A theoretical framework for office activity location

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A Theoretical Framework for Office Activity Location

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ABSTRACT

In accordance with the requirements of the University of New South Wales relating to the submission of theses for higher degrees, the following abstract from the thesis entitled, "A Theoretical Framework for Office Activity Location", is provided.

The attached thesis investigated the problem of formulating a theoretical framework for office activity location, to provide guidelines for the public policymaker. It was also envisaged that this work would provide recommendations pertaining to data collation techniques and relevant directions for future research. Although it is recognised that public policy should ideally be directed at both the requirements of the community and the office based activities, the scope of the study is limited to the locational requirements of the office based firm. Accordingly the major aim of the thesis is the development of a theoretical framework to identify those influences and restrictions which confront a firm undertaking activities that are dependent on conditions within the environment and the firm.

In order to investigate the problem identified, an integrated approach was adopted to enable the variables determining office location to be addressed together rather than pursuing one strand of office location in detail. The idea that the interaction of categories of influences and restrictions affected the contact work of office activities at specific locations in time and space depending upon conditions within the firm and the environment was pursued. The five categories of influences and restrictions identified were: administrative systems, environmental perception of individual's, environmental structure, economic principles and other "rules" such as statutory and supply restrictions.

For the most part the annunciated aims of this thesis were achieved as a rudimentary theoretical framework was able to be deduced for office activity location. It was demonstrated that the categories of administrative systems, environmental structure and economic principles had a direct bearing on the location of office activities when viewed as independent and interrelated variables. However due to time and data limitations it was not possible to test in detail the relevance of those categories relating to environmental perception of individuals and other "rules".

In the case of the three categories investigated in detail the prime consideration was the firms locational requirements which varied according to the critical functions of the firm. The remaining categories were relevant to the theoretical framework for the following reasons. The environmental perception of individuals dealt with the situation where optimal, economic, rational behaviour was unlikely to occur. Other "rules" did not directly influence the location of office activities but restricted the ultimate range of locational choices.

In addition to achieving the stated aims of the thesis a number of useful planning guidelines were able to be developed for urban policy makers; such guidelines pertained to functional differences which exist between office activities. Relevant directions for future research and suggestions relating to the compilation of more effective data systems also emerged from the findings of this thesis. It was concluded that the most appropriate direction for further research is the development of a fully integrated approach which recognises the importance of the communication function and permits all the variables determining office activity location to be addressed together.

CONTENTS

CONTENTS continued

Chapter 1 A Theoretical Framework

Chapter 1 - A Theoretical Framework

INTRODUCTION

As the growth of white collar office based employment in developed countries has been more rapid than the growth of employment in any other sector, the importance of understanding the office activity location process should not be underestimated. The distribution of office activities may have a significant effect upon the social, economic and physical environment. Office activities are not only large employers of workforce but tend to concentrate in central locations within urban areas. On a regional scale, the centralization of office activities has created spatially uneven distributions of economic activity and employment.

Planners have expressed concern that at the urban level the journey to work could become longer and more congested as the workforce moves out to the peripheral areas and office employment concentrates in the city centre. As a result, suburban centres may not grow to the extent whereby a wide range of services and job opportunities can be offered in the suburbs and peripheral areas. Adverse effects on the physical environment could result as city centres reach such a scale that amenity within the centre itself is reduced. Visual, noise and air pollution resulting from traffic destined for the central business area may occur along the route to the centre. Unnecessarily long journey to work patterns of office workers contribute to the excessive consumption of energy resources. Planners are also concerned that at the regional level, the tendency for office activities to concentrate in central locations will produce differentials in contact opportunities and ultimately in some aspects of social and economic development. Accordingly, inequalities in income levels and employment opportunities may result. If the more prosperous regions undergo spontaneous growth at the expense of other regions, such areas become economically depressed or continue to grow at a very slow rate.

In view of the possible impact office activity location may have on the environment, effective public policy measures are required to ensure that the interests of the community are considered. Given the large gaps in current knowledge of the locational requirements of office activities, frequent intercourse between public policy makers and theoretical work is essential to enable public policy to make an effective contribution to the solution of urban and regional problems. While public policy should ideally be directed at the entire community, the interests of private capital should be fully appreciated and given due consideration in such a policy. From the viewpoint of business enterprises, public policy must be feasible in order to ensure the continued existence of economic activity and employment opportunities at which such policies are directed. Although an investigation of both the requirements of the community and the office based firm would be of considerable value, the time and resources available permit only the locational requirements of the firm to be investigated. Thus it is necessary to undertake this line of research before further work relating to a composite office location policy can be comtemplated.

The overall aim of this thesis is to develop a theoretical framework to identify those influences and restrictions which confront a firm undertaking activities that are dependent on conditions within the environment and the firm. Given the absence of a theoretical base upon which public policy decisions pertaining to office activity location may be based, it is hoped that the suggested framework will facilitate public policy decision making. It is also envisaged that this work will provide some directions for future research. In this regard, the adoption of an integrated approach whereby all the variables determining office activity location may be assessed together is advocated. However, there are a number of difficulties inherent in this approach. Although the underlying objectives of most studies relevant to this field have a similar objective as a basis, it is frequently the case that particular strands of analysis have been actively pursued and have tended to dominate other relevant approaches to the problem. It is

proposed to pursue the idea that the interaction of administrative systems, environmental perception of individuals, environmental structure, economic principles and other 'rules' such as statutory and supply restrictions influence and restrict the contact work of office activities at specific locations in space and time depending upon conditions within the firm and in the environment.

THESIS STRUCTURE

Equilibrium and behavioural principles, office communications behaviour, urban land use, morphological studies and external influences such as the influence of office developers, vested interests and finance and legal restrictions have all been given much attention in recent studies. Despite these advances, it is unlikely that a comprehensive office location theory will emerge until the interactions between all these components can be comprehended. In accordance with the overall aim of this thesis it is intended to adopt an integrated approach whereby the variables influencing office activity location are assessed together. In order to pursue the idea that the functions of office activity systems at specific locations in time and space are subject to various influences and restrictions depending upon conditions within the firm and in the environment five categories of influences and restrictions may be identified. The five categories referred to are administrative systems, environmental perception of individuals, structure of the environment, economic principles and other "rules" such as statutory and supply restrictions.

Each category is considered briefly, in the first instance, to assist in the development of the theoretical framework. However only the categories of administrative systems, environmental structure and economic principles are given detailed consideration in subsequent chapters due to time and data limitations. It was considered that the combination of these three factors would provide the best explanation of office activity location as initial observations suggested that these categories were more interrelated. In order to achieve the overall aim, the chapter structure is organized in the following manner.

The introductory section of the first chapter introduces the office location problem, establishes the relevance of public policy to office activity location and illustrates the existing lack of knowledge in this field together with the limitations which confront the urban policymaker. The overall thesis aims and structure and the variables

relevant to the proposed theoretical framework are then introduced. The task of introducing the office location variables is carried out by the following means. Office activities are firstly defined in a manner which enables such activities to be classified for analysis purposes and then the concept of organisational activity systems is introduced. At this point the dependence of office activities upon assessibility to and application of relevant information is introduced. The subsequent section of the chapter is concerned with the identification of influences and restrictions on office activities attempting to complete essential functions and with a justification of the proposed theoretical framework.

Chapter Two examines the effect of administrative influences and restrictions on office activity location. Based upon an examination of studies relating to business contacts of office activities, this chapter attempts to establish a basis for classifying office activities in such a manner as to enable the introduction of spatial considerations. It is proposed not only to develop a methodology to permit contact requirements to be quantified but to demonstrate that the contact requirements of office activities (and hence locational requirements) vary according to administrative structure and type of business activity. The final section of the chapter assesses the relevance of this line of research in the light of new technology and changing attitudes towards telecommunications.

The next chapter extends the concept of organizational requirements to incorporate environmental influences and restrictions operating on the firm. Within this context, the relevance of factors such as market accessibility, external economies, interdependencies between firms and the complexity of a firm's operations are examined. Basically this section of the study stems from the proposition that the linkages between offices constitute a city centre activity system containing a number of interrelated sub systems and that the environmental opportunities and restrictions are changing in respect of some office

activities. Additionally there are certain essential office activity functions which have to be satisfied by the external environment.

An assessment of the importance of economic principles as an influence on the implementation of activities within and between firms is carried out in Chapter Four. This chapter is divided into two strands of analysis as two distinct levels of economic activity are examined. The first strand deals with macro considerations such as national and regional patterns of growth and control; the second component relates to the micro economic factors affecting the location of individual office activities.

The final chapter contains the conclusions of the thesis. At that stage it is proposed to assess the extent to which the overall aims of the thesis were achieved, to explain how the components of the theoretical framework are interrelated and to show the importance of the theoretical framework to public policy, to develop guidelines to direct the efforts of those policymakers concerned with office activity location and to provide relevant directions for further research.

LIMITATIONS CONFRONTING THE URBAN POLICYMAKER

Apart from the intangible nature of office activities there appear to be other limitations confronting the urban policymaker. The first limitation arises out of the acute shortage of suitable and accessible data. There are wide variations in the amount, detail and reliability of information relating to office occupants. This is perhaps due to the difficulties associated with the cataloguing of many aspects of office activity and to the absence of an integrated approach to office location research. Pursuit of diverse individual strands of office location analysis has contributed to the above variations in data. The second major limitation to the formulation of urban policy relating to office location is the failure to appreciate the emerging role of office activities in the internal structure, integration and co-ordination of organizations of varying sizes and levels of complexity. This situation is reflected in the formulation and implementation of urban and regional development strategies applied to office activities by public agencies.

The following sections demonstrate the need for new methods of data collection to facilitate an integrated approach to the office location problem. The analysis of the impact of public policy on the individual and the ultimate effectiveness of such policies clearly demonstrates the existence of large gaps in current knowledge of the locational requirements of office activities. The need for public policymakers to encourage theoretical work to be undertaken before an effective urban and regional approach to the solution of problems, is demonstrated in this section.

Data Limitations

The lack of organized, collated and freely available data at the local and State Government level presents one of the greatest obstacles to office location research in Australia. A centralized data system containing land use, valuation ownership area of office space, location of office space and employment, and details of office leases, together with the availability of statistical information outlined below, would enhance the opportunities for research in the field of office location theory and would ultimately aid public planning authorities to guide the

location of office development. Studies of contact patterns of offices in the Sydney Region and New South Wales would also be of assistance to the researcher, however such a study would require government support to obtain the co-operation of the firms which would be concerned. To date, these types of studies have not been undertaken in Australia.

The Australian Bureau of Statistics records the value of building approvals, commencements and completions by local government area. Also available from the Bureau are statistics relating to employment; these are termed Classification of Occupations and Australian Standard Industrial Classification (see Appendix 1). The main difficulties associated with the building statistics are that such information is not available at commercial centre level, but can only be disaggregated to local government level and records of floorspace approvals, commencements or completions. The latter information is often only available on an individual site basis at local councils and presents the researcher with an extremely onerous task of compilation.

Employment statistics by industry and by occupation are able to be disaggregated to collector district level but they do not indicate where the job is located and whether such job is carried out in an office building. It could probably be assumed that persons having occupations such as professional/technical, administrative/executive/managerial and clerical would be performing primarily office activities whereas the proportion of office workers could vary considerably in the other occupations. The unknown factor would be whether these activities were actually carried out in custom built office buildings or were carried out by a firm carrying out principally office activities. Studies of the locational characteristics of office type employment such as clerical workers as a means of studying the locational requirements of office activities can be extremely misleading. If large industrial plants or retailing outlets employ office type labour within the plant or retail outlet then it is more likely that the

ancillary office component of the firm will be located to satisfy the locational requirements of the primary use - the industry or the retail outlet. Thus this study is concerned only with office activities which have separated from the production component of the firm or with service oriented activities. Thus office building and employment statistics are not directly comparable. Similar data difficulties apply to the industrial classification of employment. An additional difficulty lies in the fact that no direct correlation between industry and occupation is made by the Bureau to allow the researcher to determine the complexity and characteristics of tasks carried out in various industries or to ascertain the degree to which industrial sectors are office employment oriented.

Journey to Work tabulations provide information regarding the location of jobs by occupation and by industry by zone however these zones are not directly comparable to collectors districts although they are comparable with demographic and building statistics on a local government area basis. A further difficulty with Journey to Work data is the fact that the necessary survey work is carried out only once every five years and the time taken to analyse such can be as long as four years before preliminary information is available to the researcher. A further difficulty lies in the fact that the 1966 and 1971 Journey to Work studies are not directly comparable due to boundary reductions to the City of Sydney local government area and the adoption of the Australian Standard Industrial Classification (A.S.I.C.) for the 1971 Census, a change from the 1966 classification. The preliminary 1976 Journey to Work data was unavailable until 1980 and the survey zones chosen for 1976 can only be compared on an approximate basis to the 1971 zones.

The only other sources of information relating to office activities are the private planning consultant firms who carry out commissioned studies and the Valuer General. The annual report of the Valuer General supplies information pertaining to rentals and values by selected local government areas and suburbs and discusses very briefly

commercial office development trends. Plant Location International[1] has carried out an extensive study dealing with supply and demand aspects of the likely Sydney office space market from 1972 to 1980. This study touches briefly on office location requirements but as this information was obtained from questionnaires distributed to office firms, the results are questionable without further substantiating research. Since 1973, Jones, Lang Wootton Pty. Ltd.[2] have annually published data pertaining to the absorption, supply, location and rental levels of new office development in the C.B.D. and the larger North Shore office centres such as North Sydney, St. Leonards and Chatswood. Unfortunately these publications only cover part of the Sydney region and contribute more useful tools for supply and demand analyses. From recent enquiries at the Department of Environment and Planning it was ascertained that it maintains no centralized records of office employment or development trends nor has it undertaken any studies pertaining to office location requirements; the Department has only recently commissioned several studies to assist in the development of an office policy.

Public Policy Approaches to Office Location

This section demonstrates the limitations of public policy which has had only marginal effects upon the location of the office sector and in some instances has created undesirable social and economic side effects as discussed below.

Local and Regional Planning in Australia

From a brief examination of the regional and local planning in the Sydney region, it can be established that there is a clear lack of understanding of the location requirements of various office

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1. P.L.I. Aust. Ltd., Scott W.D. & Co. Pty. Ltd., The Office Space Market, Sydney Metropolitan Area: 1972-1980, Vols I and II, (Unpublished study)

2. Jones Lang Wootton (a) Sydney Office Space Survey, 31/12/73
(b) Sydney Office Space Survey, 31/12/74
(c) Sydney Office Space Survey, 31/12/75
(d) Property Review, 1977, 1978, 1979, 1980
(Unpublished papers)

based activities. An appreciation of the complexity of the supply and demand of office floorspace appears also to be absent. In the past regional plans have assumed that offices are attracted by other land uses such as shopping centres, hospitals and educational establishments, proximity to port facilities and convenience to concentrations of populations. Local planning techniques have used employment trend projections and traffic capacity of roads as the basis of office location policy. No supporting research has been carried out in the Sydney Region. Plans which aim to stress the importance of decentralization of commercial employment have failed during the past twenty years to prevent the concentration of offices in the Sydney city centre and will continue to be ineffective until more is known about office location requirements and other limiting factors.

Since 1950, when the first planning scheme, the County of Cumberland Planning Scheme was placed over those local government areas which together with several other local government areas[1] now constitute the Sydney Region, the approach to regional and local planning as it affected development has tended to be rather broad and vague.

The County of Cumberland Planning Scheme provided for a County Centre, that is, the C.B.D. in which

> "development was to be confined to activities associated with its function as the capital and principal transport terminal of the State and to those activities concerning the interests of the County as a whole" 2.

The County Plan further stated that,

> "Dispersed centres of employment must be given the benefit of an extensive supply of skilled and unskilled labour ... A close relationship between places of

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1. Penrith, City of Blue Mountains, Colo Shire, Gosford and Wyong Shires were not part of the County of Cumberland but were later added to the County to form what is now known as the Sydney Region.

2. Cumberland County Council, Report on the Planning Scheme for the County of Cumberland, Sydney, 1948, pub. by Cumberland County Council, p.63

residence and employment is essential to sound social and economic structure"[1].

By 1961 it had become obvious that the plan did not achieve its objective - relating to dispersal of employment the number of non factory workers in the City of Sydney had increased by 54,000 persons, whilst the number of non factory residents in that area had increased by only 2,000[2]. Imbalance of jobs/person particularly in the outer suburbs was perceived by the government to be undesirable in social and economic terms. The centralization of office employment in the C.B.D. represented the most obvious shortcoming of the plan's intentions relating to control of office development. The dearth of knowledge of office development requirements is evidenced in the following statement pertaining to the decentralization of office activities as envisaged in the County Plan[3]:-

> "Generally the factors governing its (industrial activity) location are less rigid than those of commercial activities whose siting is largely determined by proximity to port facilities and convenience to concentrations of population".

No research in support of this assumption was implemented during the formulation of the County Plan.

The Sydney Region Outline Plan was devised by the State Planning Authority of New South Wales (now the Department of Enviornment and Planning) and published in 1968. Generally it was a plan comprising principles, policies and broad strategy[4] and proposed an urban structure for the development of Sydney from the year 1970 - 2000, having regard to economic efficiency and environmental considerations. Already it appears that one of the

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1. Ibid, pp 62, 63

2. State Planning Authority of New South Wales, Sydney Region - Prelude to a Plan, A Report by the State Planning Authority of New South Wales, 1968, p.69

3. Cumberland County Council, Op. Cit., p.63

4. State Planning Authority of N.S.W., Sydney Region Outline Plan 1970-2000, A Report by the State Planning Authority of N.S.W., 1968

objectives of the plan, that is,

> "a wider and more balanced distribution of commercial activity should be established so that over-concentration in the metropolitan centre can be avoided"[1]

is not being realised as demonstrated by Alexander[2], who describes the increasing specialization of city centre activities towards office activities. Between 1960 - 1975 the central area of Sydney accounted for more than 75 per cent of the value of new office buildings. In 1971 the central area of Sydney accounted for 50 per cent of office employment in the Sydney region whereas the area accounted for only 25 per cent of the total regional employment[3].

Basically the plan proposes intra regional decentralization of office development to those suburbs with good transportation links; the proposed outer "regional" commercial centres to be developed on a selective basis are Parramatta and Campbelltown. The manner in which office development was to be encouraged to locate in these centres is indicative of the absence of knowledge pertaining to office location as this task was left as a matter requiring further examination and consultation with other government authorities and commercial organizations. Regional scale shopping development was to be encouraged to locate on railway lines, (where convenient for office development), in order to attract office development. No differentiation is made between the requirements of office activities and the preferences of employees. There is no evidence to suggest that employee convenience or public transport patronage is an office location requirement. The plan states that[4]

> "The two kinds of commercial development are mutually re-enforcing"

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1. State Planning Authority (1968), Op. Cit., pp 5-8

2. Alexander, J. The Changing Role of the City Centre, Urban Research Unit, Research School of Social Sciences, ANU, Canberra, Nov. 1976, p.5

3. Alexander, J. "Office Decentralization in Sydney" in Town Planning Review, Vol. 49, No. 3, July 1978, p.407

4. State Planning Authority (1968) Op. Cit., p.35

and further that shopping centres constitute a

> "more reliable commercial[1] base for a developer and it becomes easier to attract staff".[1]

In the first instance it could be reasoned that retailing may be partially reliant on office employee and customer patronage but why an office firm would require a location near a shopping centre is not clear. It is assumed that employee convenience constitutes an office location requirement.

In the second instance it appears that the motives of the office developer and the office activity are seen as one and the same.

The plan also assumes that the relocation of major institutions such as advanced colleges of education, hospitals and the like to selected regional commercial centres will prompt growth of such centres - no mention is made, of possible office linkages with such organizations.

Whilst the Sydney Region Outline Plan lays claim to the fact that

> "the biggest single urban problem in the Region is the great and continuing concentration of employment in the metropolitan city centre"[2]

no consideration is given as to how decentralization should be achieved or to the fact that some office activities may be better able to decentralize than other office activities.

Planning controls at a municipal or shire level in the Sydney Region are implemented by way of planning schemes which permit commercial development in specific zones primarily set aside

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1. State Planning Authority (1968) Op. Cit., p.35

2. State Planning Authority (1969) Op. Cit., p.

for small service industries, retail and office development. Apart from location controls there are controls which are implemented by way of a floorspace ratio, which is calculated by dividing the total floorspace of a building (including external facades) by the total site area. Without any established knowledge of the locational requirements of office activities, local planning schemes which are intended to reflect the objectives of the Sydney Region Outline Plan, are unable to locate commercial zones with any degree of accuracy. It is often the case that commercial zonings are applied to areas where commercial land uses have already begun to develop. While it is claimed that public policies are operative, planning is based merely on trends rather than public objectives which are feasible from the viewpoint of the private office firm.

A recent publication by the New South Wales State Planning Authority[1] suggests the following technique for selection of density levels (i.e. floorspace ratios) for business centres:-

(a) Estimate future office employment taking into account trends and existing infrastructure capacities of roads and public transport.

(b) Estimate the amount of office floorspace from (a) above on the assumption of an average floorspace/ worker. Determine average floorspace for the centre then distribute among blocks depending upon environmental factors and ease of traffic movement.

This method of estimating future office floorspace further reinforces the statement that there is little understanding in New South Wales of the process of office location. To follow such a procedure would constitute a reinforcement of trends rather than encourage Sydney Region Outline Plan's decentralization objectives. This method of

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1. State Planning Authority of N.S.W. Density Control for Non Residential Land Uses , Technical Bulletin, 1974 Ch. 4, p.19

planning assumes that overall trends will reflect the future requirements of all types of office activities but this may not be the case at some point in the future. Whilst the Regional Plan considers social and economic policy issues, this method of plan implementation considers only road capacity and limits office location accordingly.

Office Location Policy in Britain

Attempts have been made in other countries to influence the location of private sector offices. In Europe most of these overall planning policies were directed at the highly centralized pattern of office development which was emerging. Attempts were made to redistribute employment opportunities within cities but as demonstrated below, the growth pattern of the office sector was only marginally affected by what appeared to be trial and error attempts to formulate office location policies.

In 1957 the London County Council adopted a plan to combat congestion in Central London. This plan aimed to lower plot ratios and to reduce the area available for office construction but failed because of 'third schedule' rights which allowed existing buildings to be redeveloped by an additional 10 per cent of existing cubic space[1].

In 1964 the British Labour Government introduced the Office Development Permit System into London with the aim of reducing congestion in Central London and redistributing employment opportunities within the South-East region[2]. Under this system a permit was issued where developers were able to establish a need for office space in the chosen location. As the annual rate of office development permit issue was greater than the annual amount of floor-space approved annually, this system probably did not have a significant

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1. Marriot, O. (1967) The Property Boom, Pan Books, Lond., pp 200-202

2. Ibid.

effect on the total central area office floorspace. An expected side effect that arose out of this system was a sharp rise in rents partly because of the office development restrictions and partly because developers were unable to meet demand requirements in the short term[1]. Although it was intended to encourage only those office activities with a need for a central location in Central London there was no criteria against which to assess this need and as the control applied to the developer, the type of tenant was not known at the permit stage.

At present the British Government is committed to objectives of encouraging office development to disperse from Central London to strategic centres in suburban and outer metropolitan locations to reduce congestion at the city centre and to shorten the journey to work[2].

To date British Office Location controls have been completely ineffective in promoting office relocations to depressed regions as those firms which have moved from Central London have moved only short distances. Few firms have moved to the peripheral regions.

As a result of the failure of policy to contribute towards development areas problems, the British Government introduced several new measures. In 1973 substantial financial inducements were given to office employers to move to the development areas and the Hardman Report which recommended the dispersal of over 31,000 headquarters jobs from the Civil Service in London was adopted[3]. These jobs were to be relocated in the development and intermediate areas. The Hardman Policy, however overlooked a large number of potentially

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1. D.O.E. (1976) The Office Location Review, Urban Affairs and Commercial Property Directorate

2. Alexander, I. (1980) Office Location and Public Policy, Longman, London, pp 66-70

3. Goddard, J.B. Office Location in Urban and Regional Development, Theory & Practice in Geography, Oxford Uni. Press, 1975, p.41

mobile jobs outside London and did not consider the potential for offices to adapt their communications patterns to peripheral locations while the new policy of financial inducements to the private sector was deficient in a number of respects[1]. Selective decentralization policies were not applied to the financial inducements which comprised small building grants and which were generally not applicable as offices generally preferred to rent accommodation[2]. As recent economy measures have been introduced by the government to reschedule the dispersal programme for implementation by 1989 rather than 1985 as originally proposed and as only a small number of jobs have moved some doubt exists as to whether the dispersal programme will be completed.

In 1977 the terms of reference of the Location of Offices Bureau were broadened and the Bureau was charged with the responsibility of 'promoting office employment in inner city areas'[3] in response to claims that office dispersal was having a detrimental effect on the social and economic fabric of inner London and worsening the plight of the poor and other minority group residents in the area[4]. However there appears to be some contradiction between this new policy and the suburbanization strategy.

Sweden's Approach to Office Location

Sweden has also demonstrated spatially and economically imbalanced regional development. The growth of high level office employment and economic growth has been heavily concentrated in the three largest cities, Stockholm, Gothenburg and Malmo in the south of Sweden while specialized tertiary activities are highly localised in Stockholm.

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1. Ibid., pp 38-42
2. Alexander, I. (1979) Op. Cit., pp 75-76
3. This excluded the Central London area
4. Alexander, I. (1979) Op. Cit., pp 68, 69

In order to promote the redistribution of office activity, the Swedish Government adopted the recommendations of the 1969 Royal Commission to relocate 11,300 civil service jobs (or 25 per cent of total national civil service jobs in Stockholm) from Stockholm to the northern sector of the country[1]. Whilst the Hardiman report in the United Kingdom was based upon a communications survey, the Swedish Government decided against relocating routine office jobs which were considered to lack the necessary stimulatory effects needed for regional growth and which were considered to be declining in importance as a result of automation[2]. The Swedish Government's proposals were opposed by many Government employees who were unwilling to transfer and by the Stockholm City Government which saw the moves as being potentially harmful to the city's economy[3]. Despite this opposition the programme is being continued. However this is no equivalent programme to promote private sector office dispersal. Although small cash incentives for relocation have been applied to certain office activities it appears that the national distribution of the private sector offices has not been significantly affected as few firms have chosen to disperse[4].

The United States Experience

Office employment although unevenly distributed within the space economy of the United States, is concentrated in the largest metropolitan areas rather than a single city region such as the south east of England[5]. Although New York does not dominate the

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1. Thorngren, B. "Communications Studies for Government Office Dispersal in Sweden" in M.J. Bannon (Ed.) Office Location and Regional Development, An Foras Forbath, Dublin, 1973, p.47

2. Ibid. p.55

3. Sundqvist, J.L. Dispersing Population: What America Can Learn from Europe, Brookings Institute, Washington, D.C. 1975, p.224

4. Ibid. p.218

5. Goddard, J.B. (1975) Op. Cit., p.8

American situation to the extent that London dominates the United Kingdom, New York occupies a distinctive position in that it has a significant concentration of administrative jobs in the manufacturing sector and of head offices of large industrial corporations[1].

In the United States there has been little response by the government to office location trends. This is perhaps due to the 'laissez-faire' attitude towards planning in that country and the lack of any national approach to office location given the existence of a more decentralized government. The situation in the United States has not followed the pattern of high centralization of office activities in Australian and European cities. In fact office decentralization has been more rapid in the United States and concern has been expressed over the decline of central city areas[2]. As a result local government authorities such as the New York City Government have encouraged substantial increases in the central city office workforce to offset declines in other sectors and to retain the tax base of the city[3]. Indirectly Federal Government legislation enacted in the 1950's to establish a major freeway system directed at reducing inner city congestion may have aided dispersal by rendering suburban office locations more accessible[4].

Although office dispersal has occurred without direct planning intervention in the United States there are areas requiring consideration by planners. There is scope for intervention in the office location process particularly at the regional level as now local office activity is still concentrated in the major cities and urbanized regions of the north east[5]. Private location decisions

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1. Ibid. p.5

2. Manners, G. "The Office in Metropolis: an opportunity for reshaping Metropolitan America" in Economic Geography, Vol. 50, pp 93-110

3. Ibid. pp 93-110

4. Alexander, I. (1980) Op. Cit., pp 80-81

5. Ibid. p.81

may not always be to the benefit of society especially where suburban sites are not accessible to low income earners in the inner city or to 'coloured' people who are discriminated against in certain suburban locations[1]. Additionally the adverse financial situation of large cities such as New York also require careful consideration.

DEFINING THE VARIABLES

In attempting to define the variables governing office location, the researcher is confronted by a number of questions. The initial question that has to be answered is how office activities should be defined and what types of office activities exist.

The researcher must then query whether different types of office activities have varying locational requirements at the urban and regional level. If so, what are these variables and how do they apply to each office activity type? In addition to external economies, the relevance of spatially variable cost and demand factors to the office firm must be considered. In addition to the firm's requirements it is necessary to address the possibility that other factors external to the firm, for example, planning controls or vested interests may provide constraints on the location of office activities. Other factors such as technological innovations may widen the locational choice of some types of office activities.

