

概 要

大都市の都心周辺地域に形成されてきた、住宅と工場の混在する用途混在型土地利用地域はその多くが都市計画の定める用途地域制により「準工業地域」に指定されてきた。準工業地域は利用規制が緩やかなことから用途の多様化を始め、小規模宅地による利用や狭小建物の密集を促した。戦後の経済成長を担ってきた中小零細規模の製造業もまたこのような地域に多く集積し、公害問題を深刻にしたことは記憶に新しい。このため、準工業地域等への製造業の新たな立地に対して強い規制をかけるなどの方策が採られてきた。

しかし、新たな工場の立地を規制しながらも将来のあるべき土地利用の姿を明確に示すことは必ずしも十分ではなかった。工場が移転すると、その跡地利用として住宅や業務施設などの工業以外の用途に利用を転換することが繰り返されてきた。これに伴い工場を迷惑施設とする苦情が増加し、工場の操業が一層困難になる等の現象が生じるようになった。しかし、東京都の指定する「準工業地域」の面積は減少することなく、むしろ近年まで増加し続けてきた。

一方、近年になり、社会的経済的環境の変化や工場を発生源とする公害の解消が進んだことから、住宅と工場の共存による社会的効用が指摘されるようになった。しかし、都市の土地利用計画を立案するに際して住宅と工場を積極的に共存させる論理は未だ十分に確立しているとは言えない。

本資料に報告されている論文は、このような視点から今後の土地利用計画立案に資することを目指し、工業活動の論理を積極的に明らかにしようとしたものである。このため何れの論文も大都市東京の住宅と工場が混在する地域を事例に取り上げ、アンケート等の実態調査に基づいて中小零細工場の立地行動を分析し、その一部を明らかにすると共に土地利用計画立案への適用の可能性を検討している。各論文の概要を示すと以下のようなようになる。

I 混合市街地形成と小零細工場立地では、住工混在市街地に立地する工場が、移転を迫られてもなお従前の地で操業を続けることを期待するその要因について、工業活動における経済的論理に着目して分析を行ったものである。企業間取引を受注取引と発注取引に区分し、「取引時間距離」という新たな概念を用いて分析を進めた。その結果、取引に関わる時間距離の短いことが企業の重要な立地因子の一つであることを計量的に捉えることが出来た。同時にこの短い「取引時間距離」が集積立地を形成する第1の要因であり、分散立地により集積利益が損失することを説明することが可能になった。

本稿は、日本地域学会第22回（1985年度）大会で発表し、「地域学研究」第16巻に掲載されたものである。

II 工業近接立地の集積効果に関する考察では、大都市の住工混在地域に立地する工場が享受していると指摘されている集積による外部経済を実測し、その経済効果を存続させることを前提としたときのあるべき土地利用計画の姿を空間的に捉える一つの方法を提案した。即ち、「取引時間距離」が短いほど外部経済性が高いと仮定し、取引時間距離を地区毎に集計し短い取引が集中する地域とそうでない地域に区分する方法を考察し、具体の地域に適用しその識別を可能にした。

本稿は、日本地域学会第25回（1988年度）大会で発表し、「地域学研究」第19巻に掲載されたものである。

III 技術革新の進展に伴う大都市既存工業集積地の変化では、東京都の区部で特に顕著に見られる製造事業所数減少の原因の一つが、1980年代に始まった生産技術におけるNC化やME化の急速な進展にあると仮定し、立地因子に与えた影響を明らかにし、大都市工業がその存続を期待されると仮定される時、土地利用計画が考慮すべき方策を示すことを試みた。分析の結果、加工機械におけるME化やNC化が工場の床需要を拡大していることを捉え、従前の集積形態を維持するために期待される規模（面

