different parts of Sweden, which moved out from Central Stockholm to a location 120 km outside ¹⁾).

The pilot study was executed in two stages, four months before and eight months after the move.

At each stage forms for reporting all contacts were distributed to all employees with independent contact work (120 out of 200) for six randomly chosen days of one month. The reliability was checked by comparison with a central register of all visitors and 83 % of all contacts were found to be reported on the forms. The data were processed in a newly developed programme for Latent Profile Analysis which permitted far-reaching condensation of data with low information loss.

The design of the pilot study gave opportunities to study frequency and time effort for different media, on different decision levels and for contact units in different locations.

The next step would be to get hold of the purpose and the result of the contacts in order to assign an economic value. However, this must be seen as a long term project. For pure location decisions, purely quantitative data can give valuable information.

It is of course impossible to generalize from the results of the pilot study, but since they are compatible with our theoretical framework some points are worth mentioning. Both before and after the relocation of the central office most of the information flow to the production units was by telecommunications. This flow was affected only slightly. Information flows to other information units (authorities, customers, research organizations, etc.) used face-to-face contact to a much higher degree and were also quite stable despite the increased travel effort. The increased demand on the time of top management in particular did not lead to increased use of telecommunications but to increased delegation. It looks as if the possibility of substituting present-day telecommunications for face-to-face contact are very limited in these cases.

The methods used for the pilot study will be applied to further work on a larger material in order to test these and other hypotheses.

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¹⁾ This outmovement of a central office was unique, initiated by a Parliament decision.

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