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1. Ibid. p.81

Prior to embarking upon the task of conceptualizing a framework for office location theory, it is proposed to define the term 'office activity' and to briefly outline the evolution of such activities. At this point it is intended to establish how such organizations function as activity systems in time and space by developing an understanding of how different influences and restrictions influence the carrying out of administrative activities. This would involve an examination of conditions within the firm and in the surrounding environment. Only after this line of research is completed is it considered that empirical studies will be able to be employed on a consistent basis to represent reality.

Defining Office Activities

All office activities are concerned with exchange of information, formulation of new ideas, information storage and processing and planning to direct and co-ordinate other activities such as the production and sale of goods or the monitoring and control of regional or local branches of service sector offices. Some information is circulated between various administrative units whilst other information exchanges may occur between independent organizations. The need for information flows to occur at a higher rate would likely be to depend upon the type of office activity and the complexity of the production of the goods or services involved.

Drawing on managerial theory the product of the office could be defined as an activity that:-

> facilitates any business function and has a result that is desired, anticipated and perceived to be advantageous; it must render possible or easier the performance of one of the primary business functions and it must do the above economically.[1]

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1. Leffingwell, W.H. and Robinson, E.M. Textbook of Office Management, published by McGraw Hill Book Co. Inc., N.Y. 1950, p.11

Office activities depend upon fast, efficient and reliable interchange of ideas, knowledge or documentation. Thus as information and interaction are important concepts in the study of office location it is essential that activity systems be studied to gain an understanding of how organizations such as office activities operate at specific locations, the variables which influence the implementation of administrative activities and subsequently determine office location. Office occupations referred to by Goddard[1] as groups of office activities handling similar types of information in a similar way, may make up a small part of the total employment of a firm or can dominate it throughout. Much depends upon the type of activity and kind and complexity of the production process. Office occupations can be grouped into organizational units with other types of employment or into entirely independent units. Ideas and information are circulated between these different administrative components of a firm at a rate which is likely to be determined by the specialization and complexity of construction; part of this information is used to guide and co-ordinate intra-organizational units whereas part is exchanged between independent organizations[2].

The Evolution of Office Activities

At this point it is considered that a brief deviation from the theme outlined above is warranted to show how office activities evolved and how the management of a firm to ensure the desired profits has become a complex matter. In order to conceptralize a total profits surface many assumptions have to be made by managers of firms; some of these assumptions include the spatial cost and total revenue situation, scale of operation, pricing competition

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1. Goddard, J.B. (1975) Op. Cit., p.3

2. Olander, Lars-Olof. "Office Activities as Activity Systems" in Daniels, P. (Ed) Spatial Patterns of Office Growth and Location, Wiley, Chichester, 1980, p.159

and the nature of the market. As a firm's profit will vary according to entrepreneural skill or the means by which the firm is managed, the office has become an important component of the firm.

One of the side effects of the industrial revolution was to give offices a more prominent role in economic structure. Not only were there changes in the concentration of industries and working populations but major changes in the organization and scale of industry which technological developments of that time. Such changes led to an increasing demand for the management of and communication between growing and complex organizations which could comprise production units within the same city or in a number of cities across the country. As the situation of competition with other firms arose, it was soon perceived that more detailed information was needed regarding competitors, efficiency and productivity of plants within the organization, developments in overseas markets and future expansion possibilities. Hence managerial and professional services soon became an integral part of urban and regional economies.

The earliest examples of offices occupying their own premises were those providing specialist facilities such as insurance, finance and other services. As techniques of communication and data processing improved the rate at which office activities established their own identities increased. It might reasonably be concluded that the separation of offices from their parent manufacturing plants occurred when the economic benefits of obtaining and comparing information within the market became greater for the detached office than the cost savings of directing production from the plant[1].

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1. Armstrong, Regina (1972) The Office Industry: Patterns of Growth and Location, Cambridge, Mass., M.I.T. Press, p.18

How Organizations Operate as Activity Systems

The major tasks of administration are planning, execution, control and feedback of production and distribution of goods or services[1]. Olander has conceived of administration as a project consisting of sequential activities which although they cannot always be predicted are ordered with obvious logical and sequential connections[2]. This being the case a firm's administration may be viewed as administrative projects running either parallel or with displacements in time relation to each other.

The primary function of administration which as a business organization is goal seeking and involves establishing objectives, identifying business events, activities, resources which are necessary to achieve objectives is planning. Execution is the process of putting plans into action; long term planning tends to be very broad and needs to be decomposed to the short term operational level or to the responsibility of lower management. Control involves measuring performance, comparing this with planned or standard performance and applying correct action where necessary. Feedback implies a return to the input of part of an output of a systems component to permit an evaluation of objectives or whether such objectives are being realised.

Central to the theme of this chapter is the fact that the last four processes are dependent upon the accessibility and application of relevant information. In order to provide a background to the understanding of administrative activity systems of firms and of the system of contacts participated in, details of the information likely to be required by such activities is provided below.

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1. Best, P.J. "Information Systems of the Firm" in Lindgren, K.E. and Alslabie, C.J., Eds. The Australian Firm, pub. McGraw Hill Book 6, 1976, p.211

2. Olander, Lars-Olof, "Office Activities as Activity Systems" in Spatial Patterns of Office Growth and Location, Ed. by Daniels, P.W. (1979) John Wiley & Sons, p.161

Some of the types of information that a firm's higher levels of administration is likely to require are environmental, competitive and internal information[1]. Environmental information includes population statistics, price levels, government regulations and price of tariff protection, quality and availability of workforce. Included in competitive information would be firm and industry demand, relative profitability, management competence, market price strategies, research and development and plans for growth. Internal information includes sales forecasts, productivity, resources, financial effectiveness, credit standing, product mix, employee morale and accounting information.

Not only is information important in the higher administrative function, it is also fundamental in control which task is frequently assigned to lower levels of administration. Standards of performance, are essential in any plan and then selection depends upon the availability of relevant information. Further, performance cannot be controlled unless information relating to actual performance is supplied to the controlling executives. Generally control information can be classified as follows:- market share information, quantity and quality of resources used, level of employee training and financial information. Finally this information relating to performance must be fed back to the top management. Information for control is different in nature to that required for planning. Planning is concerned with structuring the future whilst control is based more on past trends. It is likely that management might be prepared to commit more funds for the establishment of offices concerned with planning as this type of information would be more difficult to obtain and the nature of the information more complex. Without the ready availability of such information a firm could lose contact with the market behaviour and fall behind in its stock of ideas and innovations.

At this point it is appropriate to return to the theme of

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1. Best, P.J. (1976) Op. Cit., pp. 210-215

how organizations operate as administrative systems. An administrative project and its implementation involves a series of events within the firm and between the firm and its environment. In order to understand the administrative activity of a firm it is useful to describe the contact system it operates in. Thorngren[1] has provided a useful basis for research as he has drawn attention to questions relating to different kinds of processes within firms. He has differentiated between programmed processes which involve ongoing activities and transactions with the external environment, planning processes which are a response to changes in programmed processes and orientation processes the function of which is to adjust the planning processes by means of changes in the activity specialization.

The orientation tasks are probably the most complicated in an administrative project and involve processing of information about the firm and its environment and require discerning judgments. Such activities are mainly of an orienting scanning and preparatory nature are intended to pave the way for further contacts and include the initiation of a new production run and analysis of production, financing, marketing and sales prerequisites. Contacts such as these represent but a small percentage of all contact work but provide all the new information required in respect of technology, market and other essential environmental conditions.

The planning activities are probably more narrow and objectively oriented with reference to content and are to a large extent a response to decisions made at an earlier stage. The work content of these activities are not usually as uniformly complicated as the orientation activities and involve production planning, market preparation, sales organization, financial planning, experiments and design work connected with new production. The exchange of information between the firm and its established environment are

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1. Thorngren, B. (1970) "How Do Contact Systems Affect Regional Development?" in Environment and Planning, Vol. 2, pp 409-427

frequently carried out through better established information channels than in the case of orientation activities.

Programmed activities are closely connected with distribution and production and involve guidance and follow up of the production process, delivery control and sales. The exchange of information within the firm and with the environment usually involves routine and less advanced handling of information through well known and often used information services.

These administrative projects described above may run parallel to each other or may have larger or smaller time displacements. On a daily perspective a firm simultaneously carries out orientation, planning and programmed activities for different administrative projects which exist side by side. The techniques by which the contacts of organizations can be assigned to the above three contact classes together with studies dealing with the existing and changing contact patterns of organizations are further discussed in an ensuing chapter.

Influences and Restrictions on Office Activity Systems

At this stage it is proposed to pursue the idea that the contact work of office activity systems at specific locations in space and time is subject to various influences and restrictions depending upon conditions within the firm and in the environment. Those influences and restrictions on office based firms attempting to complete necessary activities could be categorized in the following manner:-

(i) Administrative systems
(ii) Environmental perception of individuals
(iii) Structure of the environment
(iv) Economic principles
(v) Other 'Rules' such as statutory and supply restrictions

and due to varying availability of information and research pertaining

to the above categories it is not possible to examine all categories at the same level of detail. It is essential, however that each category be given at least some consideration to permit the development of a rudimentary theoretical framework. The justification for the framework as suggested is as follows:-

Administrative Systems

These types of systems may be referred to as the intra-organizational factors and include such considerations as:-

type of industry,
management policies,
nature and extent of control,
effects of mergers and acquisitions on organizational structure, and location of plants and offices,
growth objectives,
degree of responsibility to shareholders, employees and concern with satisfier or optimizer solutions,
personal characteristics of individual or corporate entrepreneurs.

Many of these variables occur irrespective of spatial considerations but, as Townroe[1] has shown in his studies relating to location decisions made by firms for associated manufacturing plants, all are relevant to office location behaviour. A comprehensive office location model must take into account not only functional, spatial or communications dimensions of office location but must view such in the light of organizational structure within administrative systems and the effect on locational choice. It is beyond the scope of this thesis however to analyse office location decisions in terms of each of the abovementioned management oriented considerations which could constitute a separate study in themselves.

It has been shown that of recent, studies have been aimed at understanding how organizations operate as activity systems as a means of studying office location. Administrative activity systems

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1. Townroe, P.M. (1969) "Locational Choice and the Individual Firm" in Regional Studies Vol. 3, pp 15-24

comprise tasks which are characterized by abstract work contents which demand different levels of competence. Research has been directed at administration and its role in production, the information content of activities and the means by which they are implemented within an organization and between the organization and its environment.

Relevant research is examined in the subsequent chapter in order to illustrate the significance of studying administrative activities and contacts as a means of further understanding the office location process.

Environmental Perceptions of Decision Makers and Entrepreneur

In industrial location studies it has been found that the more general equilibrium analysis of location based on sets of simultaneous equations may be used to deduce the conditions for optimal location patterns but the general equilibrium approach cannot yield meaningful quantitative solutions nor can it encompass cases in which operators are uncertain. On this basis it appears necessary to predict decisions and the resulting partial equilibrium patterns rather than conditions for optimality[1].

The influence of the personal factor in business behaviour may be viewed in two ways: through its effect on the location of new office activities and through its effect on the mobility of existing office establishments. The main conclusion reached by Smith[2] in his work on industrial location theory and which could be applicable to office location is that economic factors probably established a broad region within which a location will be considered whilst personal factors operate at a secondary level in the decision making process. This narrows down the choice to several areas or perhaps to a single location. Given that the office activity has

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1. Weber, M.J. (1972) Impact of Uncertainty on Location, pub. by A.N.U. Press, Canberra, p.265

2. Smith, D.M. (1971) Industrial Location: An Economic Geographical Analysis, pub. by J. Wiley & Sons, pp 96-97

been established (or the industrial plant), personal factors as well as capital immobility may prevent a relocation even if this seems desirable on other economic grounds. Relocation may involve leaving familiar surroundings, an increase in managerial effort and a degree of risk and uncertainty as to the outcome.

As there seems to exist little knowledge regarding the locational requirements of office activities, Weber's generalized findings in relation to uncertainty, location and regional economic growth may be relevant at this point[1]. He found that in high income industrial societies (where office activities are prevalent) that uncertainty promotes concentration in a few large and central cities or regions and has termed this spatial behaviour agglomeration economies. He maintains that large cities are attractive as sites for new firms, which are often small, are facing uncertainty and therefore must rely on the external services of large cities for many of their inputs. Secondly large cities and regions receive advantages over other areas because of their favourable position with respect to the production and diffusion of innovations. It has been shown by Weber that innovations are produced to a greater extent in large cities than small.

The above work initiated the attempt to bridge the gap between individualistic decision models and social location patterns, however there is another body of information emerging which should be considered in the office location problem - the concept of environmental image. This concept is used to explain individual's attitudes towards and knowledge of different abstract and concrete phenomena within the firm and its environment. Environmental images whilst subjective reflect the objective possibilities within and outside the firm and are of great importance for scanning the possibilities for coupling individuals to each other where activities require individuals to receive, deliver or exchange information with

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1. Weber, M.J. (1972) Op. Cit., p.275

other individuals within the firm or the environment[1].

The period between the 1950's and 1960's marked the commencement of geographical research on knowledge and attitudes about the environment. Greenhut[2], Lowenthal[3], Lynch[4], Wolpert[5], Gould[6] and Pred[7] being the instigators of such research. The decision maker's knowledge of and views of the environment have been mapped and are used to explain the final choice of location[8]. Their authors stress the fact that each decision made within a firm is influenced by information built up by the decision maker, that is by information obtained about the environment and by acting in and gaining personal

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1. Persson, C. "Environmental Images and Decision Processes: Some Theoretical and Methodological Reflections" in Daniels, P.W. (Ed) Spatial Patterns of Office Growth and Location, Wiley, Chichester, 1980, p.165

2. Greenhut, M. (1951) "Observations on Motives to Industrial Location" in Southern Economic Journal, Vol. 18, pp 225-228

3. Lowenthal, D. "Geography, Experience and Imagination: towards a geographical epistemology" in Annals of the Assoc. of American Geographers, Vol. 51, pp 241-260

4. Lynch, K. (1960) The Image of the City, Cambridge, Mass. M.I.T. Press

5. Wolpert, J. (1964) "The decision process in spatial context" in Annals of the Assoc. of American Geographers, Vol. 54 pp 537-553

6. Gould, P. (1965) On Mental Maps, Ann Arber, Michigan Inter. Uni Community of Mathematical Geographers, Discussion Paper No. 9

7. Pred, A. (1967) Behaviour and Location, Uni of Lund, Lund Studies in Geography, Series B, No. 27

8. (a) Stafford, H. (1974) "The Anatomy of the Location Decision: Content Analysis of Close Studies" in Hamilton, F.E.I. (Ed) Spatial Perspectives on Industrial Organization and Decision Making, pub. by J. Wiley & Sons, Lond.

   (b) Green, D.H. (1974) Information Perception and Decision Making in the Industrial Relocation Decision. Unpublished Ph.D thesis, Uni of Reading, cited in Persson, C. Op. Cit., p.177

experience with respect to the environment.

There are a number of difficulties involved in further study of the subjective image of the environment for the purposes of this thesis which is aimed at establishing an overall approach to office location rather than at a concentrated effort to research a single influence. Some of these difficulties may be summarized as follows. Environmental image is a very complex phenomenon as it is based on personal experience, knowledge, imagination and memories[1]. The environmental image is a very dynamic phenomenon which can lead to progressive corrections of the image over a period of time. In order to study the relationship between environmental images and decision making its strongly micro-oriented approaches must be employed as the individual decision maker becomes the object of consideration. It is through this individual that research must be carried out to map and analyse the image and the decision process and the relationship between the two. As background material to assist in the explanation of images, it is necessary to collect information pertaining to the life history of the decision maker. The question which faces the researcher is how much information and what aspects of the individual's life should be examined. For the purposes of this paper it is not intended however to develop this section of the office location theory framework to a further stage.

Structure of the Environment

Individuals in various combinations of positions, workplaces and other organizations that surround an organization constitute what is described as the environmental structure. This structure may also be viewed as the total possible range of external contact opportunities available to a firm. This range of opportunities will vary according to the size, constitution and distribution of the structure of the environment.

The opportunities and restrictions which are experienced

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1. Lowenthal, D. (1961) Op. Cit.

by a firm which is attempting to carry out essential activities which are dependent upon different conditions in the environment may be studied by several methods. To gain insight into why office activities locate in different parts of the environment, the traditional morphological approach which studies elements of urban land use and the communications approach which takes account of the spatial characteristics of office contacts have been employed.

Although the spatial patterns of office clusters in the city may partly indicate linkage patterns, it should be recognized that spatial proximity may not be a prerequisite for the maintenance of these links. Additionally it must be borne in mind that the importance of contacts as a constraint on the location of offices may be exaggerated by management or by the observer given that all office contacts may not need to be carried out by face-to-face contact. In the case of both types of studies referred to above consideration should be given to the possibility that land use patterns may reflect outmoded location patterns and also to the possibility that observed office contacts are essential for the effective operation of offices. The recent emergence of office studies dealing with activity linkages and urban structure suggest that these contact patterns could when considered with other opportunities and restrictions, be a significant indicator of office location requirements.

Economic Principles

There exists to date no literature dealing with the costs of office location and little dealing with the costs of maintaining office contacts. Economic principles may constitute an opportunity or restriction on office activities at specific locations in space but the degree of opportunity or restriction may only be fully determined when the locational equilibrium problems relating to various office activities are understood.

There are a number of difficulties involved in the analysis of economic principles applying to office location. Given that costs

of office location could be small in relation to the total turnover in the case of some office sectors cost may not be a significant factor. In the case of other office sectors which represent a much larger proportion of total company operating costs, location costs may need regular assessment to achieve minimization of such. A further problem facing the analysist is the tendency for offices to locate in agglomerations from which they control other units. This seems to render inappropriate the concept of intermediate locations as applicable to industrial activities. The intangibility of office activity makes it difficult to apply an accounting process which can evaluate completely the costs and benefits of a particular office location.

Despite the lack of research work directed at the economic principles of office location and the difficulties inherent in such an approach, a subsequent chapter of this thesis analyses the problem within the context of industrial location theory. This approach not only highlights the operational difficulties associated with the explanation of economic principles applicable to office location but illustrates those components of established location theory which are inept in the case of office activity and which must be replaced by explanations arising out of new research.

Other Rules

In addition to the six categories of influences and restrictions outlined above there are a number of others which for the purposes of this paper have been categorized as 'Other Rules'. Although these factors may not directly affect the location decisions of office activities such influences on development can ultimately affect location. 'Other Rules' include the following influences and restrictions:-

Activities of property development companies,
Sources of property development finance,
Availability of labour, established services and facilities and convenient transportation links,
Town planning controls and other laws.

Development companies play a major role in the location of office space as the majority of office buildings are now occupied by tenants rather than owners. Due to the speculative nature of office building construction, it is frequently the task of the developer to assess the amount of office space that will be required in the future and where such space should ideally be located. In most instances the capital of tenants can more profitably be employed in more familiar areas of business other than office accommodation. Some developers or investors are involved in providing premium office accommodation for their own activities by constructing their own buildings with excess floorspace which is then sublet.

The influence of property development companies on the location of office space is strongly linked with the availability of sources of development finance which include merchant banks, insurance companies, superannuation funds and other financial institutions of both local and overseas origin. Due to the internalization of capital the task of monitoring likely inflows of investment in the office sector is extremely complex. When this capital is available the policies of lending companies may require conventional location practices to be followed in which case the existing patterns of successful office locations will follow. Also, in the process of locating his investment, the office developer may perceive the availability of convenient transportation linkages such as railway services and established retail/service centres as being attractive to a prospective tenant. He may also perceive the availability of labour to be facilitated in locations with the above characteristics.

Although factors of staffing, tradition and prestige are stated to be important influences on office location in most surveys[1] the accessiblity factor could be just a rationalization of the

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1. Alexander, I. (1979) Office Location and Public Policy, pub. by Longman, N.Y., p.18

location process which is largely based on personal preferences of the developer or the entrepreneur of the office activity. To some extent this is borne out by a recent study which indicates that existing concentrations of office employment in the Sydney region are not related to population distribution and that excessive journeys to work are necessitated[1]. It has been shown that more dispersed patterns of offices could lead to greater accessibility to the workplace. Despite the developer's interpretation access to public transport does not generally appear to be rated as important by suburban offices in Sydney as parking availability is rated as a more important concern[2]. Recognition should be given to the special requirements of some firms which may be a need for skilled staff. In these instances either a highly centralized or selective suburban location may be essential to the operation of the business. On the other hand, a firm may find that some suburban locations can provide local employees whose work performance may be preferable to non-local employees as absenteeism and turnover of staff may prove to be lower.

It can be seen that the location choice of office activities is to a large extent influenced by vested interests and complex financial influences. It is interesting to note that insurance/finance companies as office developers/investors have, according to statistics collected by D. Kemp[3] (Ph.D student - National University) been responsible for over two thirds of the value of investment in office buildings in the Sydney and Melbourne central areas in the last ten years.

The influence of town planning controls and other laws which

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1. Plant Location International, Sinclair Knight & Partners Pty Ltd and Nairn, R.J. & Partners Pty Ltd, Towards A Centres Policy, Oct. 1980, Unpublished, mimeo

2. Alexander, I. (1979) Op. Cit., p.53

3. Alexander, I. (1977) Offices in the Suburbs: A Survey of Private Office Establishments in Sydney Suburban Centres, Dept. of Envir. Housing & Community Dev., Canberra, p.49

indirectly affect the location choice of office activities must also be taken into account. At both the urban and regional level in Australia office development is more highly centralized than any other economic sector. The various State governments have made attempts at decentralizing office employment as a means of reducing the journey to work and combating congestion. These policies were never pursued with great vigour due to conflicts between Federal and State government actions and due to powerful vested interests. Attempts to restrict office development in the Sydney central business district met with such opposition in 1971, that these provisions were removed from the City of Sydney Planning Scheme prior to the prescription of such. Although some suburbanization of office activity related to services which followed the expanding population has occurred, in the main such activity has continued to centralize[1]. Recent figures indicate that office building construction in the City of Sydney, as a proportion of total office building construction in the Sydney region has remained highly centralized over the last decade.

The pattern of office development in Europe is also one of concentration; Government policy in the United Kingdom has only marginally affected the location of the office sector. Although the Office Development Permit System hastened office dispersal from the central area of London, those office activities which could afford to rent the resultant expensive office space were able to do so as opposed to the firm which needed a central location. Also the control applied to the developer as opposed to the occupier[2]. Although successful, in part, the British planning controls have not succeeded in diverting office development in the economically depressed regions.

In Sweden greater emphasis was placed on the relocation of high level jobs of Government offices but few private firms have

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1. Alexander, I. (1979) Op. Cit., pp 95-97

2. (a) Hall, P. et al (1973) The Containment of Urban England, 2 vols, Allen & Unwin, Lond.

   (b) Hall, R. "The Movement of Offices from Central London" in Regional Studies, Vol. 6 pp 385-392

followed due to lack of follow-up programmes designed to induce relocation[1]. The French regional policy of controlling the growth of Paris and directing office employment to designated provincial centres and then to a number of medium sized cities resulted in failure[2]. This and the failure to introduce effective 'congestion' taxes was due in the main to political pressures which did not permit the effective implementation of such policies[3].

It may be seen that the formulation of effective planning policies has not been possible, to date, due to extensive gaps in theoretical knowledge of office location. A good deal more research on that topic is required together with considerable government commitment before office location policies can be implemented successfully. Thus, town planning policies may not at present have a strong impact or the desired effect on office location despite the existence of a variety of regulations and combined zoning and floorspace restrictions.

Although the preceding discussion on 'Other Rules' which constitute influences and restrictions on office location could be dealt with in greater detail, it is not proposed to do so. For practical purposes it is not possible to develop every variable affecting the location of office activities although each variable able to be identified is discussed briefly to assist in the construction of a framework for an office location theory.

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1. Friedly, P. (1974) National Policy Responses to Urban Growth, Saxon House/Lexington House, Westmead Lexington, p.179

2. Beaujeu-Garnier, J. (1974) "Towards a New Equilibrium in France?" in Annals of Assoc. of American Geographers, Vol. 64 pp 113-125

3. Sundqvist, J.L. "Dispersing Population: What America Can Learn From Europe", Brookings Institute, Washington, 1975, p.140 cited in Alexander, I. (1979) Op. Cit., p.77

Chapter 2 Administrative Systems and Classification of Contacts

Chapter 2 - Administrative Systems and Classification of Contacts

INTRODUCTION

All offices tend to deal with abstract commodities - information, ideas or knowledge, namely, information search, storage and retrieval, and exchange and generation of ideas[1]. In order to determine locational priorities of office activities, studies of office complexes have been carried out using spatial association, functional and movement approaches. The latter two approaches may be termed contact patterns and include direction of information flows, type of information flows, mode of transmission of information flows for example, by telephone, taxi, walking.

As office activities deal chiefly with information, information flows should therefore contribute to the understanding of locational requirements of offices. Hence this chapter is based upon an examination of studies pertaining to business contacts of office activities with a view to isolating those types of office firms which have strong ties with the central business areas of large cities and those with weaker links. In order to achieve this classification of firms it is proposed to identify different levels of contact - routine to complex and relate the importance of these types of contact to different types and components of firms in various locations - centralized and decentralized.

Central to the theme of this chapter is the fact that office activities are dependent upon accessibility and the application of relevant information to carry out necessary functions. As the contact work of office activities is subject to various influences and restrictions both within the firm and in the environment, the prop-

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1. Goddard, J.B. (1975) Office Location in Urban and Regional Development, Oxford Uni. Press, 1975, pp 2-6

osition that administrative systems of office activities govern their locational requirements is examined below. In relation to the overall thesis structure this chapter is intended to establish a basis for classifying office activities in such a manner that spatial considerations may be introduced given the abstract nature of the work performed in offices the contact requirements i.e. the need for accessibility and the application of relevant information. This chapter then attempts to develop a methodology to permit the contact requirement to be quantified in a meaningful way which can be applied to town planning principles and in the development of a public policy. It is intended to demonstrate that the contact requirements of office activities vary according to the administrative structure (for example status, department) and by type of business activity (for example industry type).

In order to achieve the above objective this chapter is organized in the following manner. The concept of the communications process is introduced through a brief introduction of management science which pioneered the work relating to organizations and their communications processes. This concept is then extended to cover inter-office units of communication as opposed to management approach which was concerned more with the functioning of the individual firm. It is at this point that the spatial implications are introduced. Whilst some of the studies referred to do not employ rigorous analysis techniques, they do however reinforce the notion that office requirements vary according to contact requirements and that contact patterns may be useful in determining locational requirements. In order to resolve the variables relating to locational requirements of office activities in terms of contacts, it is necessary to develop a more formalized conceptual framework. In this regard it is attempted to characterize contact characteristics, and to distinguish between fundamental types of contact systems. The types and strength of contact characteristics as an influence on locational requirements of office activities is then assessed and variables identified.

As a result of technological advances in the field of telecommunications and changing attitudes relating to the usage of such

it recognized that it is necessary to look also at contact patterns likely to emerge given further advancements in the field of telecommunications. This involves an examination of new technology and an assessment of its effectiveness in replacing existing forms of contacts; in this regard laboratory and business communication surveys are useful tools for analysis. Such approach allows the relevance of contact requirements in office location studies to be assessed in the short term. While it would be useful at this point to address the changing nature of office work and its implications for location and use of urban land, this study area is considered to be beyond the practical limits of this thesis.

A FOCUS ON THE COMMUNICATIONS PROCESS AT THE MICRO LEVEL

It was in the field of management science literature that the study of office communications was pioneered. Most of these studies tended to focus on the communications process at the micro-level considering the different types of contacts carried out within individual firms.

The first of the management science studies relevant to this paper is that carried out by Burns in 1957.[1] His study was based on diaries kept by seventy six British top managers for between three and five weeks. The participants were the top managers of six companies employing 500 to 900 people and the top managers of one department in each of two other companies.

Of his findings, the most relevant one was the relationship that he suggested between the rate of change in the external environment or in the expansion or development programmes of the firm, and the amount of time that the top management group spent in discussions. Burns, in examining how the working time of these managers was spent, found that top management groups spent from 42 to 80 per cent of their total working time in internal and external discussions.

This work provided some insight into the relationship between the type of market served by the firm and certain intra-organizational factors such as growth objectives and the volume of contacts required to be made by managers.

Further work relating to types of contacts was carried out by Simon[2] who distinguished between two polar types of decisions -

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1. Burns, T. "Management in Action" from Operational Research Quarterly, Vol viii, No. 2, June, 1957

2. Simon, H.A. The Shape of Automation for Men and Management Harper & Row, N.Y., 1960, p. 45, 46
   now republished and entitled:
   The New Science of Management Decision, Prentice Hall, 1977

programmed decisions and non programmed decisions which give rise to different types of contacts. His classification of contacts may be summarised as follows. Decisions are programmed to the extent that they are repetitive and routine and to the extent that a definite procedure has been worked out for handling them so that they don't have to be treated in a novel way each time they occur. Decisions are non programmed to the extent that they are novel, unstructured and unusually consequential or complex. They give rise to contacts between unfamiliar participants, often in large meetings and usually take the form of wide ranging discussions about subjects not specifically related to sales and purchases which are usually associated with programmed decisions. The latter conclusions hinted that contact requirements may depend upon the type of department involved but this aspect was not pursued in detail until later in the decade.