積) 別工場数の需要量を試算した。

本稿は、日本地域学会第27回(1990年度)大会で発表し、「地域学研究」第21巻1号に掲載されたものである。

IV 企業会計データを用いた工業立地の変動要因分析の試みでは、大都市での立地可能性を費用の側面から明らかにしようとしたものである。「中小企業原価指標」を用いて企業の経営費用を4部門に大別し、移転を促す費用項目の抽出を試みた。標準産業分類と原価指標が用いる産業分類が異なる等、データの整合性に苦勞したが、業種により製造事業所の都区外への移動要因が構造的に異なることを捉えることが出来た。

本稿は、日本地域学会第33回(1996年度)大会で発表し、「地域学研究」第27巻第1号に掲載されたものである。

V 製造事業所の立地減少と地価の変動では、「地価負担力が低い」とされる工業活動にとって「地価」が実際にどのような意味を持っているか、又実際の地価負担力がどの程度あるのかを、考察した。地価は企業においては外部経済と外部不経済の二面性を持つことを明らかにした。また昭和40年代後半に形成された工業地価が立地コストとして上限に達していることも捉えることが出来た。また東京区部の製造事業所数の減少や規模の小零細化の進展の原因の一つがこの地価によるものであること、地価の変動に伴い工業活動に供されている宅地の量(面積)が敏感に増減する実態も捉えることが出来た。

本稿は、日本地域学会第30回(1993年度)大会で発表し、「地域学研究」第24巻第1号に掲載されたものである。

VI 企業の経営合理化行為と市街地整備の可能性では、市街地整備事業等の進まない要因の一つに「インセンティブの不足」がしばしば指摘されることに着目し、企業における経営合理化行動を企業内部に潜在するエネルギーと仮定し、また再開発など市街地整備事業を地域に投入される外的エネルギーと見做し、この両エネルギーの効率的利用が事業を促進する一つの可能性を持つとの前提に立ち、企業の合理化行動について分析を行った。市街地の形態に重要な関わりを持つ生産施設の変化と結びつくと考えられる合理化行為を取り上げ、その発生確率、創業期との関連性等を分析し、企業の内部に潜在するエネルギーを外部から予測することの可能性を捉えると同時に、これを事業の実現性を測る指標として利用することの可能性を示した。

本稿は、日本地域学会第23回(1986年度)大会で、「企業立地における経済合理性と都市開発」として発表したレジюмеに加筆したものである。また、論文の意図した目的がより明確になるよう論題を標記のように変更した。

VII 大都市東京における工場の集団化に関する考察では、大都市型工業による公害問題の解消と集積効果の維持という二つの課題を解決し、住工共存型市街地形成の可能性を検討するため、中小零細企業の近代化策として始まり、後に公害発生型工場の一般市街地からの移転・隔離を目的に進められてきた「集団化事業」に焦点を当て、その成果と問題点を考察した。工場を発生源とする公害が低減するに伴い、住宅と工場が共存することによる社会的効用が見直され、共存を積極的に支持する考え方が一般化しつつある。旧来の集団化事業はその社会的役割を既に果たしたが、改良を加えることで、社会的経済的環境の変化や新たな住工共存型地域社会形成に対する期待に応える一つの手段として十分に期待し得る事業方策であることを明らかにした。

本稿は、日本地域学会第37回(2000年度)大会で発表し、「地域学研究」第31巻第3号に掲載されたものである。

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ABSTRACT

The number of people who recognize that the usefulness of regional diversity has been brought out by the mixed land use and urge the coexistence of factories and houses in inner areas of metropolises is increasing in recent years, as the environmental pollution caused by factories has been decreasing.

To support the above view and encourage the proper development of the land use planning in town and that of the country planning in general, the papers in this report are directed to the analysis of the logic of location of manufacturing industries of the following seven types ;

- 1) iron and steel,
- 2) non-ferrous metals and products,
- 3) fabricated metal,
- 4) general machinery,
- 5) electric machinery,
- 6) transportation equipment,
- 7) precision instrument.