These types of decisions, Simon points out, are only part of a continuum with highly programmed decisions at one end and highly unprogrammed decisions at the other end - there are decisions of all shades of grey along the continuum. This division of contacts, however, constitutes a useful tool for determining those office firms, or parts of office firms which require face-to-face meetings as those firms having mostly programmed contacts could use telecommunications to a large extent and thus may not require to be close to other activities in a centralized location. Those firms characterized by a large number of unprogrammed contacts would require face-to-face meetings and would subsequently need a location convenient to its contacts. Such firms may not be able to decentralize as easily as the former type of firm.

The relationship between types of jobs, frequency and modes of contact was dealt with in Stewart's research relating to the similarities and differences in the way managers spend their time[1]. She attempted to distinguish between different job types on the basis of ways in which holders spend their time. Her division of

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1. Stewart, R. Managers and their Jobs, Macmillan, Toronto, 1967

types of contacts of jobs into internal and external contacts, face-to-face meetings and telephone contacts represents an advance on the work carried out by Burns[1] and Simon[2].

The work activities of 160 managers were recorded by the managers, themselves, over a period of 4 weeks. Analysis of the survey indicated that 57 per cent of their time was spent on internal personal contacts and only 11 per cent on external personal contacts. Approximately 43 per cent of the manager's time was occupied by face-to-face meetings whilst only 6 per cent of their time was spent on the telephone. Most time was spent with external contacts by managers whose work involved promotions or sales management. Stewart did not study the types of firms involved in the external contacts but concentrated only on the relationship between types of jobs and frequency and mode of contacts. As a large proportion of office executives' time was found to be spent in face-to-face contact her work pointed to the fact that the higher the status of a job, the more frequently face-to-face contact occurred.

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1. Burns, T. Op. Cit.

2. Simon, H.A. Op. Cit.

INTER-OFFICE UNITS OF COMMUNICATION

By the late 1960's newer studies began to branch out from those studies initiated in management science. Whereas management science studies tended to focus on the communications process at the micro-level, more recent studies have examined inter-office units of communication, this type of approach being of more direct relevance to the study of office location due to the spatial implications involved.

The Location of Offices Bureau of London was one of the first to examine inter-office contacts. This study carried out for the Bureau by Facey and Smith[1] was by means of postal questionnaires sent to all offices in the provincial city of Leeds to serve as a foundation for follow up studies. That section of the study dealing with office communications revealed some interesting results pertaining to methods of contact used by office establishments, type and frequency of contacts and type and frequency of contacts according to location.

As indicated in the survey, personal contact was the major form of communication used in office organizations. Of those firms asked to estimate their main method of contact with customers and clients, as many as 97 per cent gave face-to-face contact as their main method of contact. Approximately 52 per cent stated that personal contact away from their office was more important than at their office. See Figure 2.1 which demonstrates methods of personal contact with customers or clients by each type of office sector.

Upon analyzing this situation with regard to office function Facey found that of the financial and professional firms 60 per cent placed contact at their own offices with clients or customers was most important, but other categories particularly offices connected with

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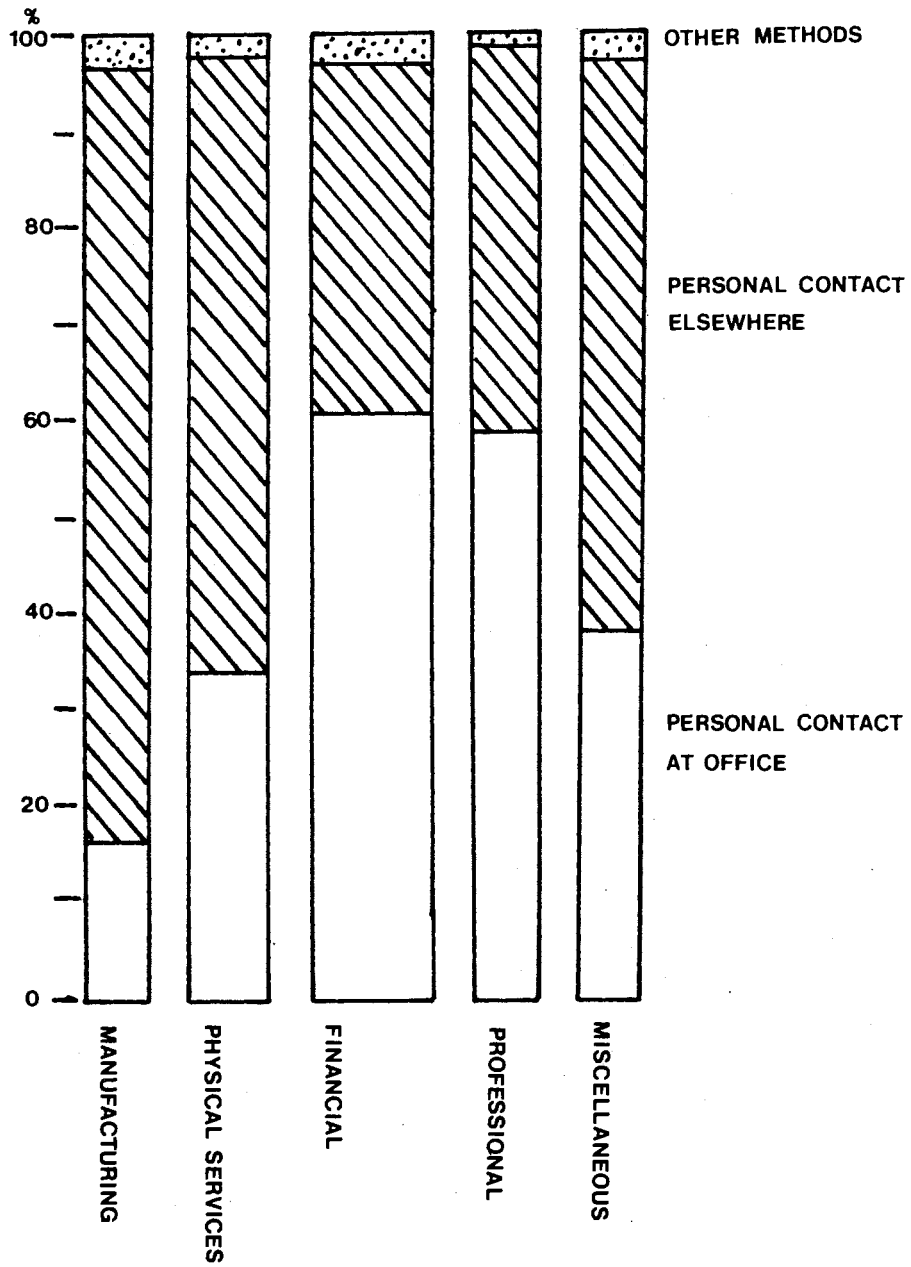
1. Facey, M.V. and Smith, G.B. Offices in A Regional Centre - a Study of Office Location in Leeds, Research Paper No. 2, Jan. 1968, Location of Offices Bureau, London, 1968

FIGURE 2.1

The Main Method of Contact with Customers or Clients by Each Type of Office



Source: Facey, M.V. and Smith, G.B. Op. Cit., p.78

manufacturing, judged personal contact elsewhere with clients or customers to be important, whilst miscellaneous and physical services placed slightly more emphasis on personal contacts outside their office than at the office. (See Appendix 2 for a more detailed breakdown of the office functions).

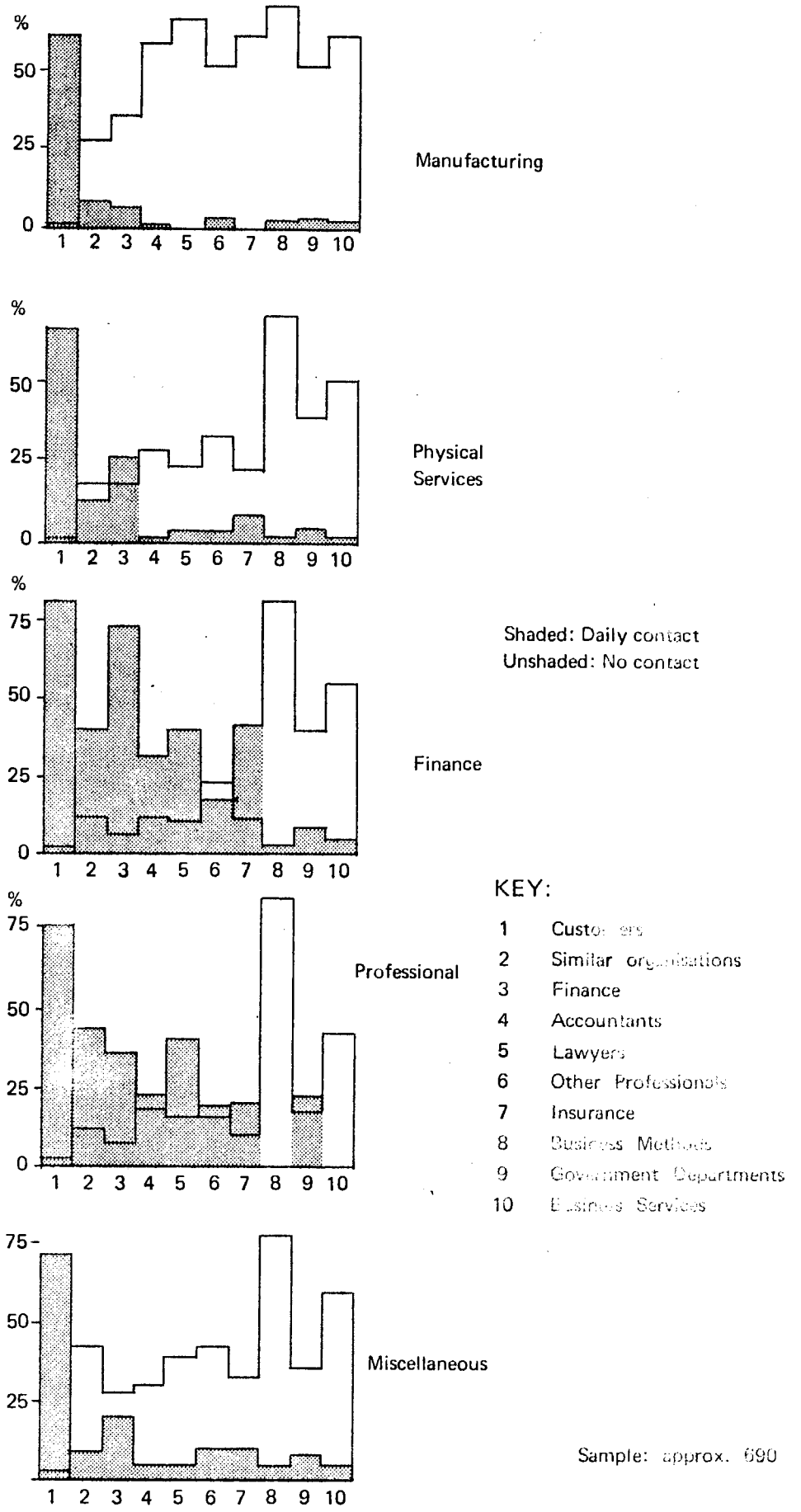
As regards type of contact it was found that contact with customers and clients was the most important type of contact for all offices, contacts with banks and finance companies being second in importance. Figure 2.2 illustrates the situation relative to a selection of contacts based on a daily contact frequency. (The importance of the contact with banks and finance companies was boosted by the high rating given by financial and professional firms). For nearly all types of contacts, the contact was more important to firms in the financial and professional categories than to other office types. Contact with service offices was low in the hierarchy of importance in all cases. No differentiation was made, however, as to the mode of contact used.

It can also be seen from these statistics that it is primarily the financial and professional firms that require daily personal contact with a wide range of establishments, whilst few manufacturing firms require daily contact with any but their own clients and the same applied, to a slightly lesser degree, with the physical and miscellaneous services. The finance sector displayed a considerably more complex system of contacts. As the contacts made most frequently by financial order offices were with clients and other offices in the same functional category, there appears to be evidence then, that all firms in this category are closely linked with each other as a whole.

From this overall pattern of contacts it would seem that most activities are located in Leeds central area to achieve accessibility to their markets. However firms in the financial sector not only require accessibility to the market but to each other and to professional services. Perhaps the relationship between manufacturing

FIGURE 2.2

PERCENTAGE OF OFFICES HAVING DAILY PERSONAL CONTACT WITH CERTAIN TYPES OF ESTABLISHMENT



Source: Facey, M.V. & Smith, G.B. Op. Cit., p.84

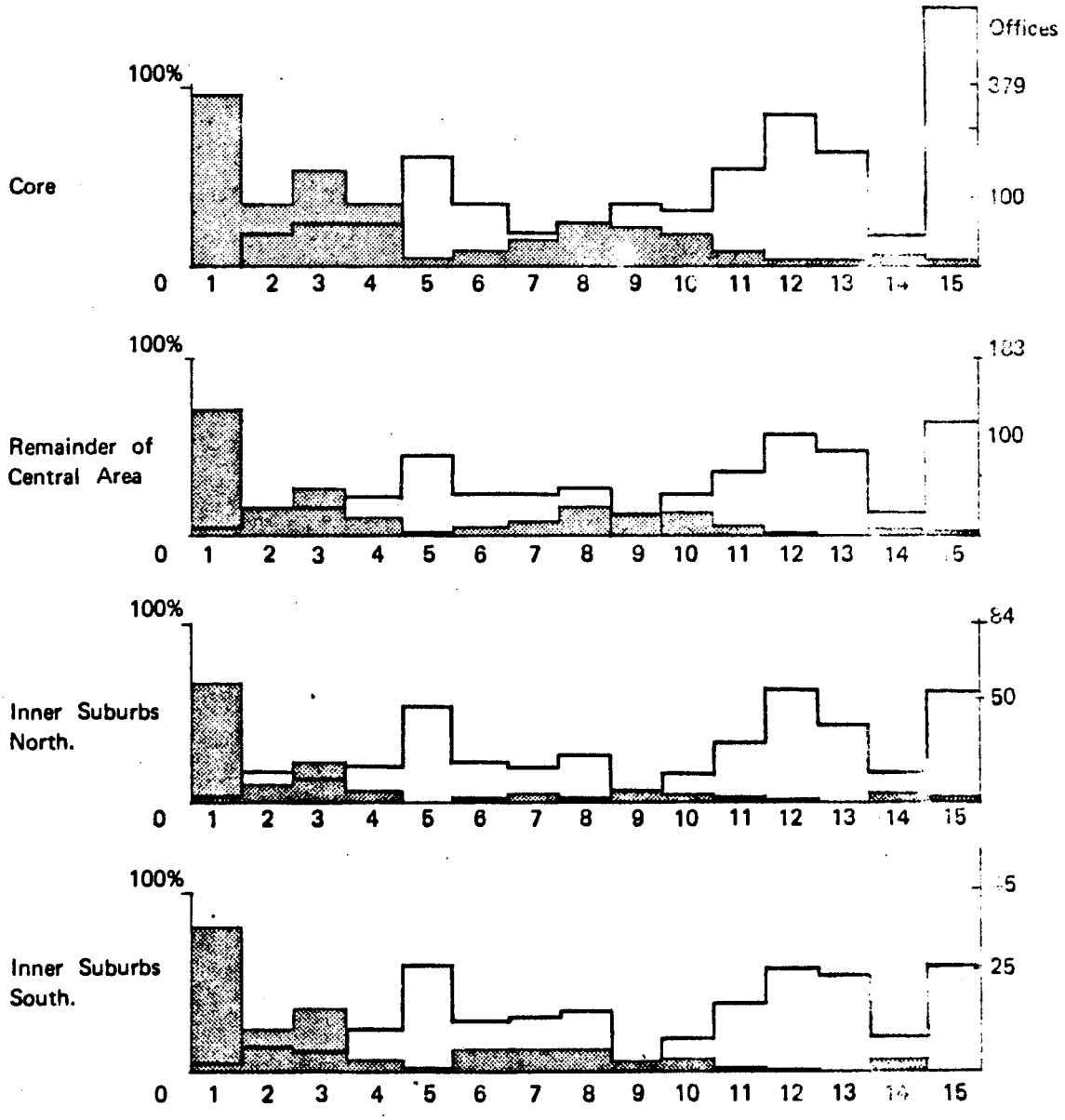
and the finance and services sector is less significant in provincial cities as such office activities are more inclined to be branches which are unlikely to have the complex requirements of headquarters. Finally it appears that finance and professional services are the most integrated sectors in the Leeds business network.

A further breakdown of contacts with London and other major cities for the financial sector revealed that there was a clear distinction between establishments in the financial sector requiring daily contact and those requiring infrequent contact. The banking establishments followed by the insurance firms had the highest proportion of daily contacts, both with London and with other major cities; the property and finance firms had a comparatively low proportion. Facey explained this by the fact that frequency of contact with London was probably a reflection of the differing functions of head or main branch offices and their subsidiaries. As the offices in Leeds are for the most part branches without subsidiaries and to a lesser extent branches with subsidiaries, it appears reasonable to assume a need for frequent personal contact with head office in London. Thus the hierarchy in terms of the status level of a firm may be important in relation to the number of contacts that a firm is required to make.

The type and frequency of contacts according to the location of offices was investigated by Facey. Generally he found that in each of the six zones, namely the Core, Remainder of Central Area, Inner Suburbs - North and South and Outer Suburbs - North and South, the patterns of contact were very similar with contacts with customers/ clients being most important, followed by contact with finance establishments. (This is illustrated in Figure 2.3). Perhaps the most important feature of the diagram was that the percentage of establishments having daily communication with the specified contacts were highest in the central area core, the degree of contact in the case of offices outside the central core being significantly lower for most types of contact. The firms in which daily contact with a wide range of functions is required tended to be located in the inner

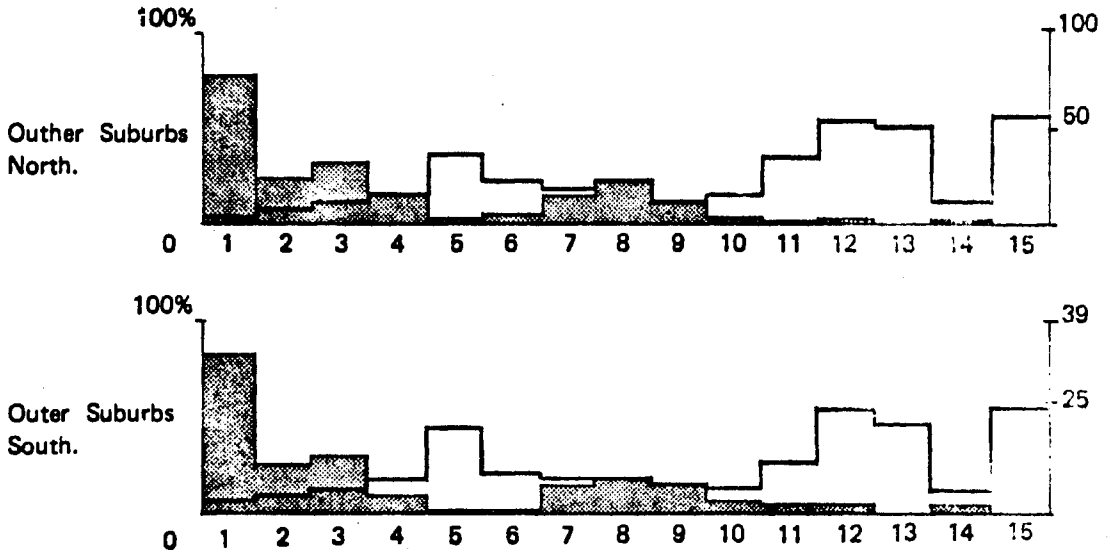
FIGURE 2.3

PERCENTAGE OF OFFICES HAVING DAILY CONTACT WITH SPECIFIED ESTABLISHMENTS ACCORDING TO LOCATION.



continued

FIGURE 2.3 continued



1 : Customers/Clients
2 : Similar/Competitors
3 : Finance
4 : Accountants
5 : Lawyers
6 : Other Professions
7 : Insurance
8 : Public Relations etc.
9 : Professional Associations
10 : Local Government
11 : Central Government
12 : Calculating Services
13 : Secretarial
14 : Business Services
15 : Organisation & Method

Sample : approx 800

Shaded : Daily Contact
Unshaded : No Contact

Source: Facey, M.V. & Smith, G.B. (1968) Op. Cit., p.88

zones, whilst those for which it was less important were further out. Perhaps the contact requirements of firms in the central areas of large cities are more complex and inter-related with other activities to a larger extent than contact requirements of firms in non-centralized locations.

This line of study has clearly demonstrated the great importance of face-to-face contacts in the office organization network, the most important type of contact being with customers/clients. However, it has not dealt with the less personal means of contact such as telephone calls, telegrams or other forms of tele-communications. It was established that those firms which required daily contact with the widest range of establishments and which were the most frequently contacted were the financial and professional firms, whilst most of manufacturing firms required contact with only their own clients. Thus it appeared that proximity of branch offices of manufacturing offices to other office types was not essential while all offices in the Finance Order required locations near each other, especially financial and insurance offices. Offices in the core area experienced the greatest intensity of contacts whilst those in inner areas indicated daily contact with a wider number of functions.

It could by hypothesized from these results that most office establishments rely on the presence of financial and professional categories, particularly the former and that their concentrated presence is a pre-requisite for an office centre. The various concentrations of office sectors in Leeds business centre is illustrated below.

	% OF TOTAL NO. OF OFFICES IN LEEDS CENTRE		
Manufacturing	15%	Professional Offices	18%
Physical Services	21%	Miscellaneous Services	16%
Finance	30%		

Other studies suggest that manufacturing, physical services and miscellaneous offices are less tied to central area locations than are financial and professional offices[1] (for detailed classification of these industries see Appendix No. 3). The financial and professional sectors appeared so inter-dependent as to suggest that any decentralization of these categories would have to be done on a large scale and include this network so as to prevent linkages being interrupted. These inter sector linkages are illustrated in Figure 2.4. Overall, the contacts or the access needs of customers and staff appeared to be major forces favouring central area locations.

In his survey directed at decisionmakers, Croft requested responses as to whether there were any types of firms with which face-to-face contacts were made so frequently that these firms should desirably be located close by (say 5 minutes walk). The result which is set out in Table No. 2.1 was that over half of the financial and professional offices (taken together) needed at least one establishment to be closely located but less than one in ten of the manufacturing physical services and miscellaneous offices (taken together) found this to be a necessity. Additionally, offices in the three latter categories accounted for 55 per cent of the decisionmakers' survey sample but for only 25 per cent of establishments referred to as essential close neighbours of other offices (this figure of 25 per cent is reduced to 14 per cent if the G.P.O. is excluded).

As demonstrated in Facey and Smith's work[2] it would appear that manufacturing physical services and miscellaneous categories need not locate in the most accessible central locations because they require few close by contacts and because these categories themselves are needed only to a small extent by other offices (See Figure 2.3).

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1. Croft, M.J. "Offices in a Regional Centre - Follow up Studies on Infrastructure and Linkages" in Location of Offices Bureau Research Paper No. 3, Oct. 1969, LOB Lond.

2. Facey, M.V. & Smith, G.B. (1968) Op. Cit., pp 82-86

TABLE 2.1

TABLE 2.1: Types of establishment required to be located within five minutes' walk of offices

At least one establishment required within 5 minutes walk	Function of offices (no's)							
	Mnf	Phys serv	Ins	Oth fin	Legal	Oth prof	Misc	Total
Yes	-	2	7	1	5	3	1	19
No	15	8	8	3	-	2	10	46
Total	15	10	15	4	5	5	11	65
Types of establishment mentioned								
MANUFACTURING								
Newspapers, etc	-	-	-	-	-	-	1(a)	1
PHYSICAL SERVICES								
Retail stores	-	1(b)		-	-	-	-	1
Cloth dealers	-	1	-	-	-	-	-	1
Office suppliers	-	-	-	-	1	-	-	1
GPO	-	-	-	1(c)	2(d)	1	-	4
INSURANCE								
Companies	-	-	2	-	-	1	-	3
Brokers	-	-	5	-	-	-	-	5
OTHER FINANCE								
Banks	-	-	2	1	2	2	-	7
Building Soc's.	-	-	1	-	-	-	-	1
Estate agents	-	-	-	-	-	1	-	1
LEGAL								
Solicitors	-	-	-	-	-	1	-	1
FINANCE/PROF.								
UNSPECIFIED	-	-	1	-	-	-	-	1
MISCELLANEOUS								
Duplicating agency	-	-	-	-	-	-	1	1
GOVERNMENT "AGENCIES"								
Stamp Office	-	-	-	-	5	-	-	5
Courts	-	-	-	-	3	-	-	3

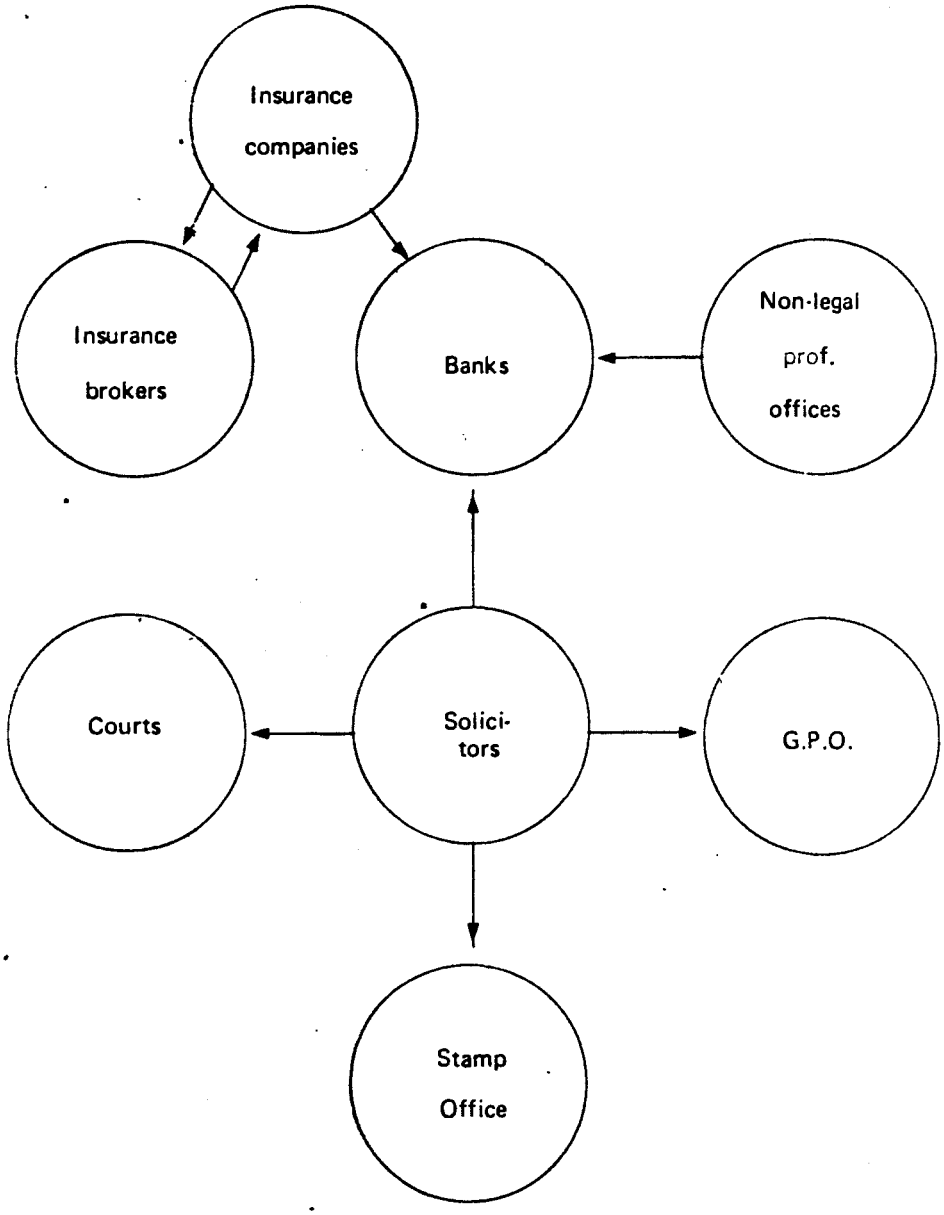
Source: Answers to Qu.18 of decision makers' survey ("Are there any particular types of firms with which your firm needs contact of a face-to-face nature so frequently (for the efficient running of your business) that they must be located very close together (say 5 minutes' walk?")

Notes: (a) Stated by television production firm.
(b) Stated by wholesalers whose biggest buyers were retail stores
(c) Stated by office with very large quantity of mail.
(d) One of these indicated the importance of dealing with "last minute rushes".

Source: Croft, M.J. (1969) Op. Cit., p.62

FIGURE 2.4

The most important linkages necessary for the efficient working of offices.



Notes: The units at the origins of the arrows are those which need contact with the units at the destinations of the arrows. The units at the origins of the arrows can be regarded as being difficult to disperse unless the units at the destinations of the arrows, on which they depend, are also dispersed. The units at the destinations of arrows can be regarded as being difficult to disperse unless the units at the origins of arrows, their "customers", are also dispersed.

Source: Croft, M.J. (1969) Op. Cit., p.63

A comparison of spheres of influence with each status category of office namely, head office, branches with subsidiary, branches with no subsidiary, decentralized departments and local independent offices, showed that variations in spheres of influence were significantly associated with variations in status. Head offices tended to have a high proportion of firms with national spheres of influence but few regionally oriented firms; branch offices without subsidiaries had a low proportion of firms with city and national spheres of influence whilst local independents had a low proportion of regional firms.

In terms of status, local independent offices exhibited frequent contact while the branch offices responsible for sub office had a large number of contacts with the same organization. As those office types already closely tied to a location due to their restricted sphere of influence, appear to have frequent contacts with a wide range of organizations, they would not constitute likely candidates for dispersal nor would the branch offices. Branches not responsible for subsidiaries had relatively infrequent contacts. In terms of status, these branch offices without subsidiaries have relatively infrequent contacts and would probably be suited for relocation.

Research carried out in Sweden indicates that the extent of an employee's external contact activity is dependent upon his level in the organization in both the public and private sectors[1]. As the job level in an organization is related to the status category of the office activity, that is, head office or branch office Tornqvist's findings are supportive of Croft's conclusions.

Offices also generate social contacts, for in an analysis of trips generated by Leeds offices, Croft found that only 19 per cent were destined for other offices, whilst 69 per cent of the trips were not related to the economic activities of the offices generating them, such trips being

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1. Tornqvist, G.E. "Contact Requirements and Travel Facilities - Contact Models of Sweden and Regional Development Alternatives in the Future" in Land Studies in Geography Series B, Human Geog., No. 35

for personal/domestic reasons. The 'social infrastructure' of office development tended to be composed of short trips to restaurants, hotels, shops and the like. It is likely that the presence of these activities are important locations for meetings and making deals. Goddard's[1] work has also indicated that entertainment is an important component of the business networks in central business areas.

Whilst these studies identify those linkages which appear to have a marked effect on location requirements such work does not extend into an investigation of which factors have the most effect on linkage patterns namely the strength of communication ties, nor have such studies attempted multivariate analyses to obtain a more comprehensive picture of networks. These aspects are considered in the ensuing pages of this chapter.

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1. Goddard, J.B. "Office Linkages and Location - A Study of Communications and Spatial Patterns in Central London", in Progress in Planning, Vol. 1, Pt. 2, Pergamon Press, Oxford 1973

CONCEPTUAL MODELS OF CONTACT SYSTEMS

By collecting information on the characteristics of personal and other means of communications within and between offices it may be possible to assess whether some firms could be decentralized without reducing the efficiency of the office operations. Additionally some insight may be gained into the significance of office activity structures in centralized locations. However prior to assembling such information being possible a conceptual model of contact structure is necessary to allow all the aspects of those contact structures, employment structures and related employee characteristics to be examined in relation to office location requirements.

Within the business managerial field two main methods of surveying communications have been employed[1]. The first involves respondents estimating the amount and type of communication and recording this information in a self completion questionnaire. In the second respondents record details of each contact as and when it occurs, either on a single line of a table or in a diary in which one sheet is used for each contact. The earliest attempt at using this form of diary to study communications and office location occurred in Sweden. Thorngren[2] supplied single contact sheet diaries to informants who recorded details of external meetings and telephone calls on six randomly selected days.

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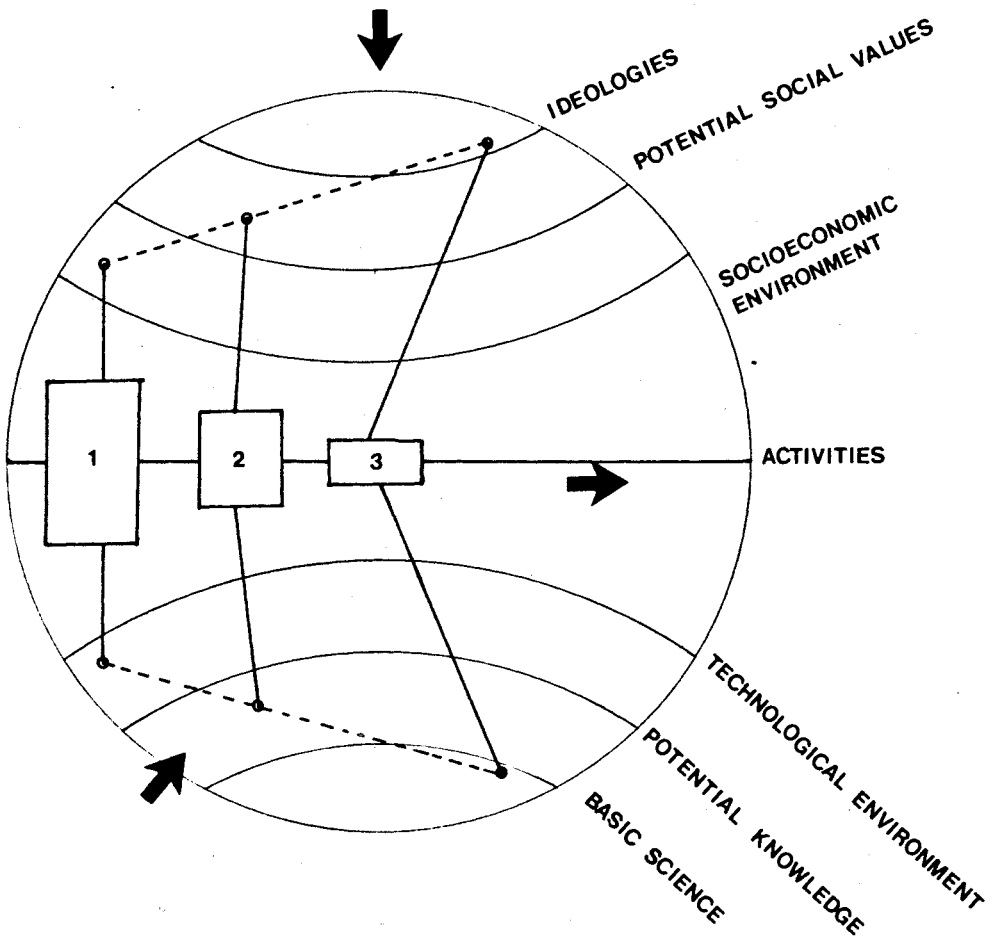
1. Goddard, J.B. (1973) Op. Cit.

2. (a) Thorngren, B. "External Economies and Urban Core" in M. van Hulten, ed. Urban Core and Inner City, Brill, Leiden, 1967

   (b) Thorngren, B. "Regional Economic Interaction and Flows of Information", Proceedings of the Second Poland-Norden Regional Science Seminar, Studies Vol. 33, Committee for Space Economy and Regional Planning of the Policy Academy of Sciences, P.N.N. Polish Scientific Publications, Warsaw, 1967. Cited by Goddard, J.B. "Office Communications and Office Location: A Review of Current Research" in Regional Studies, Vol. 5, Pergamon Press, 1971, pp 263-280

FIGURE 2.5



Source: Thorngren, B. (1971) Op. Cit., p.412

On the basis of the results of this survey, a model of organizational environmental relations has been suggested by Thorngren as a means for understanding contact patterns. His model is based on the assumption that every activity requires access to knowledge and values in its environment and that all organizational processes and related contacts can be related to specific sections of a time horizon.

Location of Activities and Sources of Information

Figure 2.5 describes how the sources of this information can be located. Value oriented information is located in the upper portion whilst the lower proportion represents technological knowledge which may be used in ongoing activities. Some activities seek their information from the adjacent sectors whilst others seek their information from the extreme segments of the 'development space' where information is more difficult to obtain. Thus the location of the information sources within the development space represents the various degrees of accessibility of different types of information. The utilization of physical resources has been placed in the middle of the development space and are distributed in three different positions as utilization of resources may refer to different time horizons for example routine production (1) or long run utilization (2 and 3). Differences in the time horizon of activities could imply different contact activities.

Expanding on Simon's[1] definition of programmed or non-programmed process, Thorngren distinguishes between programmed, planning and orientation processes. Most activities and programmed processes (1) are related to routine transactions and operate within the contemporary socioeconomic environments. (See previous Figure 2.5). Planning processes (2), the next largest group link potential social values and technologies, and are thus concerned with likely changes in the more

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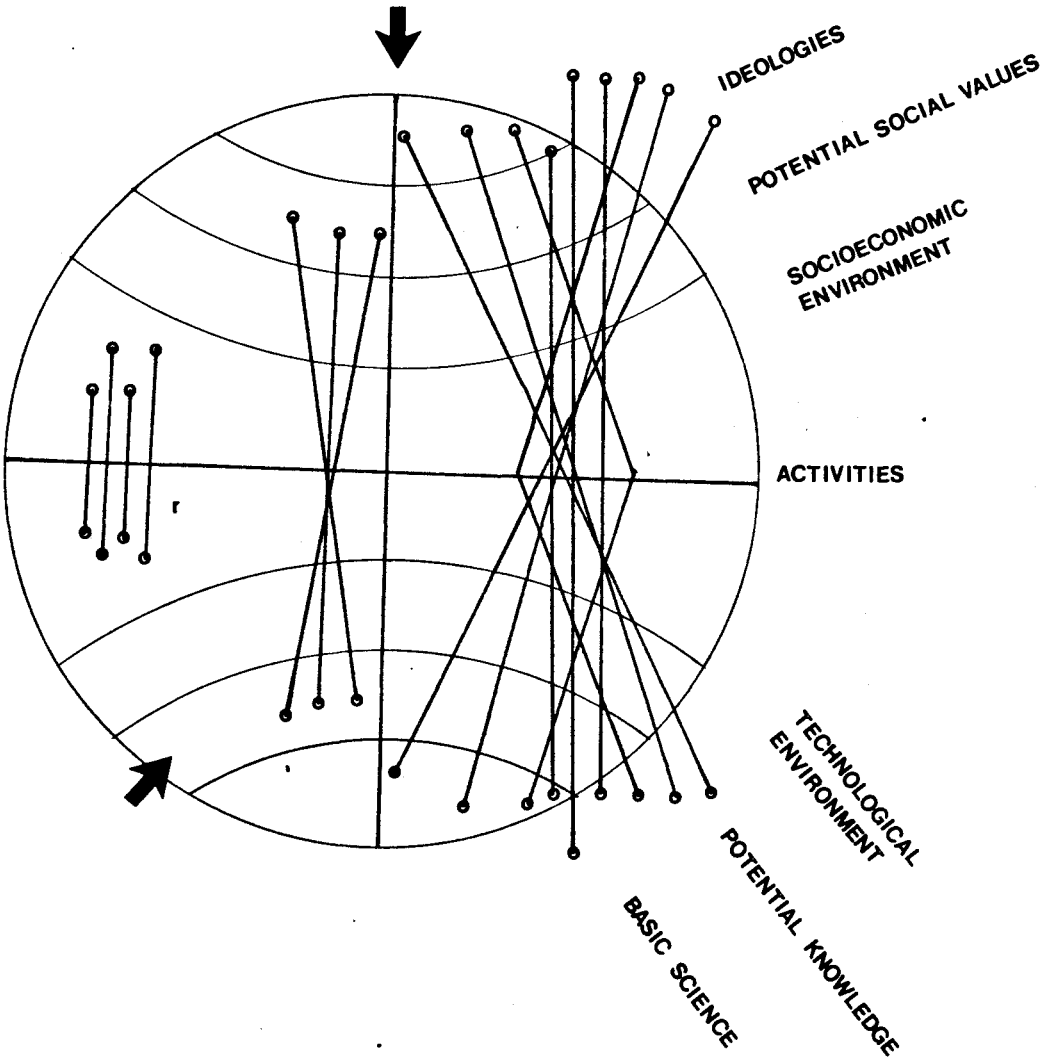
1. Simon, H.A. (1960) Op. Cit., pp 45-46

FIGURE 2.6



Source: Thorngren, B. (1970) Op. Cit., p.415

immediate environments in which programmed activities currently operate - development and choice of alternatives occur here. The smallest proportion of total activity, orientation processes (3) is concerned with long term scanning of the environment, reaching out to basic science and to ideology.

The Structure of Contact Systems

The basic model outlined above is further expanded to distinguish between at least three different types of contact systems with different tasks and structure - the variability and scope of such contact systems are shown in Figure 2.6 . Contacts related to orientation processes involve wide ranging and often random scanning of the knowledge and values environments. Planning processes and related contacts take the form of a more directed evaluation of development of new possibilities arising as a result of previous orientation contacts. The programmed contacts and activities occur within a relatively closed circuit as they have been constrained by conditions resulting from earlier planning contacts.

Contact Characteristics - Empirical Findings

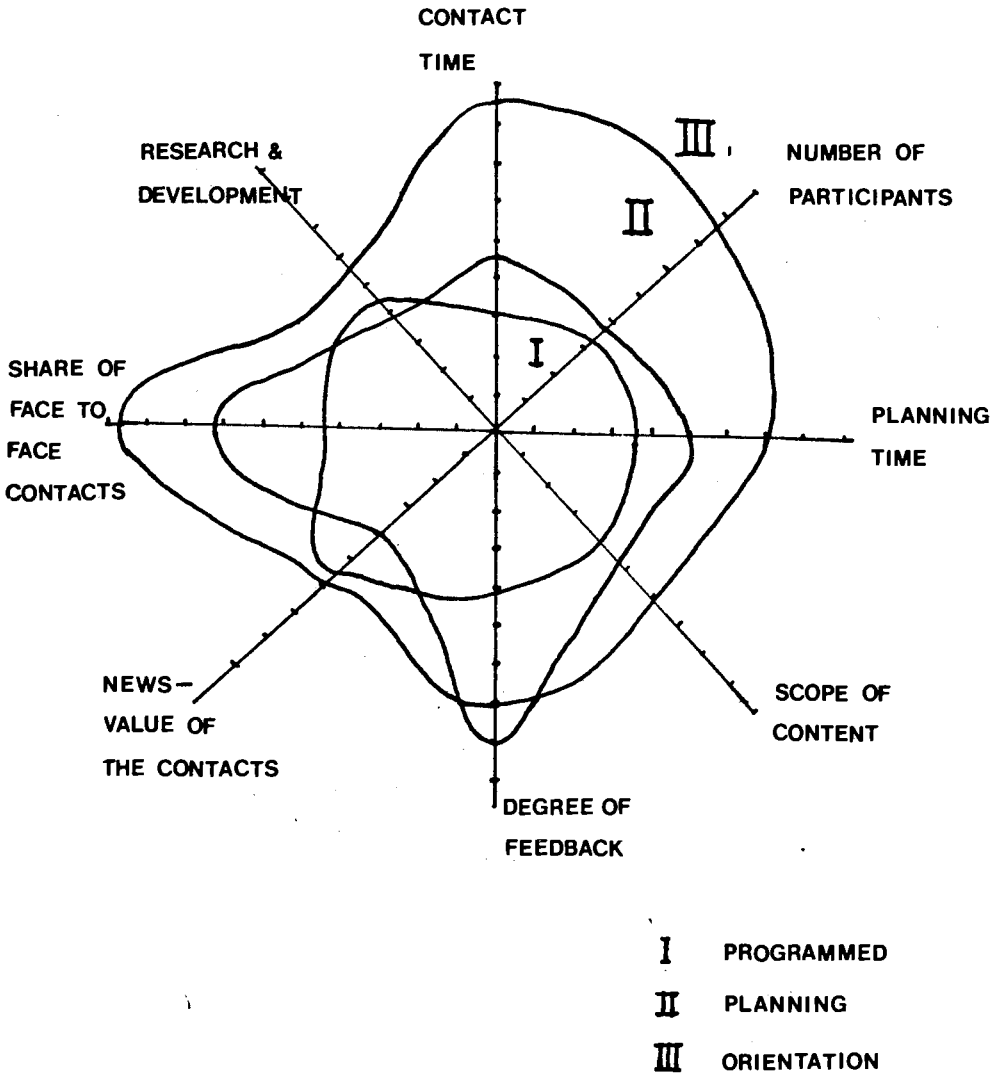
In a study of contact structure undertaken by use of contact diaries covering a three day period, Thorngren looked at over twenty aspects of contact structures, employee characteristics e.g. age, status, function etc and the structure of employment and production in establishments. Over 3000 executives took part in 15,000 contacts. Using the technique of multivariate classification latent profile analysis as a basis for classifying contacts Thorngren was able to confirm that his basic assumption that the 15,000 observations could be classed into three fundamental contact patterns - the programmed, planning and orientation network. See Figure 2.7 which summarizes the amount of contact in each network. The axes and points on the scale show the amount of contact in each network (I - the inner circle), (II - the middle one) and (III - the peripheral figure) which correspond to programmed planning and orientation contacts respectively.

Basically the programmed network was characterized by:

(1) fast and short contacts (often requiring an answer

FIGURE 2.7

NETWORKS OF THE CONTACT SYSTEM. THREE MAIN NETWORKS THROUGH WHICH NECESSARY INFORMATION IS CHANNELLED CAN BE DISTINGUISHED IN THE CONTACT SYSTEM OF ORGANIZATIONS. THE AXES AND POINTS ON THE SCALE REPRESENT THE AMOUNT OF THE CONTACT IN EACH NETWORK THAT IS DEVOTED TO DEVELOPMENT PROCESSES, HOW MUCH PLANNING TIME THE CONTACT REQUIRES, HOW MUCH NEWS VALUE THE EXCHANGED INFORMATION HAS. (DATA HAS BEEN ANALYSED USING LATENT PROFILE ANALYSIS)



Source: Thorngren, B. (1970) Op. Cit., p.418

to only a single question)

(2) a good deal of purchasing activity
(3) a large proportion of total contacts i.e. 70%
(4) insignificant breadth of information exchanged
(5) one-way and well structured messages
(6) short planning time e.g. one day or less
(7) contact times of less than 15 minutes
(8) frequent use of telephone contact.

The planning network contained:

(1) information of a greater scope
(2) exchange of information in both directions
(3) contact times of about 30 minutes
(4) mixed telephone and face contacts
(5) well established relations.

The orientation network involved:

(1) difficult problems
(2) less than 5% of total contacts
(3) involved 80% of all new contacts
(4) unstructured exchange of information
(5) usually three or more participants in exchanges
(6) planning time of usually a week
(7) contact times of over several hours
(8) only face-to-face contacts.

As regards the relationship between patterns of contact and processes, Thorngren's work demonstrates that stable components such as firms with slowly changing technology, volume of production and personnel usually have few members of the organization involved in contacts - these contacts are usually of a programmed type. Earlier studies carried out in Britain by Burns[1] tended to support this finding. Strongly market-oriented processes require more extensive contact with the environment in which orientation type contacts play

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1. Burns, T. (1957) Op. Cit.

an important part. More members of the organization are involved in contacts. Processes involving technical development often show a narrower but more intensive connection to limited parts of the environment. The number of members of the organization involved in contact activity is high and for the most part contacts are of the planning type.

Whilst existing linkages are indicators of offices' dispersal potential, too great an emphasis should not be placed upon volume of contacts as the basis for location determinants. Thorngren found that many of the contacts between offices in Sweden were routine or programmed contacts - important face-to-face contacts, which could be classed as orientation (Class I) formed only 25 per cent of contact patterns.

Clearly Thorngren's studies establish new methods for determining whether firms require locations within orientation networks (large urban centres) or whether activities could be carried out in isolation from such centres in programmed networks (i.e. outer urban areas) but perhaps more work needs to be done in relation to sheer volume of contacts. Although office firms with chiefly programmed contacts might appear to be able to communicate successfully in more isolated areas, factors such as accessibility to customers to generate further demand for the firm's product or the sheer volume of telecommunications costs over long distances could render operations unsuccessful. These factors are examined in detail in the chapter relating to economic considerations.

Thorngren's work does not extend its frame of reference to the analysis of internal and external contacts or to the detailed examination of types of contacts within and between different business sectors. This approach was later pursued by Tornqvist[1] whose studies of contacts enabled conceptual models of the contact

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1. Tornqvist, G.E. "Contact Systems and Regional Development" in Lund Studies in Human Geography, No. 35, 1970, Ch. 5

systems of administrative and operating units to be derived in relation to job level and job sector.

Activity System Model

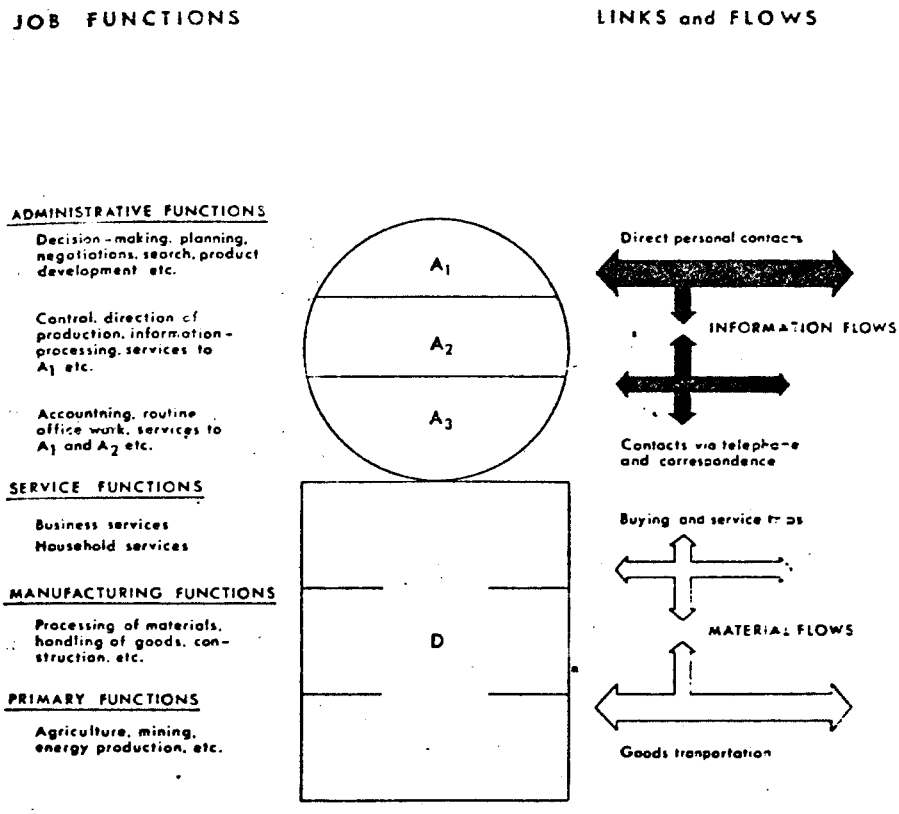
Jobs functions are the basis groupings in a complex activity where the links are different kinds of transportation and flows. Figure 2.8 gives examples which are characteristic of various functions. The circle encompasses the administrative functions which are found in varying degrees in all organizations and linked by flows of information. The square represents the production functions which are linked by material flows the shift in occupational structure from the primary functions typical of an agrarian society to the manufacturing functions typical of an industrial society to the service functions and administrative functions which account for increasing employment numbers. The great concentration of job opportunities and residential facilities especially in major urban regions of developed economies and the growth of cities is conceived by Tornqvist as being largely the result of the dynamic expansion of service and administrative functions around which congregate all types of services, media corporations and the like. As this development has lead to a far reaching division of labour and specialization, Tornqvist sees the interdependence of work functions within and between the firm has increased considerably as the focus of his studies.

As regards job function and contact intensity, there was a tendency for employees in the same occupational field but in different organizations to have direct personal contacts with one another. Those work functions which are primarily found to be engaged in contact activity are:

(a) decision making, planning and negotiation
(b) distribution of information, publicity and selling
(c) control and intelligence activities
(d) research, analysis and educational work
(e) construction, product development and designing

Investigation by Tornqvist has shown that employees primarily

FIGURE 2.8



Diagrammatic representation of an activity system consisting of job functions connected up by links and flows.

Source: Tornquist, G.E. (1973) Op. Cit., p.87

engaged in external personal contact activity are those in administrative units (circles marked 'A' in Figure 2.9). Employees in operating units marked 'D' have very few external personal contacts. As found by Thorngren[1] (1967), 'D' type employees mostly communicated by telephone and written memoranda. Within the circles shown on Figure 2.9 some administrative employees spent a good deal of time on external personal contacts i.e. A_1, A_2 spent less time and A_3 have no external personal contacts whatsoever.

In absolute figures, these studies showed that the number of external personal contacts were a function of both job level in the organization and the type of commercial sector involved.

Tornqvist found that the extent of an employee's external contact activity is dependent upon his level in the organization in both the public and private sectors. The highest job levels appeared to be primarily responsible for external contacts whilst the number of external contacts decreased considerably in respect of those jobs which had little or no responsibility attached. Tornqvist found from his investigations that manufacturing, public administration and commerce sectors account for the greatest number of external personal contacts. Trade associations, labour market organizations and business services also have a considerable number of external contacts. However, when account is taken of the number of employees in each sector (i.e. the absolute number of contacts in one week is divided by the number employed in that sector), the situation changes. Then trade associations, labour market organizations and public administration are the most contact intensive sectors. Lower frequencies are recorded by scientific activity, business services and finance. Figure 2.10 shows the various economic activities and their contact patterns. Intrasector and intersector contacts are illustrated by the black arrows within each section and in the inner circle respectively. The thickness of the arrow is determined by the frequency

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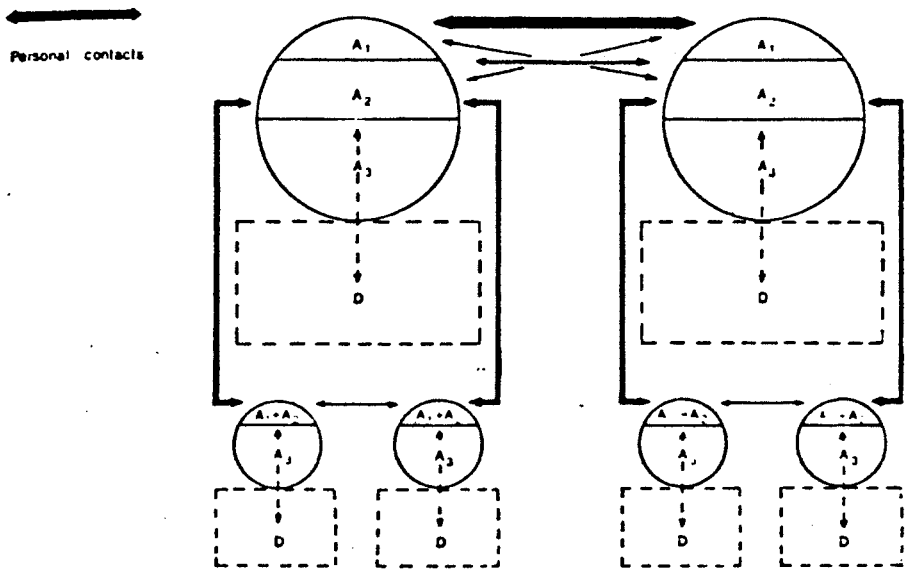
1. Thorngren, B. (1967) Op. Cit., pp 84-86

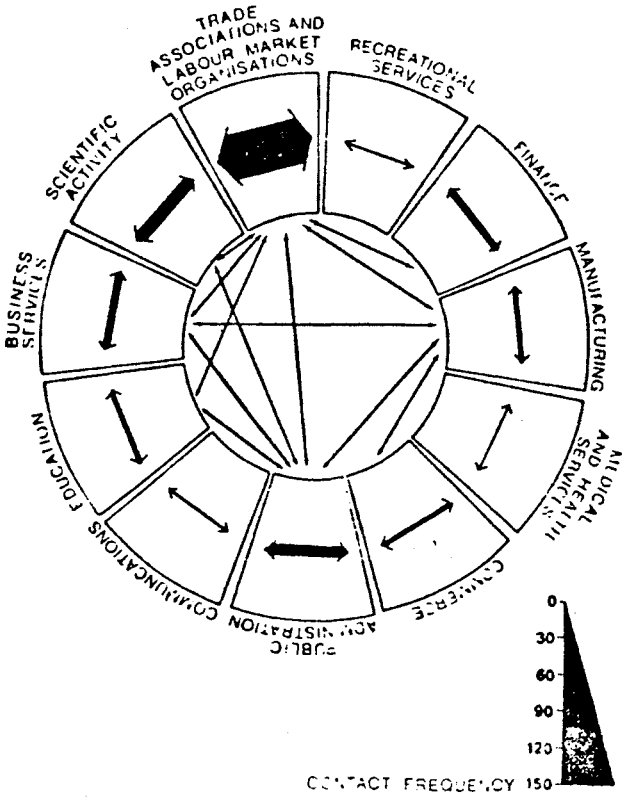
FIGURE 2.9



Diagrammatic representation of personal contacts within and between two regionally dispersed organizations.