I On the Relation of the Mixed Land Use in an Urbanized Area and the Location of Small Factories

Various actions have been taken to disperse factories located in the mixed land use area of metropolitan cities since 1960's. Many factories have moved out of the cities as the result of these actions. Nevertheless, still there are a large number of small factories operating in those cities. This suggests the necessity of developing a new policy for the proper handling of the location problem of small industries in those areas.

In this paper, a new approach has been taken for the analysis of the inevitability of the agglomeration of small factories. The trading behaviors of small factories are studied by using the data of a survey conducted in 1984. The application of a computer program package CATDAP disclosed that the distance, measured by the trip time between factories trading each other provides definite information for the understanding of the characteristic of the agglomeration of the small factories.

The paper concludes with the recognition that any plan to disperse factories, which agglomerate in mixed land use area of inner cities must take into consideration the economic function provided by this type of complex of small factories.

This paper was presented at 22nd Annual Meeting of the Japan Section of the Regional Science Association International (RSAI) in 1985, and was appeared in *Studies in Regional Science*, Vol.16, 1986, pp.179-198.

II A Study on the Agglomeration Effect of Concentrated Factories

The change in the industrial structure is causing new conflicts in the mixed land use areas of the inner cities where small factories are located mixed with residences, shops and so on. The conflicts disturb the location activity of small factories in inner cities, and this may lead to the disintegration or termination of the external economies, which were generated by the agglomeration of a similar type of industries. Reconstruction activities of an urban area induce the relocation of buildings or the change of the land use. This may also disturb the external economy.

This paper presents the result of an analysis of the effect produced by the agglomeration of factories in Sumida ward of Tokyo.

The basic concept used in this paper is *the time-distance for trading* that measure the distance between a factory and its correspondent in terms of the required time for the trip by usual means of transportation. It is assumed that *the time-distance for trading* represents the value of the agglomeration effect.

It is seen that the areas with high agglomeration effect are concentrated in some particular part of Sumida ward. This shows that a proper planning of the renovation of Sumida ward could be realized without seriously damaging the present economic activity if only the high-density areas are left untouched. This observation suggests a possible use of the regional science approach to the problem of urban renovation.

This paper was presented at 25th Annual Meeting of the Japan Section of the Regional Science Association International (RSAI) in 1988, and was appeared in *Studies in Regional Science*, Vol.19, 1989, pp.47-64.

III Change of the Industrial Location in Tokyo Metropolis Caused by Technological Innovations

In this paper we explore the actual state of the decrease of the number of factories in the inner area of Tokyo Metropolis and analyze the influence of the technological innovation of machinery as the cause of this phenomenon. It can be seen that the structure of the type of industry in Tokyo is not showing significant change, even though the number of factories is rapidly decreasing. However, due to the quick decrease of the number of larger factories, the percentage of small factories is increasing.

The analysis shows that the continuation of operations is more difficult for larger factories in the inner area, and most of them are related to the difficulty of the expansion of the factories. It is observed that factories, which cannot solve the problems at present locations, are forced to move out of the inner area.

The analysis is then extended to clarify the factors that cause the demands for the expansion of factories. It is found that the advance of the application of microelectronic techniques to machinery is causing the necessities for the replacement of the equipment. Further it is observed that the new type of machinery require more spaces for factories.

These observations show that the existence of various regulations that restrict the expansion of factory spaces in the inner area is causing the relocation of factories from the inside to the outside of Tokyo Metropolis.

This paper was presented at 27th Annual Meeting of the Japan Section of the Regional Science Association International (RSAI) in 1990, and was appeared in *Studies in Regional Science*, Vol.21, No1, 1991, pp.17-43.

IV An Inquiry into the Location Factors of Manufacturing Industries from the Point of View of the Production and Management Costs

It is generally recognized that economic activities tend to agglomerate because of the expectation of external economies. In Japan there are several metropolises where manufacturing industries are agglomerated. However, the number of factories in those areas has been decreasing since 1975. It seems quite probable that this is due to the tendency to move the location of factories from the metropolises to local areas to save production and management costs.