Source: Tornquist, G.E. (1970) Op. Cit., p.85

FIGURE 2.10



Personal contacts within and between industrial, trade and service sectors.

Source: Tornquist, G.E. (1970) Op. Cit., p.83

of contact made during one week in relation to the number employed in the relevant economic sector.

The main contribution by Tornqvist to the field of office location study is his achievement in linking a hierarchical model of organizational structure to the volume of information flows within and between organizations. He has isolated the various sectors of the economy which require personal contact with other sectors and with similar sectors. He has also found that within these sectors the external contact intensity depends upon the function of the job and the level of the job in terms of responsibility and salary. Such results are useful only for conceptual purposes as the survey results are not sufficiently detailed as to be directly applicable to enable town planning decisions to be made. It is necessary to take account not only of the sheer volume of contacts of administrative systems but also the strength of contacts made by firms and in order to assess the spatial proximity requirements of offices.

THE STRENGTH OF CONTACT CHARACTERISTICS AS AN INFLUENCE ON LOCATIONAL REQUIREMENTS OF OFFICE ACTIVITIES

It has often been argued that particular patterns of location within the city centre are a response to functional linkages between offices[1]. As demonstrated in the preceding section of this chapter administrative activity systems comprise tasks which are characterised by abstract work contents which demand different levels of competence. Therefore it could be assumed that some contacts would be more important to the administrative activity than others or that the strength of linkages would vary.

Although existing patterns of contacts provide a useful insight into office location requirements, the linkage approach may be criticised on several grounds. Firstly such contacts may be made by firms suboptimally located and secondly the linkages may not be strong enough to warrant close spatial proximity as telecommunications could be utilized as a substitute for face-to-face contact. In order to assess the strength of office linkages and to ascertain how far they required close spatial proximity, Goddard[2] undertook a detailed study of the location of different categories of office employment in Central London, together with a study of the pattern of personal contacts through meetings and telephone calls between offices in Central London. Account has been taken of the strength of these linkages in terms of the extent of spatial proximity demanded and also the possible impact of telecommunications technology on contacts and office location requirements.

Goddard has examined the intensity of contact between firms (by business sector, status group and type of department), the

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1. Rannells, J. The Core of the City, University of Columbia Press, New York, 1956

2. Goddard, J.B. Office Linkages and Location - A Study of Communications and Spatial Patterns in Central London, Progress in Planning Series, Vol. 1, Pt. 2, 1973, Pergamon Press, Oxford

geographical distribution of contacts by business sector by department and contact travel time and mode of travel. An analysis has also been made of intersectoral contacts and the degree of involvement in connectivity of each sector in the functional groupings. Following an analysis of the characteristics of telephone and meeting contacts for a sample of office activities, a three profile classification of face-to-face meetings and telephone contacts was produced using latent profile analysis. Using this classification of business contacts as a basis for suggesting strength of inter-sectoral linkage, the variation of strength of business contact was then assessed according to status group, type of department and sector.

Goddard obtained his contact data by using contact diaries (as had been successfully used by Thorngren (1970), and Tornqvist (1973). An example of the sheet one of which was completed by respondents after each contact is shown in Appendix 4.

Intensity of Business Contacts

As regards the overall volume of contacts variations were found to occur on the basis of business sector, status group and department type. Over all of the business sectors, there appeared to be a correspondence between the volume of telephone contacts in a sector and the volume of meetings. Presumably as the intensity of meetings increase so do the resultant phonecalls. Generally speaking the intensity of contacts by firms in the financial sectors exceed that of other sectors and was followed closely by business and professional sectors. (See Table 2.2). Appendix 5 contains a detailed classification of business sectors.

As may be seen from Table 2.3 there were considerable variations in contact intensity according to status level (or managerial grade). Managing directors had more meetings than the lower status groups - this appeared to occur down the line of decreasing status. Telephone call intensity also decreased in this

TABLE 2.2

. Intensity of Contact by Sector

Manufacturing	Chemical	Engineering	Other manufacturing	Paper, printing and publishing	Construction	All manufacturing[a]
No. of respondents	135	54	31	24	26	300
Telephone calls per respondent	7·3	3·9	10·2	4·2	9·3	6·5
Meetings per respondent	2·3	1·4	2·2	1·0	2·0	1·9
Total contacts	9·6	5·3	12·4	5·2	11·3	8·4

Financial	Insurance	Banking	Other finance	All financial
No. of respondents	44	113	67	235
Telephone calls per respondent	5·3	6·2	9·9	7·9
Meetings per respondent	2·7	2·9	1·4	2·5
Total contacts	8·0	9·1	11·3	10·4

Services	Professional	Business	All services	All sectors[a]
No. of respondents	44	49	93	705
Telephone calls per respondent	5·9	9·2	7·8	7·4
Meetings per respondent	1·5	3·3	2·5	2·6
Total contacts	7·4	12·5	10·3	10·0

[a] Includes sectors with less than 20 respondents which are not listed in this table.

TABLE 2.3

. Intensity of Contact by Status Group

	Managing director/ chairman/ senior partner	Director/ company secretary/ junior partner	Manager/ section head	Assistant manager/section subhead/ professional	Executive	Total sample
No. of respondents	15	57	365	160	97	705
Telephone	10·2	7·0	7·8	6·5	8·3	7·4
Meetings	3·2	2·3	2·6	1·9	1·3	2·6
All contacts	13·4	9·3	10·4	8·4	9·6	10·0

Source: Goddard, J.B. (1973) Op. Cit., p.161

fashion but rose slightly in the executive grade.

Taking into account the type of department, it was found that the highest intensity of meetings was recorded by advertising, buying departments and insurance and finance departments, whilst the highest intensity of telephone contacts recorded were buying departments followed by export sales, marketing, shipping transport and distribution. The lowest level of telephone contacts were by departments that service firms as was found to be the case by Tornqvist (1971, 1973) and Croft (1969).

Geographical Distribution of Contacts

In Central London Goddard recorded a slightly larger number of meetings than telephone calls with other firms in Central London. Taking Greater London as a whole, most telephone contacts and meetings (about the same proportions) were directed to the internal part of the urban area thus illustrating a highly concentrated level of contact activity.

Between sectors there are marked differences in the geographical distribution of contacts, the financial sectors have more contacts confined to Central London than the manufacturing sectors which had more overseas meetings. Within the finance group there were differences between sectors with respect to telephone contacts and meetings - other finance had the most geographically concentrated pattern of telephone contacts followed by banking and then by insurance. The reverse order applied for meetings. The services group fell between the finance and manufacturing in terms of geographical concentration but there is considerable contrast between the two services - business services appear to serve Central London or a local market whilst professional services serve a wider market beyond Greater London, as illustrated in Croft's work relating to Leeds[1].

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1. Croft, M.J. (1969) Op. Cit.

The other finance sector recorded an above average proportion of overseas contacts so did construction, engineering and chemicals sectors.

Travel to Meetings and Mode of Travel

Over two thirds of meetings occurred outside respondents' offices with one third of those business trips being made on foot and lasting less than 10 minutes. Seventy eight per cent of total journeys were less than 30 minutes. Journeys by taxi and private cars being the next most important mode of travel. The following table No. 2.4 confirms the importance of Central London contacts.

TABLE 2.4 - TRAVEL TIME TO MEETINGS AND MODE OF TRAVEL

Length of Journey	%	Mode of Travel	%
Less than 10 minutes	38	Walk	33
10-30 minutes	40	Bus	5
30-60 minutes	10	Private Car	21
1-2 hours	7	Taxi	24
More than 2 hours	5	Underground	6
		Train	10
		Plane	1

Source: Goddard, J.B. (1973) Op. Cit., p.165

Connectivity of Business Sectors to the Contact Network

Having identified a number of distinctive functional groupings of office sectors, Goddard employed factor analysis to determine those sectors with high factor loadings and hence a heavy involvement in one or more groups. He also employed a connectivity communality and a concentration index to determine whether a sector had a large proportion of its contacts with a limited number of other sectors or were connected directly to a large number of other businesses. Sectors like primary industry, textiles, commodity broking and insurance demonstrated a low connectivity having highly concentrated contact flows, few indirect linkages and little involvement in any group. Sectors like banking, retailing, general construction and central government have a high level of connectivity with dispersed contacts, numerous indirect connections and high group involvement. See Appendix 6. Of moderate connectivity were sectors like specialist construction which have numerous indirect connections yet a relatively weak involvement in any group and a concentrated pattern of contact flows.

The Characteristics and Classification of Business Contacts

In order to break down crude volumes of contacts and to weight these linkages in terms of need for spatial proximity, Goddard has examined the characteristics of telephone and meeting contacts and classified such business contacts into orientation, planning and programmed contacts as identified in earlier studies carried out by Thorngren (1970).

Face-to-Face Meetings and Telephone Contacts: The most noticeable aspect of telephone contacts Goddard found was that generally they were very short, dealt with specific subjects, were unarranged and were between familiar participants. Meetings fell into all time categories but the bulk of them were short (10-30 minutes), most were prearranged at least two days in advance and very few meetings occurred on a regular basis and frequently were

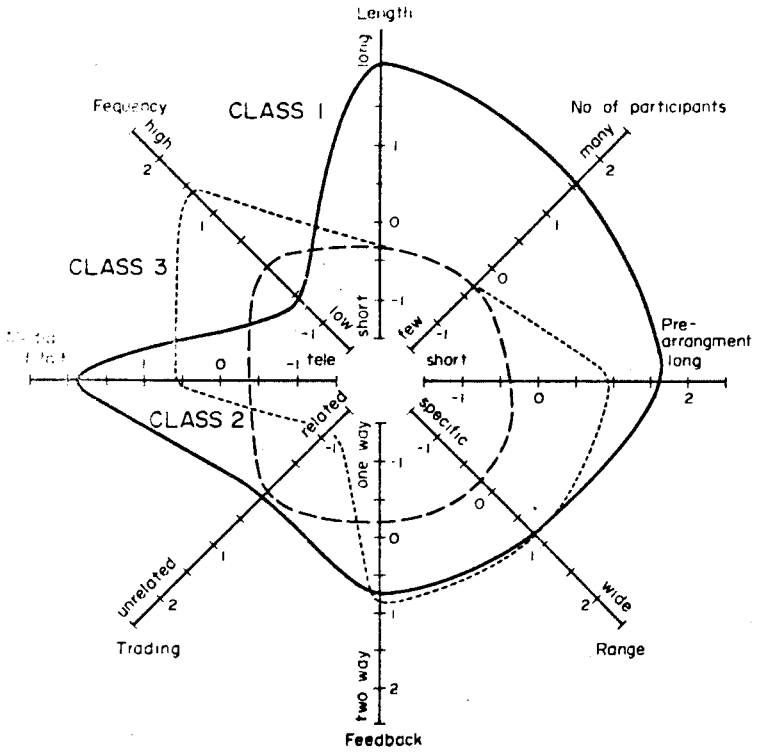
concerned with at least several subjects. As regards purpose, telephone calls were mostly concerned with giving orders and giving and receiving information; meetings were frequently held for bargaining, exchanging information and general discussion i.e. for interaction or feedback. Generally there was a consistent relationship between each of the features of a contact within a group e.g. a high frequency of contacts is associated with short contacts involving few people in limited discussions. The characteristics of telephone calls and meeting contacts are summarized in Appendix 6. These contacts were found to vary between business sectors, department types and different status groups.

Contact Location: Those firms with daily meetings were more likely to be contacting other firms within Central London. This was also the case for unarranged or meetings lasting less than 30 minutes.

Classification of Groups by Latent Profile Analysis: Using latent structure analysis (in which the data are dichotomous responses to a series of questions) and entering both telephone and meetings in dichotomised format into the analysis, eight characteristics were found to be common to both types of contact. These were: prearrangement, length, frequency, purpose, range of subject matter discussed, number of participants, concern with sales or purchases and the media involved. As the question of purpose could not be entered into the analysis as a quantitative variable, it was recoded to indicate whether feedback was involved. Three latent profiles as illustrated in Figure 2.11 gave the best fit for this data. Class I contacts are shown to be predominantly face-to-face contacts and Class II predominantly telephone contacts, whilst Class III contains even proportions of meetings and telephone contacts. These contacts comprise 14.5%, 81.2% and 2.4% respectively of total contacts.

It seems that Class I contacts can be associated with the orientation processes of Thorngren's basic model - these are chiefly large meetings of unfamiliar people, covering wide ranges of subjects. Meeting of new contacts who form the basis of future contacts is likely.

FIGURE 2.11



. A classification of face-to-face meetings and telephone contacts using LPA (three profiles).

Source: Goddard, J.B. (1973) Op. Cit., p.195

The likelihood of future telecommunications replacing these meetings appears unlikely as telecommunications are likely to inhibit chance connections and future contacts. Class III contacts tend to be associated with planning processes of the basic model - they are more intensive than orientation contacts, involve a limited number of people meeting frequently for bargaining as opposed to general discussion and both pre-arranged meetings and telephone contacts are involved. Decentralization might be possible due to the existing use of telecommunications provided there were opportunities for face-to-face contact. Those contacts in Class II were of the programmed variety were part of a well established network in which contacts were routine questions and answers between acquainted individuals. It is unlikely, then, that these types of contacts would be seriously affected by decentralization. The question of other costs such as relocation, telecommunication charges, rents etc as considered by Pye (1973) do not form part of Goddard's study which is concerned more with effects of lcoation on the effectiveness of communications. This classification of business contacts reveals that the programmed (Class II) contacts in Central London could constitute decentralization opportunities.

Comparing the study of business contacts conducted by Thorngren[1] in Stockholm to his latent profile analysis, Goddard found a large degree of similarity in the classification - where any differences occurred, they concerned the number and proportion of contacts of each basic type i.e. orientation, planning and programmed types. However, the basic similarity between the two studies suggests that the fundamentals of contact patterns may be independent of national differences.

Variations in Strength of Contact Characteristics

The classification of business contacts analysis by Goddard did much to suggest the strength of inter-sectoral linkages to determine decentralization possibilities. This analysis demonstrated the existence of variations in contact strength according to status, the sector, types of department and between individual firms.

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1. Thorngren, B. (1968) Untitled, cited in Goddard (1973) Op. Cit., p.198

Generally it appeared that the individuals at the highest status level dealt with the highest proportion of orientation contacts but all groups had some contacts of each type, whilst the proportion of programmed contacts decreased with increase in status. The ranking of status groups from highest to lowest was as follows:

Group 1	Managing Director, Chairman, senior partner
Group 2	Director, Company Secretary, junior partner
Group 3	Manager, section head
Group 4	Assistant Manager, section subhead, professional
Group 5	Executive

The executives dealt mainly with routine contacts i.e. programmed contacts, whilst the Managing Directors, Group 1, dealt with a greatest proportion of orientation contacts. Most of the planning contacts were dealt with in status Group 3 - managers and section heads which are the middle management.

Over the entire sample 14.5 per cent of all contacts were of the orientation type. In Table 2.5 departments are organized according to the proportion of their contacts which are the orientation type, the ranking being divided into departments above and below average. Although these differences may partly be a function of status, it is clear that jobs functions associated with, for instance, organizations and methods usually involve more orientation contacts than do jobs of equivalent status in accounts or buying. Those instances where jobs have a high proportion of orientation contacts but a low overall contact intensity can be explained in terms of the length of meetings which reduces the time available for more frequent meetings. Generally it follows from this analysis that departments with a low number of orientation contacts can have a high proportion of programmed contacts. The exceptions to this are the financial departments, buying, insurance and market departments which account for a good deal of planning contacts.

The two digit sectors (See Table 2.6 for details) are arranged in order of the proportion of total contacts which are the

TABLE 2.5

. Ranking of Departments According to Proportion of Orientation Contacts

Department	No. of contacts	Department contacts (%)	LPI contacts (%)	Total No. contacts	Total contacts (%)
Above average					
Computer services	26	35·6	2·7	73	1·1
Miscellaneous office services	13	35·1	1·3	37	0·6
Maintenance	36	27·7	3·7	130	1·9
Organization and methods	7	25·0	0·7	28	0·4
Planning	34	22·8	3·5	149	2·2
Advertising	55	22·0	5·7	250	3·8
Personnel	90	21·0	9·3	428	6·4
Market research	12	18·8	1·2	64	1·0
Marketing	72	18·5	7·4	390	5·8
Research and development	19	17·1	2·0	111	1·7
Director and administration	150	16·7	15·4	902	13·5
Architects	13	15·9	1·2	82	1·2
Legal and patents	12	15·6	1·2	77	1·1
Technical design	10	14·9	1·0	67	1·0
Professional services	20	14·8	2·1	135	2·0
Engineers	37	14·7	3·8	252	3·8
Public relations	30	14·5	3·1	207	3·1
Below average					
Sales	43	13·0	4·4	332	5·0
Production	60	12·3	6·2	487	7·3
Property	21	11·8	2·2	178	2·7
Insurance	31	11·8	3·2	261	3·9
Information services	4	10·5	0·4	38	0·6
Client relations	6	9·3	0·6	64	0·9
Financial	69	9·2	7·1	753	11·3
Buying	42	8·8	4·3	478	7·2
Accounts	25	7·9	2·6	313	4·7
Export	17	7·1	1·8	241	3·6
Transport and distribution	1	3·4	0·1	29	0·4
Company records	0	0·0	0·0	6	0·1
All departments	971	14·5	100·0	6680	100·0

Source: Goddard, J.B. (1973) Op. Cit., p.202

TABLE 2.6

Ranking of Sectors According to Proportion of Orientation Contacts

Sector	No. of contacts	Sector contacts (%)	LPI contacts (%)	Total No. contacts	Total contacts (%)
Above average					
Gas, electricity and water	25	26·9	2·6	93	11·4
Food, drink and tobacco	19	26·0	2·0	73	1·1
Engineering	57	20·3	5·9	281	4·2
Chemicals	224	17·6	23·1	1270	19·0
Banking	168	17·0	17·3	985	14·7
Wholesale distribution	14	16·5	1·4	85	1·3
Professional services	49	15·4	5·0	318	4·8
Paper, printing and publishing	31	13·3	3·2	203	3·0
Below average					
Transport and communications	4	14·3	0·4	28	0·4
Entertainment	47	13·5	4·8	347	5·2
Other manufacturing	48	12·9	4·9	371	5·6
Insurance	44	12·7	4·5	346	5·2
Construction	36	12·3	3·7	292	4·4
Business services	71	12·2	7·3	580	8·7
Societies and associations	32	12·0	3·3	267	4·0
Metals and other metal goods	3	10·0	0·3	30	0·4
Other finance	69	9·2	7·1	749	11·2
Primary industry	2	55·9	0·2	34	0·5
Commodity dealing	18	8·1	1·9	221	3·3
Miscellaneous offices	3	6·5	0·3	46	0·7
All sectors	971	14·5	100·0	6680	100·0

Source: Goddard, J.B. (1973) Op. Cit., p.203

orientation type. There is no clear distinction between the services, finance or manufacturing sectors. As can be seen from Table 2.6, while banking has above average orientation contacts, insurance and other finance fall below the average number. Different sectors of manufacturing fall into both groups. Professional services differs from business services in that the former sector has an above average proportion of orientation contacts, whilst business services fall below the average.

To test whether the relative importance of different types of contact varied between two firms, Goddard classified separately the contact data from several firms with large samples of response by latent profile analysis, but a separate profile was unable to be produced in some instances, so for convenience, the analysis was only divided into two classes - orientation and programmed contacts. It was found that all firms needed to maintain both types of contacts and that at the firm level, the same contact structure regularities existed regardless of sector. Some minor differences noted amongst the selected firms (oil companies, rubber manufacture, pharmaceuticals, clearing bank (head office), property company and civil engineering consultants), were as follows. Class I (orientation) contacts in the bank took place more frequently than for other firms and were arranged some time in advance. The Class I contacts in the oil company were mostly of the orientation type whilst the clearing bank had a distinctively large number of meetings falling into the programmed class.

A more detailed analysis of an individual firm (the head office of a London clearing bank) was carried out. It was found surprisingly that 84 per cent of meetings occurred daily, were usually relatively short and that only 36.5 per cent of these meetings were of the orientation class.

Financial activities have tended to be associated with those groups having a special need for central location, however an analysis of contact patterns does not support this notion as most

contacts are of the planning type which include a good deal of routine contacts which could be substituted for by telecommunications. As discussed earlier, there are other cost factors which could prevent decentralization being achieved. Goddard introduces another difficulty - the case where an individual may have orientation, programmed and planning contacts in one day. Goddard's studies did not keep a continuous time series but maintains it is unlikely that the same contacts would be carried out in a new location for decentralization would ensure a greater rationalization of contact activity between individuals as some firms would probably be devoting more time to one type of contact. However a good deal more disaggregation of data and analysis would be necessary before these issues could be answered.

THE IMPACT OF TELECOMMUNICATIONS ON OFFICE LOCATION

There has been considerable speculation as to the likely impact of new telecommunications on personal contact patterns within business activities and subsequently the effects on office location. Due to technological advances in telecommunication and changing attitudes relating to the use of telecommunications it is necessary to study not only existing contact patterns but the contact patterns likely to emerge as a result of improvements in technology in the telecommunications field. Less rigid contact requirements could render some sectors of office activities relatively 'footloose' as a result of allocation of contacts such as meetings to alternative systems of communication.

Some sectors of business could be affected in such a manner that headquarters control may become more centralized as a result of improvements in communication methods. A further factor to be considered is the likely effect of telecommunications not only upon existing contacts but upon the possible generation of new contacts upon relocation. Consideration is also given to the relative importance of telecommunications as a proportion of an office based firm's costs to determine which types of firms could be influenced in respect of their location and whether the influence of telecommunications varies spatially.

Since the 1960's literature concerning the impact of telecommunications on the business sectors of the economy has begun to emerge. It is only recently however, that a number of studies have been carried out by The Communication Studies Group[1] both in the laboratory and by means of business communication surveys. These studies and other such contributions are analysed in the ensuing pages with a view to determining the likely impact of telecommunications on the location of offices.

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1. Communication Studies Group, Joint Unit for Planning Research, (Uni. College), London

Available Communication Channels

At present there are two types of media widely available for the transmission of information within and between office based activities - face-to-face meetings or the telephone. Teleconference facilities, both audio only and audio visual are now being used in several countries. Examples include the British Confravision and Confraphone, the Bell Canada TV Conference, the Quebec University audio conference system and Australian Confravision.

Of those new forms of telecommunications now available, 'Confraphone' enables several telephone calls to be linked on the one line whilst 'Confravision' employs closed circuit television for relaying images between meetings and pictoral document transmission facilities. As these facilities are not widely in use (nor is such equipment standardized) in the commercial world it has not been possible to observe the choice process of this media from other available media in a 'real' situation[1].

From a cost point of view audio conference facilities and conference phones can enable group discussions to occur at little extra costs in terms of the number of telephone lines required[2]. The audio conference facilities allow individual participants to be identified by loud speakers placed at a remote meeting table and document transmission facilities can be linked with this system. Video facilities such as 'Confravision' are very costly in terms of the number of telephone lines required[3]. The need for special studios and costs involved in travelling to the studios also adds to the cost. These conference links have, however, only been in

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1. Goddard, J.B. "Office Communications and Office Location: A Review of Current Research" in Regional Studies Vol. 5, Pergamon Press, 1971, p.264

2. Goddard, J.B. and Morris, Diana, "The Communications Factor in Office Decentralization", Vol. 6, Part I, in Progress in Planning, pub. by Pergamon Press, Oxford, 1976, p.57

3. Ibid.

4. Albertson, L.A. "The Substitution of Telecommunications for Travel" in National Telecommunication Planning, Departmental Discussion Paper No. 7, April 1975.

operation for a short period of time and the future of such will probably depend upon the acceptability rating of a system. At present Confravision is operating within Australia on a test basis between Melbourne and Sydney and international tests are to be held in the near future[1]. The audio-conference facility which is operating in Australia can be set up for virtually any group of locations but requires improvement to produce a more lifelike atmosphere and a better indication to participants of who is speaking and a more orderly interchange between groups[2].

It is visualized by Stanton that centralized studios will be established in capital cities and rented out as required on a time/cost basis and that eventually many large businesses could have their own studios on the premises ordering up the necessary video and audio circuits for each teleconference[3]. However, prior to this being the situation, a more active marketing approach designed to generate increased community interests, specific market research to ensure that the requirements of users are catered for in these facilities and the establishment of a balance between cost and utility would need to occur.

Prior to making any statement on the likely substitution of contacts to alternative channels of communication, an understanding of the suitability of different channels for various communication tasks together with

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1. Albertson, Lesley A. "The Substitution of Telecommunications for Travel", in National Telecommunications Planning (NTP), Departmental Discussion Paper No. 7, April 1975

2. Telecom Australia Outcomes from the Telecom 2000 Report, July 1978, pub. by Aust. Telecom Comm. p.50

3. Stanton, F.A. "The Contribution of Telecommunications to Business and Commerce" in The Communication Revolution, Australian UNESCO Committee for Communication, Aust. Govt. Publish. Service, Canberra, 1975, pp 110-116

Communication Tasks and the Suitability of Communication Channels

The following simplistic statement is indicative of the lack of research on office location in terms of communication requirements that existed in the early 1960's:

> 'Why must almost all major policy makers congregate with their assistants and ancillary help in the same vicinity at the same time?.....they spend their time there manipulating symbols which are directed at others. Why not transmit the symbols over a somewhat greater distance instead of moving people?'[1]

The results of recent surveys demonstrate that some communication channels are more effective than others for different types of contacts.

Results from an A.P.O.[2] questionnaire in which 39 per cent of the respondents indicated that teleconference systems were seen as being as effective as a face-to-face meeting would have been whilst, on the other hand, 11 per cent of the respondents rated the teleconference as more successful than a face-to-face meeting. An examination of the results from the survey revealed that the acceptability rating of a system incorporates factors such as convenience, time, cost saving and flexibility. Other studies carried out in Canada[3] also support this conclusion and report that because of time saving most of the teleconference users they interviewed would prefer teleconferencing to travel at least some of the time. In the case of routine meetings in familiar places Short[4] (undated) also observes that people will go to considerable lengths to avoid travel. Of course desire to travel and the use some of the associated privileges such as expense accounts and the like could result in a

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1. Meier, R. A Communications Theory of Urban Growth, M.I.T. Press, Cambridge, Mass., 1962
2. A.P.O. - Australian Post Office (now Telecom Australia)
3. Casey-Stahmer, A.E. & Harvon, J.D. Planning Research in Teleconference Systems, Human Sciences Research Inc., Virginia 1973, Report prep. for Dept of Communication Canada
4. Short, J. "A Report on the Use of Audio-Conferencing Facilities in the University of Quebec, C.S.G.", J.U.P.R. (undated) Cited from Albertson, L.A. (1975) Op. Cit.

satisfactory system becoming more unacceptable.

Responses to the abovementioned A.P.O. questionnaire showed that teleconferencing was seen as most suited to more straightforward types of communication. Problem solving, decision making and resolving disagreements were seen as less suited with persuading and bargaining being the most difficult. Results of Williams[1] study were broadly similar as users of the Bell Canada T.V. Conference saw it as inappropriate for communications such as those involving conflict, confidential exchanges, emotional or 'touchy' matters and 'brainstorming'.

Measuring effectiveness in terms of accuracy with which the receiver had grasped the core information and total information and additionally the time taken for the transaction, Reid[2] carried out a number of pilot studies on communication tasks such as complex problem solving and bargaining tasks using different media. Subjects were asked to communicate by telephone and face-to-face meetings the key points and total information in three letters - a low comprehension task. The results revealed considerable accuracy of the transmission of the core information irrespective of the media with wide variations of time between pairs of subjects. There was a significant relationship between time and accuracy in transferring total information between pairs but overall a consistent accuracy. Whereas core information could be transmitted quickly on either medium, the success of transferring total information was related to transaction length. Thus a principle disadvantage of the telephone is the difficulty with which long conversations are handled, otherwise it appears from these experiments that low comprehension tasks could be handled as effectively by telephone as by face-to-face meeting. In this circumstance it is not

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1. Williams, "The Bell Canada Conference Television System: A Case Study" C.S.G., J.U.P.R., London, p.193 (mimeo) Cited in Albertson, L.A. (1975) Op. Cit.

2. Reid, A. "Proposals for a Study of the Effectiveness and Impact of Future Systems of Person/Person Telecommunications" Joint Unit for Planning Research, London (mimeo), cited by Goddard, J.B. (1971) Op. Cit., p.266

information about the other participation that reduces communication by telephone media but the lack of comfort and interest of speakers which could be countered by picture phones which encourage greater relaxation and, as a consequence, longer transactions[1].

The advantage of the telephone lies in the ability to communicate immediately, in the case of urgent matters arising the telephone has a distinct advantage, especially when long distances are involved. However, the telephone contact can usually only take place between two people. Meetings which take time to arrange have the obvious advantage of immediate feedback which is often beyond the conscious control of the participator. Thus the meeting enables feedback through non verbal communication, displays of visual information such as documents.

Non verbal communication has been categorized into three basic roles[2]:

(a) communicating inter-personal attitudes and emotions for example seating arrangement, eye contact, facial expression

(b) supporting verbal communication that is
- completing meaning of utterances
- controlling the synchronizing of speech
- obtaining feedback
- signalling attentiveness

(c) replacing speech when speech is impossible for example in noise.

As these means of communication cannot be used or observed over the telephone, a good deal is lost in use of the telephone as a communications channel for some types of contacts. Goddard's[3]

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1. Goddard, J.B. (1971) Op. Cit., p.267

2. Argyle, M. "The Psychology of Interpersonal Behaviour", Penguin, Lond. 1967

3. Goddard, J.B. "Office Communications in Central London" Geography Dept., (L.S.E.), mimeo, 1971, cited in Goddard, J.B. Op. Cit., (1971) pp 267-270

study of communication patterns of offices in Central London addressed the question of which types of contacts were suited to the telephone media. The most noticeable features of the telephone contacts studied were that the bulk of them were short, unarranged and very specific subjects. Generally, telephone calls were between familiar participants. As the purpose of telephone calls contacts were most frequently made for giving orders and giving and receiving information, it appears that this medium is used by firms for the most part to carry out low level routine contacts, whilst meetings occur in respect of more complex matters on a less frequent basis. Firms considered that meetings were required for tasks involving 'feedback' between participants and that the telephone was not an adequate communication channel for lengthy discussions especially with three or more participants.

These observations suggest that the type of contact, depending upon whether it is of the programmed, planning or orientation variety could be related to the choice of communication channel and the potential for substitution of contacts to different communication channels. As previously discussed orientation contacts involve large meetings, wide ranging discussions, often between unfamiliar participants. It is likely that those types of contacts would be difficult to transfer to telecommunications channels due to the need to suppress informal communication. Meetings of a programmed nature where the giving or receiving of information between familiar participants occurs could probably be dealt with by telephone. Planning contacts which also involve familiar individuals and often involve two way discussions between individuals could probably be carried out using telecommunications with the use of additional facilities such as document transmission.

These assumptions can be assessed by examining responses to a survey which compared responses to questions on meeting or telephone choice according to whether the contact was of the orientation programmed or planning category[1]. This study showed

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1. Goddard, J.B. and Morris, D. "The Communications Factor in Office Decentralization" Vol. 6, Pt. 1 in Progress in Planning, Pergamon Press, 1976, p.60

that planning contacts were more restrained by the use of the telephone than with programmed contacts as the respondents stated that 20 per cent of the planning contacts would have been better as meetings compared to 10 per cent of the programmed contacts. On the other hand 82 per cent of programmed meetings could have satisfactorily been implemented by telephone.

Reasons attributable to these differences in choice of contact media may be derived from Table 2.7 opposite. A comparison of programmed and planning telephone calls demonstrates that the need to consult documents and the need for a group to take part are the more important reasons for preference of planning meetings. The more important factors, the need to consult, exchange or sign documents is a much more important reason for a programmed contact in the form of a meeting than is the case for orientation contacts. Thus these types of programmed meetings could probably be suitable candidates for telecommunications channels if document transmission facilities were used. Group audio or video facilities would probably be required for orientation contacts which involved assessing a person's reactions and gathering background information. However of the programmed meetings, it is likely that the group involving either the physical inspection of a fixed object or personality assessment could not be replaced by even an advanced video system.

An examination of why meetings are presently chosen in preference to a telephone call could point to the telecommunication constraints that could be overcome given the availability of the appropriate technology. This idea was the subject of a study recently carried out by Goddard and Morris[1] in collaboration with the Communications Studies Group. The results of the study are summarized in Tables 2.8 and 2.9 on the opposite page.

From Table 2.8 it can be seen that the two most important

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1. Ibid, pp 58, 59

TABLE 2.7

Reasons for the choice of meeting or telephone call for different types of contact

Reason	Telephone				Meeting			
	PRO		PLA		OR		PRO	
	A %	B %	A %	B %	A %	B %	A %	B %
Documents	48	(17)	50	(24)	24	(13)	45	(29)
Group	6	(8)	12	(8)	30	(17)	2	(5)
Assess Reaction	5	(11)	3	(7)	8	(11)	2	(5)
Exercise Persuasion	11	(9)	2	(9)	3	(6)	6	(5)
Confidentiality	3	(6)	2	(5)	3	(5)	4	(3)
Background information	20	(20)	24	(22)	19	(17)	13	(20)
Friendly relations	4	(8)	2	(11)	3	(6)	2	(8)
Courtesy	0	(4)	3	(4)	1	(4)	2	(5)
Physical	1	(0)	0	(0)	6	(2)	11	(5)
Personality assessment	0	(0)	0	(0)	2	(0)	13	(7)
Complexity	0	(0)	2	(1)	2	(0)	2	(0)

A Primary reasons only
B All mentions

Source: Goddard, J.B. and Morris, D. Op. Cit., p.60

TABLE 2.8

Reasons for the choice of meetings or telephone calls

Reasons Because of need to:	Meeting: tele inappropriate % 1st choices	% all mentions	Ratio 1st choices to all mentions	Tele: meeting better % 1st choices	% all mentions	Ratio 1st choices to all mentions
Consult, exchange or sign documents	28	17	0.55	48	25	0.69
Group to take part	25	18	0.45	7	9	0.32
Gather background information	18	20	0.46	21	21	0.35
Inspect site	7	0	0.91	1	0	1.00
Assess reaction	6	13	0.17	5	10	0.18
Excercise persuasion	4	7	0.16	9	9	0.39
Assess personality (interview)	3	0	1.00	0	0	1.00
Maintain confidentiality	3	5	0.16	3	6	0.17
Maintain friendly relations	3	7	0.11	3	9	0.13
Subject matter	2	0	1.00	0	0	1.00
Courtesy	1	4	0.10	1	4	0.09
Total	300	919		307	851	

Source: Goddard, J.B. and Morris, D. (1976) Op. Cit., pp 58, 59

TABLE 2.9

Reasons for the choice of a telephone call

	Internal contacts No. 1st choices	%	External contacts No. 1st choices	%
1. Travel time not justified	311	42.1	261	43.9
2. Urgency	286	38.8	214	36.0
3. Travel cost not justified	80	10.9	47	7.9
4. Telephone adequate	40	5.4	51	8.6
5. Other reasons	20	2.7	20	3.4
Total	737	100.0	593	100.0

Source: Goddard, J.B. and Morris, D. (1976) Op. Cit., pp 58, 59

reasons which influenced the choice of a meeting were the need to consult, exchange or sign documents and the need for a group to take part. Whilst it is possible that telecommunication could satisfy these demands, the next important reason, the need to gather background information is unlikely to be met even by costly video-conference facilities due to the requirement that such meetings need to be formalized to the extent that peripheral discussions necessary for background information are unable to be included. Other reasons such as the need to assess reactions, exercise persuasion and maintain friendly relations were regarded as being of secondary importance whilst the primary reasons for rejecting telecommunications were interviews and site inspections. Thus the most important primary and secondary reasons for choosing meetings similarly applied to telephone contacts that proved unsatisfactory.

Additional results regarding the differences which occurred between the prior expectation of the likely nature of the contact and what actually occurred were derived. Approximately 13 per cent of the total number of meetings, it was reported by respondents could have been carried out just as well by telephone while 11 per cent of the telephone calls would have been better as meetings.

Also there were a number of instances where a meeting was preferred but a telephone call was made. Table 2.8 summarizes the reasons for this choice of communication channel. The saving on travel time was the main factor for choosing a telephone call followed by the urgency of the matter to be discussed. Travel cost was not a major influence on choice but was recorded as important by some respondents. Unfortunately this survey did not examine the possibility of the importance of travel time costs increasing with distance between contacts.

The Likely Potential for Substitution of Contacts Between Communication Channels

The potential for substitution of contacts between alternative

communication channels would depend upon:

- the degree to which the contact task can satisfactorily be carried out and
- the overall costs and advantages involved in the re-allocation of the contact to another channel.

In view of the preceding discussion on telephone and meeting contacts it would appear that some potential for substitution between meetings and telecommunications exists. As telecommunication systems other than telephones are not widely used it has been necessary for researchers to simulate telecommunications systems of varying degrees of complexity to specify different levels of complexity within communication tasks and to measure how effectively each task was able to be performed by different media.

The Communications Study Group[1] surveyed a large number of meetings to assess their suitability for being conducted by an audio medium or if that did not appear suitable, a video medium. It was found that approximately 34 per cent of existing meetings consisted only of tasks, the outcome of which would not be affected by the use of audio-medium, enhanced by display graphics if necessary. A further 10 per cent of the meetings consisted of tasks which could successfully be conducted on a video medium but not on an audio medium.

As estimates of the proportion of meetings that could be replaced by telecommunications vary among researchers, it would appear that there is not a high degree of accuracy as yet in these predictions. Goddard's[2] communication survey suggests that around 20 per cent of all meetings could be replaced by audio medium due to the characteristics of such meetings whilst a further 5 per cent

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1. Pye, R., Champness, B., Collins, H.A. and Connell, S. (1973) "The Description and Classification of Meetings", Communications Study Group, Paper No. P/73160/PY

2. Goddard, J.B. (1973) Op. Cit., p.213

could be replaced with document transmission and the opportunity for monthly meetings. Of those meetings recorded as orientation contacts principally because of the numbers of persons present and the wide range of subject matter, he estimates that only 15 per cent could not utilize telecommunications. On the basis of an extensive list of reasons for the choice of face-to-face meetings in the Civil Service, Collins[1] estimated that 40 per cent of these meetings could be performed by a narrow-band telecommunications system, for example, audio conference facilities and 23 per cent by a broad-band system, for example video conferences facilities.

A preliminary allocation model for allocating different types of existing contacts to meetings, broad-band systems, narrow-band systems and telephone calls has been developed by the Communications Studies Group[2]. Contacts are assigned to each medium on the basis of the primary reasons given for selecting either a meeting or a telephone call. It was found that meetings were obviously required for interviews and site inspections and 'soft' reasons such as the need to maintain friendly relations were unlikely to be satisfied even by the broad-band systems. Tasks such as gathering background information presented a difficult consideration as informal discussion may be possible with a broad-band facility. Thus in the absence of any hard facts in this area where background information was given as a primary reason for a meeting, such contacts were allocated on a 50/50 basis to meetings and to the broad-band system. Assigned to the narrow-band system were those contacts which gave as a primary reason the need to exchange, consult or sign documents.

From psychology experiments carried out by the Communications Study Group the exercise of persuasion and assessing of reactions

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1. Collins, H. (1973) "The Communications Impact Models - Stages I and II", Communications Studies Group, Uni. College, Lond., mimeo

2. Goddard, J.B. and Morris, D. (1976) Op. Cit., p.61

could be carried out satisfactorily using wide-band systems. Some meetings involving groups of people and which did not require visual feedback were able to be carried out satisfactorily with a narrow-band audio conference system whilst other group meetings requiring visual feedback needed a wide band system. Where there was no information on the proportion of contacts involving a group that fell into these categories, the contacts which gave as a primary reason the need for a group to take part were allocated to the broad and narrow-band systems on a 50/50 basis. Those contacts giving as a primary reason the need to consult, exchange or sign documents were assigned to a narrow-band system which incorporated document transmission facilities.

Since the allocation model demonstrated that only 20 per cent of those meetings in decentralized location would need to remain as face-to-face contacts, 30 per cent could be allocated to a wide-band system and 50 per cent to a narrow-band system, it is suggested that there could be significant opportunities to reduce communication costs for decentralized offices through use of telecommunications (See Table 2.10 opposite). However given the assumptions made about the input data one could only accept the models results as a guideline. Perhaps the main problem with this method is that the primary reasons emphasize those aspects which are more easily dealt with by telecommunications, rather than the 'softer' reasons which are important as secondary factors. These secondary factors were unaccounted for due to the unavailability of a means of weighting such.

As a result of these problems the Communications Study Group has attempted to carry out a multivariate classification of contacts, using a large number of descriptive characteristics of occurrences in meetings and incorporating findings from psychological experiments on different media and its effectiveness. The following classifications emerged:

- Contacts involving more than 12 persons, inspection of fixed objects, disciplinary interviews and conflict

TABLE 2.10

Allocation of contacts to alternative communication systems

Reason	% Existing meeting	% Type allocation	% Existing telephone
I. Face to Face			
Interview	3.3		0.3
Site inspection	7.0		1.0
Friendly relations	2.7	20.6	3.3
Courtesy	1.0		1.0
Other	1.7		0.3
II. Wide band systems			
Background information	18.3		20.5
Assess reactions	6.3		4.9
Exercise persuasion	3.7	29.8	9.4
Group	24.7		7.2
III. Narrow band systems			
Documents	28.3		48.5
Confidentiality	2.7	49.6	2.9
Inconvenience of telephones	0.3		0.9
TOTAL	300 (100%)	100%	307 (100%)
IV. Existing telephone system			
Telephone satisfactory	44 (13%)		2438 (88.8%)
All contacts	344		2745

Note: Arrows indicate a 50/50 split between each system

Source: Goddard, J.B. and Morris, D. (1976) Op. Cit., p.61

all require face-to-face contacts;

- Contacts which involve forming impressions of others can often be allocated to broad-band systems;
- Other contacts involving policy making, report presentation or delegation of work may be allocated to broad-band systems but at present this is a lack of supportive experimental evidence;
- Contacts involving discussion of ideas, negotiation, giving and receiving of information and problem solving can all be allocated to narrow-band systems.

Application of these results to contacts recorded in a survey of 115 office establishments in various locations in the United Kingdom indicated that 30 per cent of all contacts would need to remain as face-to-face and 38 per cent could be substituted by narrow-band systems[1]. In terms of broad-band systems it was apparent that only 3 per cent of contacts could be allocated to broad-band systems with any certainty with an additional 29 per cent being possible.

Thus, whether or not telecommunications can replace face-to-face meetings without loss in effectiveness of communication is not the only relevant consideration. To assess whether telecommunications could affect office location requirements, operating and moving costs as well as communication costs should be considered in relocation or decentralization proposals. Whilst it has been suggested that economic evaluations of particular communication strategies are of little value due to the large area of uncertainty involved and the speed with which changes can occur in new environments, it is considered that some initial evaluation is required. Firms will not relocate without first knowing where such a move would be cost effective. If government programmes involving financial incentives for decentralizing firms are to be conducted then the likely substitution costs must be arrived at as well as the initial cost of relocating.

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1. Goddard, J.B. and Morris, D. Op. Cit., p.62

In addition to costing individual moves, the use and location of telecommunication facilities needs to be rationalized by government in order that use of such facilities as opposed to travelling to meetings is also cost effective[1].

A model of cost minimization approaches to office location choice has been devised by Pye[2], in order to investigate the possible impact of telecommunications on the economics of office location decisions. It is recognized that other factors such as rent, salaries will constrain office location.

The model assumes that the organization in question will maintain its existing pattern of external communications, that is, there is no abandonment or transfer of meetings occurs. The cost of maintenance of contacts is then compared with savings on rent, rates and salaries - a move of a department from one location to another is classed as cost effective if net savings are positive, that is,

$$\frac{\text{total number of person contacts}}{\text{total number of people in department}} \times \frac{\text{savings in rent, salary and rates in relocating one employee}}{\text{fares cost} + A \times \text{journey time for return travel}}$$

where A = value of time

where X = journey time

This first initial exercise is necessary to form a basis for cost comparison of telecommunication substitution.

Although a move may be cost effective for a firm, assuming a certain value of time A, the organization may not be able to allocate all the time required to maintain contacts, then the model assumes a

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2. Pye, R. and Connell, S. "Survey Methods in Applied Telecommunications Research": A Paper given at the 1973 Conference of the OR Society Torquay, pub. by Communications Studies Group, Joint Unit for Planning Research (Uni. College, Lond), 1973

maximum amount of travelling time, B. The model also includes a constraint on total communicative per man, as up to a certain level in total communication per man, the most cost effective move will be to the region where rent, rates and salary savings are greatest. Above that level the additional resource expenditure required to maintain communication will nullify the additional savings.

If telecommunications are used instead of face-to-face meetings, fares cost and travel time are replaced by the cost of telecommunications i.e.

$$(1 - r)\ (\text{fares cost}) + \frac{r\ (\text{telecoms cost})}{\frac{1}{2}\ (\text{average number of people who attended meetings})}$$

and $(1 - r)$ (travel time)

where r = proportion of meetings replaced by telecommunication. Number of persons in attendance is halved above as it is assumed that 50 per cent will each attend in the 'in house' studies of each firm).

Telecommunications are used in the model whenever they are adequate, whether or not they are cheaper than travel. Both broad-band (e.g. individual or conference television conference systems) and narrow-band telecommunications (e.g. audio conference systems, loud speaking telephones or remote graphic facilities plus telephone) were considered in the allocation of meetings to telecommunication.

On the basis of the approach presented above and a detailed survey of communications of an engineering firm, it was found that telecommunications would not allow a move outside the South East of London of the whole or part of the organization on a cost effective basis. The results were sufficiently marked as to hold more widely and for variations in telecommunications cost. On the other hand the impact of telecommunications in saving travelling time was found to be much more pronounced and in situations where decentralization is ruled out, not on economic grounds but because time could not be spared for the additional travelling, the impact of telecommunications is likely to be much greater. One factor which could have markedly changed the results was the differential between office rents in and

outside the South East. If rents in the South East were to increase, then further decentralization could possibly have become cost effective. This study, whilst of some value in that it considers other constraints besides telecommunication costs does not consider the possible reallocation of some contacts to the new environment and subsequent sources in telecommunication costs.

The idea that geographical separation could affect the potential for decentralization and substitution of contact methods was also pursued by Rhodes and Kan[1]. Having found that movement away from Central London has been over relatively short distances, mainly to other areas within the South East region, they claimed that the predominance of short and medium distance moves was consistent with what could have been expected from a rational decision making process. Generally operating costs were as low in areas only 40-80 miles from London as they were in the provincial centres further afield, in fact they were often lower. Financial savings upon relocation included office rentals and clerical wages which are higher in Central London than elsewhere; in addition government assistance was available. Thus as only relatively small increases in overall savings resulted from offices relocating beyond the South East of England, the extended use of telecommunications was not a relevant consideration. This was also noted in the United States[2] as there is no reason for a firm to decentralize past a certain point and replace face-to-face contacts with contact by telecommunication to reduce travelling costs.

In another study a model was devised by Richard Pye[3] to

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1. Rhodes, J., Kan, A. Office Dispersal and Regional Policy Cambridge University Press, 1971

2. Manners, G. "The Office in Metropolis: An Opportunity for Shaping Metropolitan America", Harvard Joint Centre for Urban Studies Working Paper No. 22, 1973, pp 12-13

3. Reid, A. and Pye, R. "The Effect of Substitution on Communications Damage", Joint Unit for Planning Research, London (mimeo), 1970, cited in Goddard, J.B. Op. Cit., pp 278-279

estimate the proportion of contacts able to be transferred to telecommunication systems of varying sophistication. The basic assumption of the model was that replacement of face-to-face meetings with telecommunications would occur only if substitutions did not reduce effectiveness of communication and there was a saving in costs such as travelling time.

Communication tasks were assumed to have found levels of complexity and the sophistication of the telecommunications system is considered in multiples of the cost of a normal call, for example, T, 4T, 16T. The other factors relevant to the model are length of existing meetings and the extent of physical separation. With estimates for the status of meeting types according to degree of sophistication of required medium, data on meeting lengths and costs for each system (i.e. travel time and costs of system used) the proportion of contacts that would be transferred to various telecommunication at different distance separations were calculated. However this model fails to take into account the overall cost structure of a firm at various locations and the possibility that at a certain distance executive travelling time cost may be prohibitive or that contacts may be lost.

Using the method of comparing costs of telecommunication against costs of travel (as described in the preceding pages which refer to Pye's work), Cook[1] found that the use of audio conference facilities was always cheaper than travelling, but that the use of the studio based visual equipment media such as the British Post Office Confra-vision is seldom cheaper than the cost of travelling. On the basis of Cook's results, it would seem that the greater impact on office location should arise from use of the audio tele-conference media enhanced by graphics display where required. Combining this information with Pye's results above, it would appear that there is potential for telecommunications to replace only 34 per

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1. Cook, A. (1975) A More Detailed Comparison of the Costs of Travel and Telecommunications , Communication Studies Group, Paper No. P/75008/CK

cent of existing meetings in the short and medium term.

However for advanced telecommunications to be able to substitute for external meetings Goddard maintains that the equipment would have to be in widespread use on a public network and that, as the use of tele-conference media such as British Post Office's Confravision is seldom cheaper than travelling costs, the locations found to be most cost-effective are seldom changed just by the introduction of telecommunications. The cost of an initial network investment for video conferences in Australia was found to be high as was the case with terminal investment and manpower training. As the potential for cost reduction is very high, the cost of such facilities at present is expensive[1].

He argues that existing contacts could well be reorganised, on relocation of a firm, rather than entirely lost, but that if improved telecommunications were available, it would be less likely that loss of the contacts would occur. In the case of contact intensive functions with non-replacable contacts in the central area of a major urban centre such as London, telecommunication would be unlikely to reduce travel times for decentralized firms until advanced forms of telecommunication are available on a public network basis. In fact, use of Confraphone and Confravision in established office centres could lead to increased interaction as new contact opportunities are realized. Due to difficulties in quantifying such factors and lack of data, these considerations have not been addressed in the communications research projects outlined above.

Planning Implications

The possible substitution or alteration of contacts telecommunications would constitute an area in which government policy should be developed. In order to consider office location policies

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1. Goddard, J.B. "Telecommunications and Office Location" in Regional Studies Vol II, Pergamon Press (1977) pp 31-46

it is necessary to establish a basic understanding of the possible effects of relocation on communication and conversely the effect of communication advances on relocation possibilities. From a planning viewpoint there may also be energy savings implications if it is possible for telecommunications to influence the future pattern of office location. Finally there may be advantage in selective investment in major office centres in terms of telecommunication and other forms of investment and the resultant availability of higher levels of contact.

SUMMARY OF FINDINGS

The objective of this chapter was to establish that contact requirements of office activities vary according to administrative or organizational factors such as type of business and status, that is, type of department and branch. On this basis contacts of office activities were formally classified to allow inter and intra communication units to be identified as a basis for the establishment of a study of locational requirements. The following summary of findings demonstrates that this objective has been achieved.

Some useful conclusions were able to be drawn regarding the variation in volume of contacts according to organizational structure, type of business, the existence of contact networks and the relevance of this approach in studies involving spatial dimensions. Some understanding of the significance of the type of market, the status level of the labour force, intra-organizational objectives and the different levels of contact tasks were provided by early management studies, however studies of inter office units of communication were of more direct relevance to the study of office location due to the spatial implications involved. Although only univariate techniques were employed in these studies the following results pertaining to methods of contact used, type and frequency of contact according to sector and frequency according to location, sector and status of contact.

Generally it appears that the sectors which are most interrelated with all others are the banking and finance and the professional services sector. Manufacturing and miscellaneous had few contacts with other sectors which in the case of manufacturing, can be explained by the presence of branch offices which would be unlikely to experience the complexities related to manufacturing head offices. The finance sector exhibited a high degree of involvement within itself - other finance and banking exhibiting frequent contacts. These findings established the existence of contact networks.

In terms of total number of contacts banking followed by insurance were involved in the greatest number of daily contacts; property and other finance exhibited low levels of contact. In the case of all sectors most contact was made with customers or clients. Accessibility to market was thus an important contact requirement. Variations in contact patterns occurred on the basis of office status such that branch offices without subsidiaries had small spheres of influence while headquarters tended to have national spheres of influence. Also the higher the firm status the greater was the number of contacts. The number of contacts varied according to whether the firm was located in a central or non-centralized location. In central locations firms exhibited a greater number of contacts whilst firms in outer locations were not as contact intensive. Thus it was established that total number of contacts varied according to status of office activity, type of industry and the centrality of the location of the activity. It was also demonstrated that office activities demonstrated social contact patterns not associated with the office industry. While these patterns are of relevance to town planning policy making, the scope of this thesis does not permit this aspect of contact patterns to be pursued.

Having established the relevance of contact patterns to office location requirements, a conceptual framework relating to different types of contact systems with different tasks and structures was devised in order to gain some insight into the influences and restrictions on the administrative systems of office activities. At least three fundamental types of contact systems can be distinguished:

orientation
planning and
programmed.

Most activities were found to be programmed processes and are related to routine transactions and operate within the contemporary socio-economic environments. These contacts occurred within

a relatively closed circuit as they have been constrained by conditions resulting from earlier planning contacts. The planning processes, the next largest group link potential social values and technologies were concerned more with likely changes in the more immediate environment in which programmed activities operate. Planning processes took the form of a more directed evaluation of development of new possibilities arising as a result of previous orientation contacts. The orientation processes which represented the smallest proportion of total activity were concerned with long term scanning of the environment reaching out to basic science and ideology. Contacts relating to the orientation processes involved wide ranging often random scanning of knowledge and values.

The three following contact networks were able to be characterised by the following contact characteristics:

PROGRAMMED	PLANNING	ORIENTATION
fast short contacts	greater scope of information	difficult problems
much purchasing activity	two-way information exchange	small proportion of total contacts
large proportion of contacts	about 30 minutes contact time	involves most new contacts
small breadth of information exchange	mixed face/telephone contacts	unstructured information exchange
one-way structured messages	well established relations	three or more participants
little prearrangement		at least one week planning time
contact time less than 15 minutes		contact time over several hours
frequent telephone usage		only face-to-face contacts

The establishment of the above framework for classifying contacts provided a means of assessing the strength of contact characteristics as an influence on locational requirements of office activities. In this regard, it was found that the strength of link-

ages between firms in terms of the spatial proximity demanded was able to be determined by an examination of intensity of contact between firms and geographical distribution of contacts by business sector, status group and type of department. Contact travel time and modes of travel used, together with an analysis of the connectivity or degree of involvement of each sector in functional sector groups was also a useful indicator of the degree of inner city spatial organization.

As regards the intensity of contacts amongst the various sectors the greatest intensity of contacts occurred in the finance and business and professional sectors. Within the finance sector "other finance" (which included stockbroking and jobbing, investment banks, building societies, property developers and real estate agents) had few meetings and many phonecalls. In terms of status the number of meetings attended by higher status types of employment such as managing directors increased with status whilst the converse was generally true for telephone calls. By type of department the highest intensity of meetings occurred in buying departments, insurance and finance departments while the intensity of telephone contacts was higher for buying departments followed by export sales, marketing, shipping, transport and distribution. The lowest number of external telephone contacts was experienced by departments essentially servicing the firm, namely typing services and despatch and computer services. It appeared that variations in sectors could be explained by the different occupational structures of the labour force within sectors and that the type of department was also a proxy for job function.

The geographical distribution of contacts was such that a high proportion of contacts were with other firms in Central London (slightly more meetings than telephone calls); the same situation applied to contacts within the whole of London except that the proportion of telephone calls and meetings were similar. This pattern was explained by the high proportion of contact intensive jobs in the inner city area. The financial sectors had more contacts

confined to Central London than manufacturing sectors which tended to have more overseas meetings. Other finance demonstrated the most concentrated pattern of telephone contacts followed by banking and insurance; the reverse order applied for meetings. Within the manufacturing sector, publishing, paper and printing had the highest proportion of all contacts with other firms in the central area while construction followed by engineering and chemical had a high proportion of overseas meetings. In terms of total contacts with Central London, professional and business services fall between manufacturing and finance, however business services tended to serve a local or Central London market and the professional services, a wider market. These patterns were explained by the fact that some sectors are more export oriented than others and hence serve wider markets as reflected by their geographical distribution of contacts. Other sectors either serve a local market for example business services, or are closely related to a highly structured internal market for example some components of the finance sector.

The following findings demonstrated the relevance of contact networks to office activity location. By employing various indices of concentration, communality and connectivity the degree of connectivity of each sector to the business contact network was able to be weighted according to concentration of contact flows, number of indirect linkages and involvement with other sectors. Those sectors which had a high connectivity to the contact network included banking, retailing, general construction and central government. Sectors like primary industry, textiles, commodity broking and insurance demonstrated a low connectivity while sectors like specialist construction demonstrated a moderate degree of connectivity. A detailed analysis of the characteristics of business contacts and the classification of such into three basic profiles allowed linkages to be weighted according to need for spatial proximity. The three profiles produced could be equated with orientation, planning and programmed types of contacts and were classified according to length, number of participants, pre-arrangement, range of discussion, feedback, trading and media.

Contact strength appears to vary according to status, department, sector and between individual firms.