This paper is intended to clarify the factors that motivated the move of the location of manufacturing industries. The relation between the temporal variation of the number of factories located in the 23 wards of Tokyo and that of the average production and management cost per enterprise in the country is analyzed.

The paper concludes with the observation that the amount paid to sub-contractors and the cost of direct labor related to wages were the main factors that caused the movement of the location of some types of manufacturing industries located in the 23 wards of Tokyo Metropolis.

This paper was presented at 33rd Annual Meeting of the Japan Section of the Regional Science Association International (RSAI) in 1996, and was appeared in *Studies in Regional Science*, Vol.27, No1, 1997, pp.151-164.

V A Study on the Influence of Land Price for the Location of Manufacturing Industries

The land price rose quite rapidly in Japan in the period 1986 to 1990. It was particularly remarkable in metropolitan areas. In this period, the number of the manufacturing industries also decreased rapidly in the ward area of Tokyo metropolis.

Based on the traditional theory of industrial location, it can be said that the decrease of the number of factories in Tokyo Metropolis was caused by the external diseconomy generated by the rise of the land price. From the side of the Japanese accounting system, it can also be said that the rise of the land price produced latent profits to enterprises as an external economy.

In this paper two kinds of time series data are provided to clarify the relation with the land price. One is the data of the number of factories from 1960 to 1990, and another is the data of land use form from 1977 to 1991, of Tokyo Metropolis.

It is observed that the behavior of the industrial location is linked to the level of land price. In particular, it is clearly seen that when the land price was low the industrial location was active and that the new location of manufacturing industries decreased as the land price increased. The extremely high level of recent land price almost refused the location of any kind of manufacturing industry in Tokyo Metropolis. It is further observed that the manufactures tended to sell their properties when the land price went up and that they acted quite sensitively to the level of the land price.

This paper was presented at 30th Annual Meeting of the Japan Section of the Regional Science Association International (RSAI) in 1993, and was appeared in *Studies in Regional Science*, Vol.24, No.1, 1994, pp.285-302.

VI Study on the Usefulness of the Method that Exploits the Information on the Managerial Renovations of Manufacturing Industries for Urban Renewal Projects

It was expected that the managerial renovation of manufacturing industries would positively contribute to the project of urban renewal. In this paper, based on the above expectation, the effect of managerial renovation that would influence the renewal of the plant is analyzed. The relation between the length of the history of a factory and the experience of managerial renovation is analyzed.

It is observed that, in medium and small sized factories, the occurrence of managerial renovation can be predicted based on the length of the history of the factory. It is also observed that the frequency of the implementation of managerial renovation in the factories in an area is useful for the evaluation of the possibility of implementing an urban renewal project in that area.

This paper was presented at 23rd Annual Meeting of the Japan Section of the Regional Science Association International (RSAI) in 1986.

VII A Study on the Results and Issues about the Collecting Projects of Small Factories

Many factories are located in the inner areas of the metropolises in Japan. Often the factories are located mingled with houses, shops and other utilities. Factories in those areas produced heavy environmental pollution since the beginning of 1960's and it was a general opinion that they should be located separated from houses.

The project for the collective establishment to assemble small factories and enterprises in an industrial park or a high-rise building was started in the middle of 1960's. The project has covered the activities such as separating the factories from houses and promoting the modernization of management of small enterprises. Almost 40 years have passed since the project was started.

In this paper the usefulness of the project is analyzed in relation to the improvement of the environmental pollution, the reduction of mingled location of factories and houses, and the modernization of management of small enterprises.

It is clarified that the project of the collective establishment for the factories and works has played its role effectively. The author considers that the project should be carried on, though it has some points that should be amended.

This paper was presented at 37th Annual Meeting of the Japan Section of the Regional Science Association International (RSAI) in 2000, and was appeared in *Studies in Regional Science*, Vol.31, No.3, 1994, pp.251-269.