The relevance of individual job status and type of department to contact requirements was able to be established. On the basis of status, individuals at the highest status level dealt with the highest proportion of orientation contacts whilst the proportion of programmed contacts decreased with increase in status. All groups of executives had some contacts of each type. Although contact differences may be a function of job status, equivalent job functions in different departments may involve different types of contacts. Organization and methods departments involved more orientation contacts for equivalent status jobs than accounts and buying departments. Those departments with below average orientation contacts included sales, production, property, insurance, information services, client relations, financial, buying, accounts, export, transport and distribution and company records. There was no clear distinction in the ranking between the sector for example, the services, finance and manufacturing sectors. However, within the sectors some ranking was possible. In the finance sector, banking had above average orientation contacts and insurance and other finance fall into the below average category. Professional services differ from business services in that the former had a higher proportion of orientation contacts. At the level of the individual firm it was found that all firms needed to maintain both orientation and programmed contacts.

It was established from an investigation of the potential impact of telecommunications that the approach to office location espoused was legitimate despite changes in technology and changing attitudes towards telecommunication. In the short term, cost, lack of publicity and attitudes may hinder the transfer of those tasks such as face-to-face contacts to other media but there are some tasks which are unlikely to be transferred to other media. Given also the relative operating and moving costs of firms in various locations, telecommunication may not be a major influence on office

location. Loss of contact and uncertainty may also reduce the impact of telecommunications but the main impact will be in routine contacts. The potential to generate new clients and to maintain existing customers is an important consideration. It was found that orientation functions such as these tasks are unlikely to be replaced by telecommunications. Thus the potential to transfer contacts to various media depended upon the level of the task.

Although the availability of a combination of advanced telecommunications services could conceivably make it possible for office work to be performed in a wider variety of locations, however, the technologies that this concept encompasses still require further development. As teleconference and audio-conference facilities are not widely known a good deal more publicity is required before demand for these services is likely to increase. Additionally there is a need to satisfy the psychological requirements of users by improving the quality of services offered. It has been suggested that confravision which is presently in black and white should be converted to colour. Audio-conference facilities need to be improved to produce a more 'lifelike' atmosphere whereby participants may have a better indication of who is speaking and who wants to speak to allow a more orderly inter-group interchange. At present, the cost of setting up teleconferencing facilities is very high due to the number of telephone lines which are required. These costs will need to be reduced in order to encourage increased patronage, however, developments such as cost reductions and improvements in services would probably have to await an appreciable increase in demand. Whilst teleconference facilities can be set up for virtually any group of locations, teleconference facilities which are available between a very limited number of locations would better fulfil communication needs if extended to a greater number of cities. Such equipment would need to be in widespread use on a public network but the location of public telecommunications studios may have to be limited to major office centres which are easily accessible to other centres due to the high cost of setting up the studio facilities.

Given that the above technological advances were made on a cost effective basis, it could not be assumed that communication tasks could be transferred to other channels of communication satisfactorily. Some transfers may be able to occur depending upon the nature of the task involved and more specifically the type of contact to be made. Some communication channels are more effective than others for different types of contacts as was demonstrated by a number of experiments which were carried out both in the laboratory and in the 'field'.

Observations suggest that the choice of a particular telecommunication channel and the potential for substitution of contacts to different communication channels depends upon whether the contact is of the programmed, planning or orientation variety. It is unlikely that orientation contacts could be transferred to telecommunications channels due to the need to suppress informal communication and the inability to transmit 'non verbal' communication characteristics. Meetings of a programmed nature which involve the giving and receiving of information between familiar participants could be dealt with by telephone. Planning contacts which also involve familiar individuals and frequently two way discussions could probably be carried out using telecommunications with the aid of document transmission facilities. Programmed meetings involving physical inspection of a fixed object or personality assessment could not be replaced by even an advanced video system.

Having examined the factors governing the choice of telecommunication medium, it would appear that some potential for substitution between meetings and telecommunications exists depending upon the degree to which the contact task could be satisfactorily carried out and the overall advantages and costs involved in the reallocation of the contact to another channel. It is likely that contacts involving more than 12 persons, inspection of fixed objects, disciplinary interviews and conflict will all continue to require face-to-face contact regardless of whether the task is of the planning, orientation or programmed type. Contacts which involve forming

impressions of others can often be allocated to broad-band systems such as confravision, whilst contacts involving policy making, report presentation or delegation of work may be allocated to broad-band systems but at present there is a lack of supportive evidence. Those contacts involving discussion of ideas negotiation, giving and receiving of information and problem solving can all be allocated to narrow-band systems such as audio-conference facilities with or without supportive document transmission facilities.

To assess whether substitution of contacts from one communication channel to another is feasible in terms of whether it would affect office location requirements, it is necessary to consider not only factors such as effectiveness of communication but also the operating and moving costs of firms and new contact opportunities for different locations and the relative benefits of telecommunication facilities.

The notion that the decentralization of offices might be facilitated when the substitution of telecommunications for transportation becomes an effective alternative, needs to be examined in the light of a multiplicity of factors pertaining to whether decentralization is 'desirable' and whether it is or could be made cost effective, or in fact profitable as demand factors could be influenced by a relocation. These factors such as rent, rates, salaries and availability of staff are discussed more fully in the chapter relating to economic considerations. It has been found that telecommunications would not allow a move on a cost effective basis except in the case of very short distances, for example from Central to South East London. This was thought to be due to the fact that operating costs in areas within approximately 80 miles from the centre of large cities were the same or less than similar costs in provincial centres. Thus due to relatively small increases in overall savings or lack thereof, the extended use of telecommunications may not be a relevant consideration in all cases.

On the other hand the impact of telecommunications in saving travelling time was found to be much more pronounced and in situations where decentralization is ruled out not on economic grounds but because time could not be spared for the additional travelling time, the impact of telecommunications is likely to be greater. While the use of audio-conference facilities is always cheaper than travelling the use of the studio based equipment media such as confravision is seldom cheaper than the cost of travelling.

It is acknowledged that the approach adopted in this chapter does not take into account the changing nature of office technology, economic and social changes, whether the rate of office employment will continue unabated or whether office workers will perform the same functions with the passing of time. Although this dimension is beyond the scope of this particular study it is considered that further work is necessary to address the changing nature of office work and its implications for location and use of urban land.

While the results of this chapter are useful for conceptual purposes, the findings are not sufficiently detailed or cross referenced to facilitate town planning decisions to be taken in relation to office location issues. Far more rigorous analysis in terms of different conditions in the environment is required to show how linkage patterns are location dependent at the level of the individual office activity. This aspect is further developed in the ensuing chapter dealing with environmental structure.

Chapter 3 Environmental Structure

Chapter 3 - Environmental Structure

INTRODUCTION

This chapter deals with the opportunities and restrictions experienced by an office activity attempting to carry out essential activities which are dependent upon different conditions in the environment. In the past little attention has been paid to the critical functional differences between offices. Whether these differences are of major significance within the city centre and whether the activities of one type of office are frequently complementary to one another are matters which are addressed by employing univariate spatial and multivariate spatial and contact studies.

In order to address these issues this section of the study stems from the proposition that the linkages between offices constitute a city centre activity system containing a number of interrelated sub systems, that the environmental opportunities and restrictions are changing in respect of some office activities and that there are certain basic requirements of the office activity which have to be satisfied. Consideration is also given to the fact that the importance of highly centralized office locations may be exaggerated by management or by the observer and to the possibility that locational requirements of some types of office activities may be changing in response to certain factors.

In the previous chapter the relevance of contacts requirements to the development of an office location theory was established and contacts were classified in a manner which allowed their relative importance to be assessed for various office activities. This chapter contributes to the overall aim of the thesis by extending the concept of organizational requirements to incorporate environmental influences and restrictions operating on the firm, for example market area

accessibility, external economies, interdependencies between firms and other contact requirements.

It is proposed to structure this chapter in the following manner. Initially patterns of office centralization in city centres are examined to determine the prime users of office space and to obtain a general understanding in relation to spatial groupings of all office activities in the city centre. In order to assist in the drawing up of lists of office locational requirements, to provide an understanding of internal and external market area concepts and external economies relevant to the office firm, the principle findings of univariate studies of the spatial organization of office activities are employed. Methodologies for identifying such groupings, namely direct mapping, delimitation of clusters on the ground and the limitations of such techniques are then discussed.

At this point it is intended to address other issues which have emerged including the importance of the externality of the geographical market area and to classify such market areas according to the economic base of the firm and geographical penetration of the market area. It is then attempted to relate these market considerations to office activities and their locational requirements.

The concept of networks of office activities in the city centre is more rigorously pursued through various multivariate analyses which interpret regularities in the spatial distribution of office activities. In order to test for historical inertia and to determine the relative strengths of office activity linkages contact flows within and between sectors are identified and networks isolated. This concept is further developed by carrying out the above analyses for different contact media in relation to variables such as office industry, type of department and status of firm.

Having identified those types of office activities which are the prime users of or operate in structured networks in city centres

in order to deduce which office activities do not require highly centralized locations, the following analysis is proposed. The locational patterns of office activities which operate in decentralized* locations are to be examined to ascertain which environmental factors or characteristics such as contact requirements and market considerations are necessary for the functioning of these activities. This section of the chapter dealing with decentralizing office activity patterns attempts to assess the type or level or part of firms involved in this process and the environmental restrictions and influences which govern the location of such activities.

This chapter is important in relation to the overall thesis aims as the urban policymaker must comprehend the structure of the environment in order to establish similar structures in remote growth centres, to alter existing urban patterns to reduce adverse impacts or to plan for provision of future services and utilities. On this basis, it is anticipated that some planning principles will emerge as a result of increased knowledge pertaining functional business environments, external economy requirements the influence of industrial sector, status level and type of market on office activity location, the need for complex contacts which only exist in particular locations. The affects of physical and social environmental conditions on office location is also relevant to the policymaker's understanding of office activity location.

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* The term decentralization is intended to be used in the widest sense of the word to include functional expansion at the periphery of the city.

PATTERNS OF OFFICE CENTRALIZATION IN CITY CENTRES

In the city centre functional differences may be of major significance as the activities of a particular type of office establishment are often complementary to those of another; this type of complementarity frequently enables firms to derive external economies which give rise to interaction between different offices. From a spatial analysis of office activities, functional associations may only be inferred but from such a study one may gain some insight into how far links depend upon close spatial proximity and an indentifiable contact network may be determined by comparing how far the locational grouping patterns correspond to functionally linked groups of offices.

Starting with the hypothesis that the linkages between offices constitute a city centre activity system containing a number of inter-related sub systems, it is considered that much may be learnt from an analysis of the static state of the system in which linkages are expressed in the form of locational associations and clusters of offices.

The spatial patterns of office activities in city centres of the United States, Great Britain and Australia were chosen as the basis for the following description of office concentration patterns. This choice depended largely upon the availability of data.

Patterns of Industrial Headquarter Activities

The New York Region contains one third of the nation's top 500 industrial corporations which control approximately 40 per cent of the corporate wealth of the nation and one fifth of the top 50 banks. Most of this wealth is concentrated in the Manhattan C.B.D. which houses 40 per cent of the Regions employment in the top 8 per cent income bracket[1]. In 1963, New York Region contained 168 head-

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1. Armstrong, R.B. (1972) The Office Industry: Patterns of Growth and Location. A Report of the Regional Plan Association, M.I.T. Press, Cambridge, pp 56-57

quarters or one third of the nation's top industrial front offices and on an intra-regional basis 28 per cent of the U.S. total were located in the Manhattan C.B.D. These firms control a disproportionate share of total office activity - 39 per cent of the nation's assets, 38 per cent of net profits and 39 per cent of its invested capital[1].

'Downtown' is the prime location for national and regional headquarters[2]. The location of the industrial headquarters in New York as reviewed by Armstrong[3] is as follows. The manufacturing headquarters located in the New York Region specialize in non durable goods such as apparel or printing and publishing. A comparable prominence however, is shown in industries whose production component in the Region is small, such as chemicals and textiles. A noteworthy characteristic regarding the location of these industrial headquarter jobs is that twice as many 'non durable' oriented head offices preferred locations in central New York. Although the diversity of New York's headquarters operation is considerable the headquarters of predominantly non durable goods accounted for 56 per cent of the total elite headquarters in New York, the leading industrial sectors being the chemical products group, the petroleum industry, food and electrical machinery sectors. These top four industries controlled nearly two thirds of the sales assets and invested capital. The remaining corporate sectors performed well above the level of any other corporate area. Whilst nearly three quarters of all manufacturing detached front offices in the New York Region are housed in the C.B.D.[4] not all industry types seem to centralize there to the same degree.

In the extractive industry sector nearly four fifths of all mining front offices have chosen the Manhattan C.B.D. as their base

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1. Armstrong, R.B. (1972) Op. Cit., pp 59-61

2. Jones, D. & Hall, R. (1972) "Office Suburbanization in the United States" in Town and Country Planning, Vol. 40, pp 470-473

3. Armstrong, R.B. (1972) Op. Cit., pp 62-69

4. Armstrong, R.B. (1972) Op. Cit., p.69

for administrative functions. The 50 mineral headquarters provide over 2,000 jobs and are about one third the size of manufacturing front offices but the non metallic industries site less than half of their front offices in Manhattan C.B.D.[1]

In Australia company control is strongly concentrated within Sydney and Melbourne, their minimum proportion of total assets being 79.5 per cent in oil exploration and their maximum 98.3 per cent in life insurance[2]. Melbourne appears to be the industrial centre leading Sydney in transport and production. Like New York and London, Sydney has an all round strength in the types of assets it controls but with some areas of specialization. Melbourne has quotients[3] of less than unity in investment and building. Table 3.1 shows the importance of Melbourne in terms of production. Melbourne is more important than Sydney in every category except food, drink and tobacco. Generally Sydney is over-represented in all categories except vehicles and wood products.

An examination of office space by industry in Sydney's C.B.D. bears out the results of Johnston's work (see Table 3.2), the manufacturing sector ranked third in importance as a user of floorspace in the private sector (excluding government activities such as utilities).

As would be expected the percentage for each industry as a proportion of C.B.D. employment was similar to the percentage floorspace occupied by each particular sector. Overall, Sydney's C.B.D.

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1. Armstrong, R.B. (1972) Op. Cit., p.88

2. Johnston, R.J. (1966) "The Australian Scene - Commercial Leadership in Australia" in The Australian Geographer, Vol. 10, pp 49-52

3. The location quotients are calculated as:

$$\frac{\text{\% of function located in the centre}}{\text{\% of Australian population located in centre}}$$

and the population percentages used are: Sydney 20.8, Melbourne 18.2, Brisbane 5.9, Adelaide 5.6, Perth 4.0 and Hobart 1.0

TABLE 3.1

BASIC DATA: COMPANIES IN THE SURVEY AND THEIR TOTAL ASSETS

	Companies	Total Assets (£'000)
Production	505	4,169,793
Trading	152	1,416,193
Investment	30	182,873
Finance	50	5,812,106
Life Insurance	30	1,931,347
Non-Life Insurance	30	244,246
Entertainment	20	74,177
Building	20	110,415
Transport/Utilities	30	371,967
Oil Exploration	20	88,308

Source: A Directory to the Top 1,000 Companies. Australia and N.Z. 1964. "The Australian", 26th October, 1964. From this source one group of data relating to Transport/Utilities with no equity capital has been omitted here.

Source: Johnston, R.J. (1966) Op. Cit., p.49

TABLE 3.2

TOTAL ASSETS CONTROLLED IN PRODUCTION CATEGORIES: LOCATION QUOTIENTS

	Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Other
Agriculture	1.40	3.12					.32
Mining	1.54	1.79	5.09	.05	.38		.08
Cement, etc.	1.71	2.98		.39	.55		.13
Fuel/Chemicals	2.23	2.68		.23	.32		.03
Engineering	1.42	3.41	.29	.36	.72		.10
Vehicles	.72	4.06		1.36			.08
Clothing/Textiles	1.15	3.48		.98		.91	.14
Food	2.48	1.16	.81	.46	.60	1.73	.15
Wood Products	.68	3.49	.68	.30	.42		.33
Others	2.12	2.48	.32	1.20	.30	.36	.01

Source: As Table 1.

Source: Johnston, R.J. (1966) Op. Cit., p.51

contained approximately 46 per cent of the total metropolitan office workforce.

Information pertaining to the number of establishments in the Sydney C.B.D. was unavailable but some data pertaining to status of office function was procurable. Administrative head offices occupied 40 per cent of the total floorspace in the C.B.D. and administrative branch offices, 27.5 per cent[1]. The remaining floorspace was divided between professional offices (5.2 per cent) and other offices (3.8 per cent). However this classification of office space is misleading to the extent that the classification of administrative headquarters includes all those small offices which do not have branches. A ratio of head offices to branch offices of 1.49 for Sydney is very high considering that Manhattan's C.B.D. which has an extremely large number of manufacturing as well as finance and insurance headquarters only has a ratio of 0.91[2]. If New York's situation is used as a guide, probably one half to one third of the headquarter establishments in the Sydney C.B.D. are small firms which have only local or regional influence.

An examination of the concentration of the assets of 'big business' in Great Britain reveals that there is a large concentration of industrial and service headquarters in London. Of the top 500 companies which control 49.9 per cent of the assets concerned, 36 per cent have headquarters in London. Most of these offices are concentrated in the financial centre, the City of London and the more general office district in the West End[3]. Within the manufacturing industries the strongest concentration in London are the chemical and allied trades and electrical engineering, paper and printing, and the

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1. City of Sydney Council (1978) Op. Cit., p.48

2. Armstrong, R.B. (1972) Op. Cit., Table 4.6, p.97

3. Morgan, W.T. (1972) "The Geographical Concentration of Big Business in Great Britain" in Town and Country Planning, Vol. 30, pp 122-124

category of building materials, pottery and glass[1]. There were 450 offices of manufacturing companies in 1964-1966 with a total employment of over 12,000 in the City of London. This included the head offices of major national and international companies but also a large number of offices of smaller firms and small departments of firms whose main activities were elsewhere[2]. There was little evidence of any movement into the City but there were at least twice as many head offices of manufacturing firms in the West End than in the City. It appeared that whilst manufacturing offices had a good reason for being in London links with the City itself were not very strong.

In Britain, the provincial centres either contained head offices which were either attached to the industry in that location where the industry operated or if detached from the plant were branch or local offices. Head offices detached from a plant very rarely located in the provincial centres. In Lancashire, Yorkshire and Bristol the head offices were attached to cotton, wool and tobacco plants respectively[3]. All of the office activities in smaller cities tended to be concentrated into the city centre[4]. This was due to the severe market area constraints of the firms which were local independent or regional branch firms[5].

As opposed to the British situation, smaller fast growing cities whose populations are between 1 and 1.5 million in the west and south of America have been gaining headquarters[6] (Houston, Atlanta).

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1. Ibid. pp 122-124

2. Ibid. p. 312

3. Morgan, W.T. (1962) Op. Cit., pp 122-123

4. Daniels, P.W. (1977) Op. Cit., pp 268-269

5. Horwood, E. and Boyce, R. (1959) Op. Cit., p.80

6. Quante, W. (1976) Op. Cit., p.78

* The banking, insurance, finance and agriculture sectors were excluded as these were operating primarily overseas-

Firms are tending to concentrate in smaller cities with only one or three headquarters each[1].

In the case of Leeds a British provincial centre of approximately 1.3 million population, studies have revealed that within the central area most offices were branches (57 per cent), the financial and manufacturing offices being most frequently represented in the branch offices[2].

The manufacturing offices were more regionally oriented; 83.3 per cent served West Riding or the north of England and many manufacturing firms had regional offices in Leeds. On the other hand finance companies proved to be more locally oriented, one third of them serving on the Leeds locality.

In so far as employment is concerned manufacturing offices have the highest percentage of their total in the central area of Leeds - only a quarter of manufacturing offices are outside the central area. This was due no doubt to these branch offices being primarily sales offices and requiring a central location with good communications. No conclusions however were able to be made about the type of industry and location due to there being insufficient manufacturing offices within the city.

Patterns of Office Activities in the Finance Sector

Apart from manufacturing headquarters there is a large concentration of financial activities in Manhattan C.B.D.[3] In the C.B.D.'s of American cities banking is heavily concentrated in

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1. Ibid, p.78

2. Facey, M. & Smith, G. (1968) Offices in a Regional Centre: A Study of Office Location in Leeds, Research Paper No. 2, L.O.B., Lond.

3. Robbins, S.M. and Tenleckyj, N.E. (1960) Money Metropolis, Harvard Uni. Press, Cambr. Mass., pp 25-147

economic and spatial terms although the former activity is always more concentrated than the latter[1]. Large corporations operating across the United States and whose credit demands exceed legal lending limits of many banks have national market areas for banking services. Corporate accounts provide the major source of the commercial deposits which are concentrated in the C.B.D. offices of American cities[2]. The headquarters banks perform a nationwide service and have 68 head offices in Manhattan plus 62 in the rest of the core but due to restrictive state laws there are a considerable number of main office banking institutions in the core area of New York. These service predominantly subregional markets - and outnumber head office establishments by a ratio of nearly 6:1 in the C.B.D. and total core areas. In comparison to 600 headquarters offices in the C.B.D.[3] there are 68 banking headquarters (or 130 in the core area of New York[4]). Whilst Manhattan contains only 14 per cent of the main offices of commercial and savings banks in the New York area, it holds 66 per cent of the deposits of the Region on account[5].

In large American cities insurance activities are present in the C.B.D. and have exhibited some outward movement to the C.B.D. frame[6]. New York's leadership in the financial world exhibits a less renowned role in life insurance underwriting. Of the 50 leading life insurance companies controlling five sixths of all life insurance assets in the nation, 9 are located in the New York Region and 7 in Manhattan C.B.D. -

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1. Bies, S. (1977) "The Future of C.B.D.'s as Financial Centres of Metropolitan Areas: A Demand Analysis" in Journal of Regional Science, Vol. 17, No. 3, p.433

2. Ibid, p.440

3. Armstrong, R.B. (1972) Op. Cit., p.73

4. Ibid, p.83

5. Ibid, p.84

6. Horwood, E. and Boyce, R. (1959) Studies of the Central Business District and Urban Freeway Development, Uni. of Washington Press, Seattle, p.70

these insurance giants control nearly half of the total assets of all life insurance companies in the nation[1]. Of fire and casualty insurance activity, nearly 20 per cent of the nation's property insurers are located in the Region with nearly 80 per cent being located in Manhattan C.B.D.[2]. It is clear that although property insurance is a smaller business venture in New York than the practice of life underwriting, the geographical segregation of property insurance firms rarely occurs (as may the population oriented life insurance) as Manhattan provides them with concentrations of customers, agents and brokers. Probably the most important factor that prevents many life insurance companies from moving is the ownership of central buildings which are usually hard to liquidate[3]. Those parts of the insurance companies more prone to locating in the C.B.D. of New York are the sectors concerned with higher level functions as opposed to servicing and selling functions[4]. The insurance companies in the C.B.D. chose exposed locations to show permanence and solidarity to the public mind[5].

The two stock exchange offices in New York which have retained their historic preference for lower Manhattan C.B.D. represent but a nominal source of office employment in themselves. Their main contribution is their ability to create demands for office space among their members. The entire stock exchange community accounts for a quarter of the financial employment in lower Manhattan and employs about 50,000 personnel[6]. As a whole the executive functions of the securities industry have continued to structure its location around the major corporate headquarter concentrations in the Region[7].

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1. Ibid, p.70
2. Ibid, p.70
3. Horwood, E. and Boyce, R. (1959) Op. Cit., p.70
4. Horwood, E. and Boyce, R. (1959) Op. Cit., pp 69-70
5. Ibid, p.70
6. Armstrong, R.B. (1972) Op. Cit., p.86
7. Ibid, p.86

The vast majority of employment in the finance sector in the Sydney Region is concentrated in the Sydney C.B.D. As can be seen from Table Sydney is the financial centre of Australia having high location quotients for investment, finance, life insurance and non life insurance[1]. An examination of office space by industry in Sydney bears out the results of Johnston's work - finance investment and insurance occupy nearly 30 per cent of total floorspace, both private and government, in the C.B.D.[2] If floorspace occupied by government, departments, enterprises e.g. Qantas and statutory authority are excluded then finance investment and insurance are found to occupy quite a substantial proportion of occupied floorspace in Sydney's C.B.D. - 40 per cent (approximately one third of this is occupied by the insurance sector). (See Table 3.3 below).

TABLE 3.3

ANALYSIS OF OFFICE SPACE BY INDUSTRY CODE (SYDNEY C.B.D.)

Industry	% of office floorspace (M^2) in C.B.D. 1976		% of daily continuous employment in C.B.D. 1971	1976
Public Administration and Defence	21		12.4	19.1
Finance Investment	16)			
Business Services and Real Estate	13)	38%	30.2	32.7
Insurance	9)			
Utility Services (electricity, gas, water, communication)	8		8.9	9.6
Manufacturing	7		7.3	6.5
Communications	7		5.2	4.7
Transport and Storage	6		7.9	5.7
Wholesale Trade	6)			
Retail Trade	3)	9%	18.7	14.1
Entertainment, Recreation, Restaurants, Hotels, Clubs	2		4.8	6.2
Mining and Agriculture	2		0.8	1.0
Others including construction personal services	insignificant		-	-

Source: City of Sydney Council (1978) Op. Cit., pp 26, 42 and 1971 Journey to Work Data

1. Johnston, R.J. (1966) "The Australian Scene - Commercial Leadership in Australia" in The Australian Geographer, Vol. 10, pp 49-52

2. City of Sydney Council (1978) Central Business District Study, pub. by City of Sydney Council, 1978, pp 26, 42

Although office space is prevalent throughout the Sydney C.B.D., over 41 per cent of all occupied office space is located in the 'core' area bounded by King, Clarence, Macquarie, Bridge and Grosvenor Streets, the focus of the core being Hunter Street[1]. See Figure 3.1 . Some insight into the pattern of office activity is able to be gained by examining the distribution of industry groups. The finance and investment group is broadly distributed across the C.B.D. but there is a marked concentration around O'Connell Street and the Stock Exchange. Most office space in the insurance sector is located within the office space core. These blocks next to Alfred Street and towards the northern end of Clarence Street contain significant amounts of insurance oriented office space.

In Great Britain the City of London conducts vast amounts of business in finance, insurance and overseas holdings whilst the West End location has been favoured by the control functions of the manufacturing industry[2]. The spatial distribution of employment of the leading office and shopping activities in the City as defined in Figure 3.2 has been analyzed in considerable detail by Morgan and Dunning whose studies show that financial activities including banking finance and insurance account for nearly half of the total office employment in the City[3]. The 'Bank' precinct is the centre of the financial district whilst other industries have shown quite distinctly different patterns of spatial preferences in the City.

There are particularly specialized sectors such as Lloyds, the Bank, Smithfield and Finsbury in which insurance, banking, wholesale markets and banking/finance are concentrated respectively[4]. The particular linkages within and between these activities are discussed in ensuing sections of this chapter.

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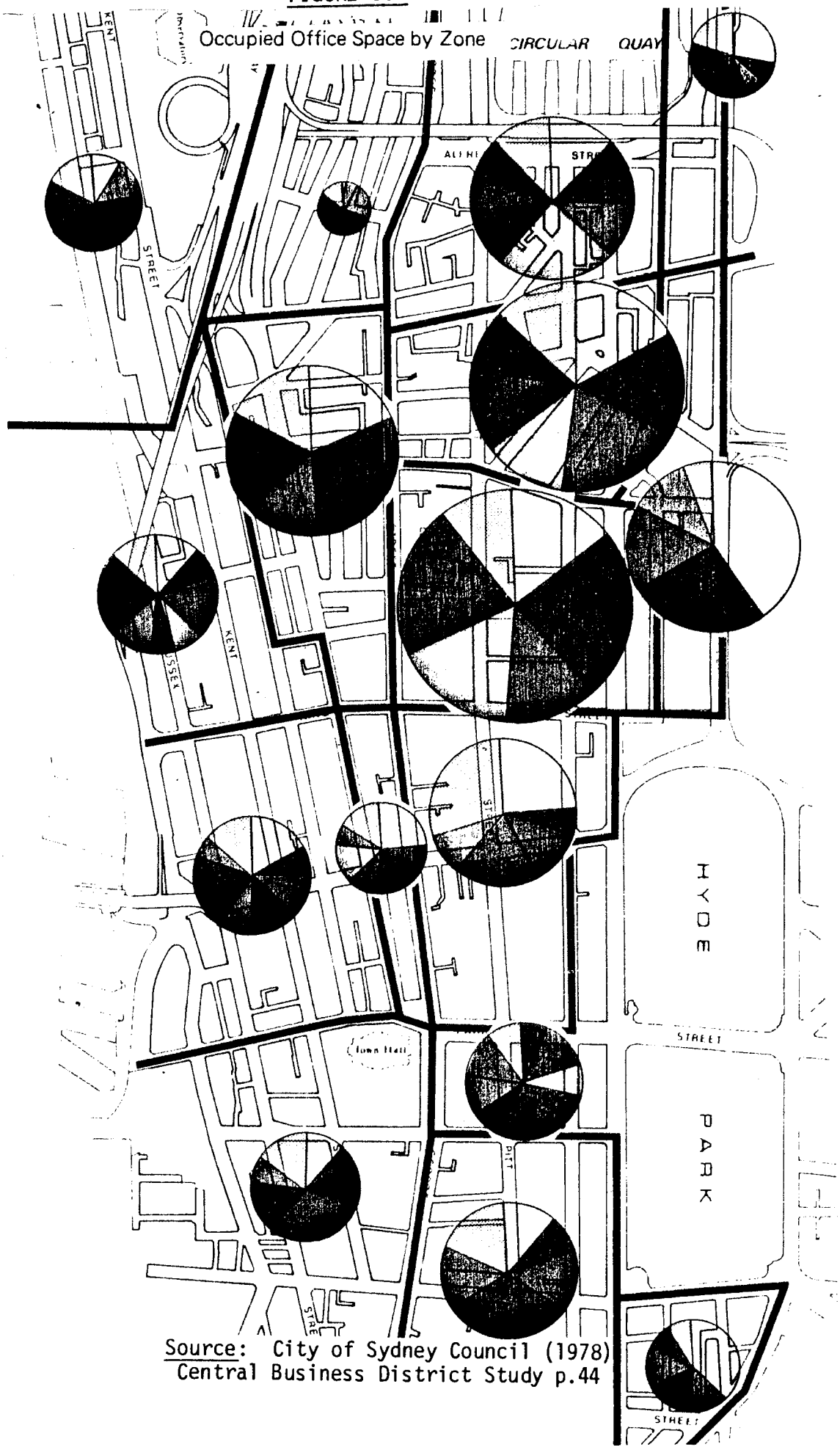
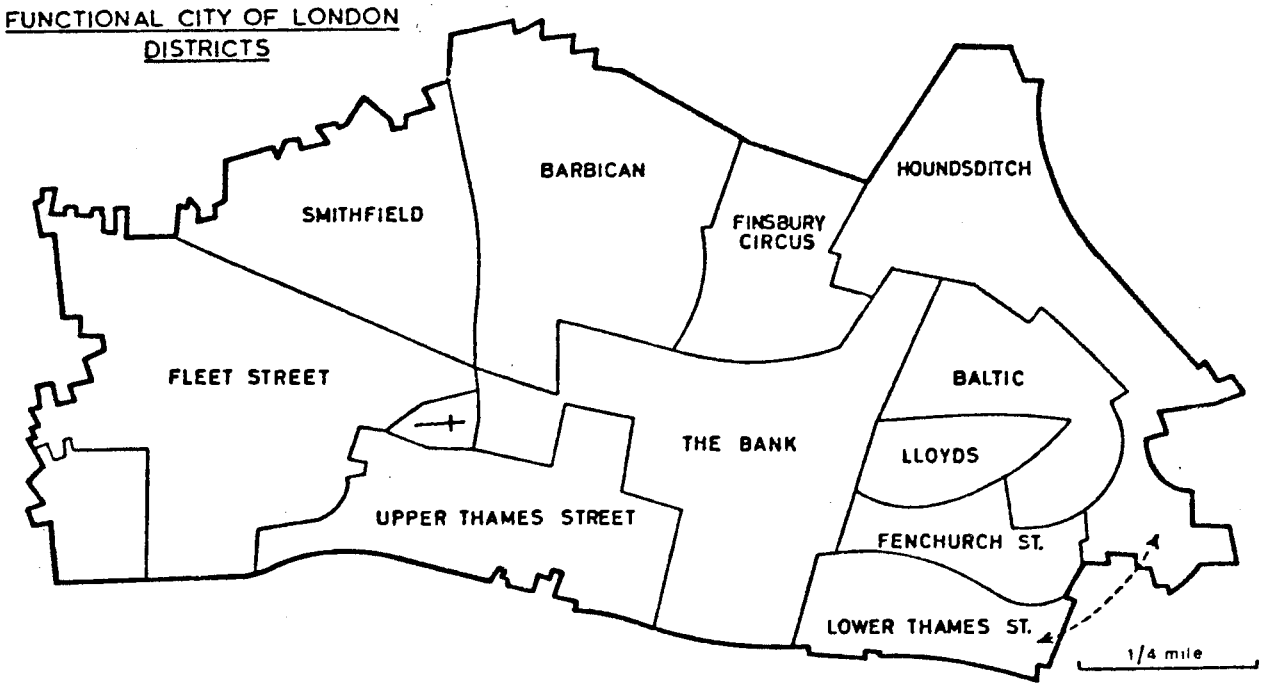
1. City of Sydney Council (1978) Op. Cit., p.42
2. Morgan, W.T. (1962) Op. Cit., p.124
3. Dunning, J. and Morgan, E. (1971) An Economic Study of the City of London, Allen and Unwin, Lond., pp 71-78
4. Ibid, pp 76-78

FIGURE 3.1



Source: City of Sydney Council (1978) Central Business District Study p.44

FIGURE 3.2



Source: Dunning, J. and Morgan, E. (1971) An Economic Study of the City of London, Allen and Unwin, Lond., p.70

Within the finance sector, the insurance group is a particularly important activity in the City of London office network. Of about 500 insurance companies located in the United Kingdom at least 280 are located in the City including 7 of the largest insurance companies which account for 36.5 per cent of premium income of all life insurance companies[1]. As is the case in the United States the fastest growing sectors are ordinary life business which is one of the chief outlets for personal savings. The next main activity is the investment of premium income. Next to joint stock banks they are the largest financial intermediary in the U.K. economy - London is the largest international insurance market in the world with most of its business being concentrated among the larger insurance companies[2].

As Table 3.4 shows the distribution of office employment by sector in London is roughly comparable to Sydney and Manhattan's distribution of C.B.D. office activities, the major area of office employment being within the finance industry and in the case of Manhattan, in the manufacturing sector.

TABLE 3.4

LOCATION OF OFFICE WORKERS BY INDUSTRY IN THE CITY OF LONDON 1961 MANHATTAN C.B.D. 1965 AND IN THE CENTRAL BUSINESS DISTRICT OF SYDNEY 1971

	PERCENTAGE OF EMPLOYMENT		
Industry	C.B.D. Sydney	City of London	Manhattan C.B.D.
Manufacturing and Extractive	8.1	9.5	20
Transport and Communication	-	-	-
Distributive Trades	6	7.3	
Insurance, Banking and Finance	)	28.7)	)
Professional and Scientific Services	) 30.2	6.9) 35.6	) 30
Other Services	-	-	-

Sources: Dunning, J. and Morgan, E. (1971) Op. Cit., pp 60-61
City of Sydney Council (1978) Op. Cit., pp 26, 42
and Armstrong, R.B. (1972) Op. Cit., p.93

1. Dunning, J. and Morgan, E. (1971) Op. Cit., pp 60-62

2. Ibid

As regards the banking and finance sectors, Dunning and Morgans[1] spatial and economic study of the City of London has derived the following patterns of location. Investment and unit trusts are highly concentrated in the City however hire purchase finance is not. Four firms exist there and the remainder of the major ones are outside London. Although finance houses (in which banks are often shareholders) have dealings with the banks and the discount market, their main operations are linked more with the stores and garages throughout the country where the customers are located. Building societies and property companies are found in the City in small numbers and without very strong linkages with other activities in the City. Pension funds are managed by merchant banks or head offices concerned or insurance companies and are bringing an increasing amount of work to the City.

In Leeds few firms served the nation (7.7 per cent), rather its role as an office centre lay in its services to the region and to the city itself[2]. Most of the offices in the centre were found to be serving the whole city. Facey and Smith[3] point out that this reflects the emphasis 'quasi' retail character of banks and building society branches also the sales office function of manufacturing offices acting on behalf of parent firms. Within the finance group the property and finance companies served the widest range of areas from the region to local areas whilst the insurance firms had predominantly regional spheres of influence.

The financial sector appeared relatively compact with half being in the inner core and a second concentration occurring in the northern part of the city due, it seems, to the presence of a large number of banks there. Generally the banks were distributed in the outer suburban residential zones whilst the remaining third consisted of larger establishments located in the central area. Over three quarters of the insurance firms were concentrated in the inner core.

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1. Ibid, p.315

2. Facey, M. and Smith, G. (1968) Op. Cit.

3. Ibid

After the insurance firms the finance and property firms were the next most concentrated group in the central area. The insurance and property firms clustered in separate areas having weaker spatial links with other city centre functions.

The Services Sector and Other Office Activities - Patterns of Concentration

Other concentrated activities which generate employment in detached central offices but fall short in terms of control administrative activity are wholesale trade, retail trade and selected services; these sectors are generally less centrally oriented firms than manufacturing but in terms of employment, however the services sector generally has a greater C.B.D. commitment than manufacturing[1].

For non goods producing firms in New York, the degree of centrality of the headquarters location seems to be determined by the need for market aggregation as opposed to inter-firm contact. Two thirds of New York Region's total service industries are located in Manhattan C.B.D. whilst four fifths are located in the core area[2]. Although the retailing headquarters concentration in the core approximates that of services, the C.B.D.'s share of total retail offices in the Region amounts to less than 60 per cent and wholesaling activity exhibits the least central preference with half of the Region's share of such offices being located outside the Manhattan C.B.D.[3]. However wholesaling cannot be considered a dispersive industry as the major portion of its activity is located between the C.B.D. and the intermediate ring near related establishments industrial producers[4]; the wholesaling offices employ fewer workers per establishment than do manufacturing offices[5].

1.

2. Armstrong, R.B. (1972) Op. Cit., p.87

3. Ibid, p.87

4. Ibid, p.87

5. Ibid, p.87

The New York Region contains many of the largest firms in transportation, communication and utility fields, Manhattan C.B.D. being the preferred location for such national activities[1]. Twenty three companies earning 44 per cent of the leaders annual sales are located in the C.B.D. with the greatest specialization being in telephone and telegraph communication and broadcasting enterprises[2]. The service markets of these business ventures are more regional than national. Growth in the utility industries has been generally non competitive on a geographical basis and has occurred by means of expansion of facilities and services rather than by increase in the service area or number of establishments[3].

Within the Sydney C.B.D. business services and real estate are the second largest users of floorspace after government, finance and insurance activities (excluding government activities such as utilities) followed by transport and storage, wholesale and retail trade, entertainment and recreation, mining and agriculture in order of descending importance[4].

As in the case of finance and investment groups, real estate office space tends to be concentrated heavily in the office core. Public administration office space may be divided into 3 patterns[5]. The Commonwealth Government office space is scattered throughout the area north of Market Street around the G.P.O., the State Government offices are in the southern part of the C.B.D. and also in blocks near Farrar Place. Local government is located near the Town Hall. The other sectors are scattered evenly throughout the C.B.D. with the exception of transport and storage which is evenly distributed north

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1. Ibid, p.88
2. Ibid, p.89
3. Horwood, E. and Boyce, R. (1959) Op. Cit., p.79
4. City of Sydney Council (1978) Op. Cit.
5. Ibid

of Market Street.

North Sydney linked to the C.B.D. by the Harbour Bridge may be regarded as a community of activity which has set up on the city fringe to serve the C.B.D. By 1972 the North Sydney-St Leonards corridor contained about 330,930M^2 of office space[1] or the equivalent of 14 per cent of the amount of office space in the C.B.D. A large proportion of this office space is composed of business services (19.9 per cent) and professional services (20.2 per cent). It would appear that high rentals in thr C.B.D. (North Sydney rents in 1970 were $4-80 compared with about $11 per sq ft in the C.B.D. in 1970) and good transport access to the northern suburbs caused this exodus of services from the C.B.D.[2]

London has a strong concentration of service industries* of which 60 per cent of the major headquarters controlling 71.5 per cent of that sector's assets are located in London[3].

In the City both legal and accountancy services provide a large volume of employment. Many of the largest firms of solicitors are involved either on the side of company finance or commercial documents. As they have close links with banks and merchant banks their offices are in or near the main financial centre. Other legal firms specializing in property have close associations with property companies and large financial institutions which are big property investors. Business may even originate from overseas. City firms of accountants are not just concerned with tax problems but with complicated schemes for financial reorganization of companies and with amalgamations and takeovers and investment trust management. The

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1. Plant Location International (1972) The Office Space Market Sydney Metropolitan Area: 1977-1980, for PL office study subscribers, p.37

2. Ibid

3. Morgan, W.T. (1962) Op. Cit., pp 122-124

* The banking, insurance, finance and agriculture sectors were excluded as these were operating primarily overseas.

larger firms have developed formal connections with the provinces and established provincial offices whilst others have associate firms overseas[1]. It is essential that bankers, lawyers and accountants be in proximity as financial negotiations often call for consultations between these professions and also between members of the same profession acting on behalf of different clients. Commercial and trading activities which include wholesale distribution, export and import merchants, commodity dealers, shipping and services incidental to the Port of London, employ about one fifth of the City of London labour force[2]. The third largest employers of labour are the ancillary services to these two main activities, the main service activities being accountancy, legal services, consultancy and advertising which alone employ an eighth of total employment in the City. Printing and publishing accounts for not more than 5 per cent of total employment.

Different sectors have shown quite distinct patterns of spatial preference in the City. The bank precinct is the centre of the financial district, printing and publishing is concentrated along Fleet Street and shipping and transport services around the Baltic and Fenchurch Street[3]. Commodity trading and wholesale distribution are more widely dispersed as are the more central offices of firms income absorbing and professional services.

Studies carried out by the Location of Offices Bureau showed that in Leeds the professional offices were found to have the highest percentage of their total in the Central area. These offices were found to be mainly local independent establishments whilst the remaining categories, physical services and miscellaneous demonstrated a more equal balance between types of status (the head office branch

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1. Ibid, p.124

2. Dunning, J. and Morgan, E. (1971) An Economic Study of the City of London, Allen and Unwin, Lond., pp 71-78

3. Ibid, pp 310-311

with subsidiaries, branch without subsidiaries, decentralized department and local independent).[1]

Professional and miscellaneous firms also exhibited regional spheres of influence but the legal and accountancy offices had a more limited threshold as over 40 per cent of their business was within the City of Leeds. Physical services offices were found to be spread more evenly throughout the city due to their varying needs - there were almost as many outer locations as there were central locations. Only the physical services group illustrated this characteristic.

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1. Facey, M. and Smith, G. (1968) Op. Cit.

THE PRINCIPAL FINDINGS OF EARLY UNIVARIATE STUDIES OF OFFICE LOCATION

Most of the initial studies concerned with the analysis of location patterns in the city centre have used a variety of techniques to show how certain types of activities are grouped in particular parts of the central area. The nature of the groupings has been identified by direct mapping, concentration indices and by the delimitation of clusters on the ground.

Each of these approaches was essentially univariate in that the characteristics of every activity, in turn, were described. Although for logistic reasons, as well as data restrictions, these investigations represent an unrefined classification of establishments, they are of interest in this study. Lists of office locational requirements, although unstructured, may be drawn up from such approaches and an understanding of external and internal market area concepts and of the firms own requirements may be achieved.

Internally Oriented Markets

The spatial organization of the financial community in the C.B.D.'s of major cities points to the existence of a market internal to members of this community, namely banks, merchant banks, discount and foreign market exchanges, insurance companies and brokers.

Although there were few comprehensive studies concerned solely with office location before 1969, the importance of offices in the urban economy was first recognized by Robert Murray Haig[1] in 1927 who identified clustering patterns of financial offices and postulated that they were a result of certain location requirements. Haig's

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1. Haig, R.M. (1927) Major Economic Factors in Metropolitan Growth and Arrangement - A Study of Trends and Tendencies in the Economic Activities within the Region of New York and its Environs, Regional Survey, Vol. I, pub. Committee on Regional Plan of New York and its Environs, pp 41, 100-106

studies placed great emphasis on money market office location. Using the financial district of Manhattan in the Wall and 42nd Street areas as a basis for his studies, Haig explained concentration and specialization of financial activities in downtown New York by the high land values in Wall and 42nd Street sections, Wall Street district being dedicated to finance[1] and 42nd Street section being primarily a retail merchandising section and developing in importance as a miscellaneous office centre. Haig maintained that the district in which financial activities located must be at the heart of the system of communication, according to land values which he found reflected the degree of accessibility.

Observations of the financial centre activities led Haig to believe that a high degree of accessibility was required as the following essential activities had to be carried out in an environment which could provide the required external economies. Not only did banks benefit from a convenient location within the financial hub as a whole, but they were found to derive substantial external economies from being located close to each other within the financial district as they needed to be located in a small district for clearance of cheques, transferring funds and securities, exchange of information, counsel and advice. Investment bankers needed to be near large commercial banks, corporation offices and investors in the financial centre, but physical proximity among their own establishments was necessary as co-operation amongst investment bankers was necessary in underwriting financial risks, physical proximity being necessary for working out the details of such co-operation. Brokers required locations near their clients and near large banking facilities, but it was also imperative that they be near each other and their exchange to make deliveries and clear transactions within strict time limits.

The primary force binding the insurance companies to the

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1. 'finance' included the Exchanges, the banks, the insurance offices, as well as various professional groups, such as lawyers and accountants dealing almost exclusively with information.

financial centre was the convenience of having near at hand agencies to underwrite the numerous risks in cases of large policies. Fire, marine and life insurance tended to locate in district groups in the financial centre as arranging insurance contracts was often done under pressure of time and a convenient location was of vital importance. As well as being a seller of services, insurance constituted a customer for investments, certain advantages accrued in the latter respect from a location within the financial centre generally.

Dunning and Morgan's recent study of London's economic structure indicates that these connections between the financial sectors are still occurring[1]. Lloyds, a society of underwriters, accept insurance on their own account and risk with unlimited liability. At Lloyds there are two main markets - the marine and the aviation markets which have experienced rapid growth. The international extent of Lloyds' business is well evidenced by the fact that about 75 per cent of the premium income of Lloyds originates from its foreign clients and much of this is reinsurance. Lloyds constitutes the largest reinsurance market in the world. As regards employment at Lloyds there are approximately 6000 underwriting members who negotiate with hundreds of brokers representing clients wishing to be insured. Over 20,000 people are directly dependent on the existence of Lloyds which is not only a market where specialists of all types gather together and transact insurance near a wide range of expertise, but is a focal point in the insurance world[2].

The investment and trustee departments of insurance offices which constitute about 3000 of the total numbers employed in the City and underwriting (2000-3000) have shown no sign of movement

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1. Dunning, J. and Morgan, E. (1971) Op. Cit., pp 71, 311-335

2. Ibid, pp 313-315

away from London's centre due to their need to keep in touch with market and development and to have access to specialized information. The distribution of employment in the City for all insurance company activities is as follows:-[1]

Life assurance	7,959
Non-life insurance	5,893
Life and Non-life	12,327
Lloyds insurance brokers	18,492
Other insurance brokers	1,890
Underwriters and underwriters agents (mainly Lloyds agents)	1,212
Other insurance	2,049
TOTAL	49,822

Studies carried out in 1971 show that the Bank of England has very close contacts with all other financial institutions; and proximity to the Bank appears to exert an influence on the location of these institutions. The Clearing House is also a strong cohesive force as the banks find it economical to centralize all their clearing operations, and proximity of the head offices to one another and to the Clearing House facilitates the exchange of documents. Although employment in the Bank and the Clearing House has exhibited much growth, employment in the financial institutions and other organizations they attract have been increasing, especially in head offices and overseas departments. The business of merchant banks in the fields of corporate finance and investment have grown extremely rapidly. The discount and foreign market exchange employ insignificant numbers of the labour force but are strong cohesive forces in relation to other financial institutions frequently involved in overseas transactions[2].

Studies carried out by Hoover and Vernon in the late 1950's

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1. Ibid, p.312

2. Ibid, p.310

reinforce the concept of an internal money market. Their studies suggest that "common locational forces have been operating to create the distribution of (office) jobs"[1] within the financial community and other office workers. They claim the strongest centralizing force attracting pieces of the New York financial community together is a common preoccupation with the operations of the money market of the nation, which consists of institutions and firms devoted to the provision of a market for the sale of negotiable instruments, for example, banks engaging with one another in trading their deposits with the Federal Reserve Banks, dealers engaged in selling short term notes of corporations, sale of United States government bonds and the sale of many other types of securities. Although those heavily involved in the money market do not require spatial proximity to consummate transactions, Hoover and Vernon point out that decision makers are "closely attuned to a common background of facts and surmises against which commitments are made and avoided"[2], and that all these factors are critical to attitudes taken and decisions made in the financial sector of New York. These types of factors are extremely difficult to quantify but nevertheless must be taken into account when assessing office location requirements. The latter part of this chapter relating to information flow attempts to deal with this aspect of office location.

Particular attention has been paid to the financial community in New York by Robbins and Terleckyj[3] who found that the financial community was made up of three principle components - the direct money market participants who would probably remain in downtown Manhattan, the consumer oriented activities which would continue to follow the consumer and the great bulk of personnel performing the

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1. Hoover, E. and Vernon, R. (1959) Op. Cit., p.78

2. Ibid, p.89

3. Robbins, S.M. and Terleckyj, N.E. (1960) Money Metropolis, Cambridge, Mass., Harvard Uni. Press

routine functions and those activities which would be located where labour and space costs offered greatest economies. A number of studies have pointed to the direct money market participants as being the group which favoured highly centralized locations[1]. They identified several new reasons, in addition to those advanced by earlier researchers, to explain the centralizing behaviour, the desire to protect real estate values and the trend towards office automation and use of complete data processing systems which could only be supported at major installations such as central city headquarters. The latter trend is a highly questionable one as data processing departments have proved to be ideal candidates for decentralization due to the routine nature of the work involved and the lack of any real need for a central city location[2]. The issue of vested interests, however, is one of greater significance than has been acknowledged by Robbins and Terleckyj as by 1959 large scale investment by the financial sector, especially insurance, was occurring in the United States[3]. This matter is, however, beyond the scope of this chapter. Some members of the financial sector require access to both internal and external market types. The headquarters of the top 9 New York insurance headquarters, housed in Manhattan, operate in a national market in the preferred location of midtown Manhattan[4]. Such a central location ensures these headquarters accessibility to their widely dispersed external markets and at the same time provides easy access to internal financial markets such as brokers and agents.

Apart from the tight internally oriented network of financial activities in the C.B.D. there exist a number of other activities which require a location accessible to a dispersed external market. Some of these activities also require spatial proximity to the financial network.

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1. (a)Dunning, J. and Morgan, E. (1971) Op. Cit., pp 310-330
   (b)Armstrong, R.B. (1972) Op. Cit., pp 84-88
2. Manners, G. (1974) Op. Cit., p.100
3. Horwood, E. and Boyce, R. (1959) Op. Cit., p.70
4. Armstrong, R.B. (1972) Op. Cit., pp 84-85

Externally Oriented Markets

The executive offices of 'big business' heavily concentrated in the Wall Street section, the 'financial nervecentre' were found by Haig to require frequent conferences concerning large financial problems between its executives and the offices of the large commercial and investment banks in Wall Street[1]. However Haig overlooks other location factors of 'big business' such as accessibility to markets, nor does he examine the role of medium sized firms or local independent firms which account for a substantial part of New York's C.B.D. today[2].

The main banking facilities in C.B.D.'s are the headquarters and middle-market office functions distributed in varying proportions (in terms of number of establishments)[3]. Those banking institutions with main offices serving mostly subregional market areas tend to rely on growth potential of the immediate environment and fit the concept of middle market office activity and therefore have externally oriented markets. Headquarters banks, however, perform a nationwide service that is dependent on and part of the New York Region's export base and may have both external population oriented and internal financial markets. Insurance activities in the C.B.D.'s of major cities are not only bound up in the financial market but also have widespread, national and international consumer oriented markets. Therefore a central location may be essential for effective involvement in both the internal financial market and the dispersed external markets.

Whilst predecessors concentrated on the analysis of the

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1. Haig, R.M. (1927) Op. Cit.

2. Hoover, E. and Vernon, R. (1959) Anatomy of a Metropolis Cambridge, Mass., Harvard Uni. Press, pp 77-80

3. Armstrong, R.B. (1972) Op. Cit., p.72

financial community, Lichtenberg[1] recognized two categories of office workers - those involved in finance and in other office work. The latter classification included central administrative offices of corporations or offices whose functions were related to central administrative functions, such as advertising, law, public relations, engineers, large groups in the field of government, offices of business associations, union, foundations and other non profit organizations.

The complex of non-financial offices which were heavily concentrated in Manhattan were observed by Lichtenberg to be mainly those portions which served the nation most directly, that is, the headquarters offices of the manufacturing corporations. He identified the locational needs of these elite decision makers as being chiefly the need for quick, convenient personal relations with those from whom knowledge and decisions are sought, personnel requirements and an adequate supply of office space.

Lichtenberg's observation of the two types of firms located in the central area of New York led him to the conclusion that each had a differing market orientation; those with an internally oriented market were the finance sector and those with an externally oriented market were the corporation headquarters which served a national market. Both types of office activity he claimed, have in common the need for quick effective communication, the need for specialized services and large numbers of clerical staff and other support. He suggests that the "key to the whole complex of non financial offices is that portion which most directly serves the nation"[2].

The main point which emanated from these studies was the effect of an office based firm's market area upon its locational

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1. Lichtenberg, R.M. (1960) One Tenth of a Nation, Cambridge, Mass., Harvard Uni. Press

2. Lichtenberg, R.M. (1960) Op. Cit., pp 154-155

behaviour. However no detailed analysis was carried out upon the different types of markets applicable to various sectors of industry. An analysis of this type was not undertaken until nearly 12 years later by Armstrong[1].

In the past large numbers of banks, law firms, foreign trade houses, wholesalers and other financial intermediaries have traditionally been housed in the urban economy and have been linked to the cities entrepot and market functions[2]. It would seem that not only has the urban environment been supportive in providing services and externalities in respect of office headquarters but that headquarters have increased the attractiveness of central city locations for the middle and local market office activities. Although traditional location theory, based upon such concepts as the minimization of physical inputs and the maximumization of revenue outputs do not fully explain the office location process, agglomeration economies and externalities do afford some useful insights into the spatial behaviour of offices[3].

Office Location Patterns and External Economies of the Office Firm

The other requirements of office firms in the C.B.D. fall into two major categories accessibility to services and accessibility to labour.

Measured by employment distribution the services sector (professional and business) appears to have a relatively large commitment to the C.B.D.[4] with accountancy, legal services, consultancy and advertising firms being the prominent providers of

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1. Armstrong, R.B. (1972) Op. Cit.

2. Ibid, p.18

3. Manners, G. (1974) Op. Cit., p.103

4. Armstrong, R.B. (1972) Op. Cit., p.87

services[1]. Access to large pools of labour also appears to constitute a requirement of C.B.D. located firms[2].

In C.B.D.'s the largest firms of solicitors in financial and commercial transactions either on the side of company finance or commercial documents (acceptance credits, bills, shipping documents) have offices in the City of London[3]. In particular they have close links with commercial banks and merchant banks and have their offices near or within the financial centre. Other firms specialize in conveyancing both for leasing and for investment in property and these tend to develop associations with property companies and pension funds which are the major property investors. Legal firms also handle private client work of a local suburban nature and may be involved in business from other parts of the country or from overseas.

Accountancy firms in C.B.D.'s are not only concerned with the basic tasks such as auditing, advising on tax problems and negotiating with the taxation authority but are also concerned with schemes for the financial reorganization of companies and with amalgamations and takeovers.

Both the corporate headquarters and the finance sector have the need for such specialized services due to the involved nature of their day to day activities[4].

In order to assess the degree to which this factor is an

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1. (a) Dunning, J. and Morgan, E. (1971) Op. Cit., p.71
   (b) Haig, R.M. (1927) Op. Cit.
2. (a) Hoover, E. and Vernon, R. (1959) Op. Cit., pp 81-90
   (b) Lichtenberg, R.M. (1960) Op. Cit., pp 154-155
3. Dunning, J. and Morgan, E. (1971) Op. Cit., p.43
4. Lichtenberg, R.M. (1960) Op. Cit., Cambridge, Mass. Harvard Uni. Press

important consideration in the office location decision, details of the type and number of labour requirements (office), of the geographical location of the required labour force and finally the accessibility of the C.B.D. in relation to various suburban locations containing the required labour must be known. Accessibility is often rated in relation to public transportation systems rather than by an 'all mode' rating. Although increased public transport usage may constitute a desirable planning objective on traffic and other grounds, in reality, office workers have free choice as to which mode of transportation they will use and this must be taken into account.

As regards the labour requirements of office activities, studies carried out in the United States[1], Australia[2], and Britain[3] demonstrate the manufacturing and financial sectors have the largest requirements for office workers. See Figure 3.3 which provides a rating of office employment by industrial sector. The finance sector, particularly insurance was found to be a large employer of clerical labour due to the routine nature of some of the related tasks.

It would seem that the advantages of a location in the city centre are many - ease of contact with other centres in the country and overseas, nearness to major clients and proximity to one another.

A two way relationship exists between service offices in the C.B.D. and the offices requiring such services. Although large companies carry a wide range of skilled persons in such areas as

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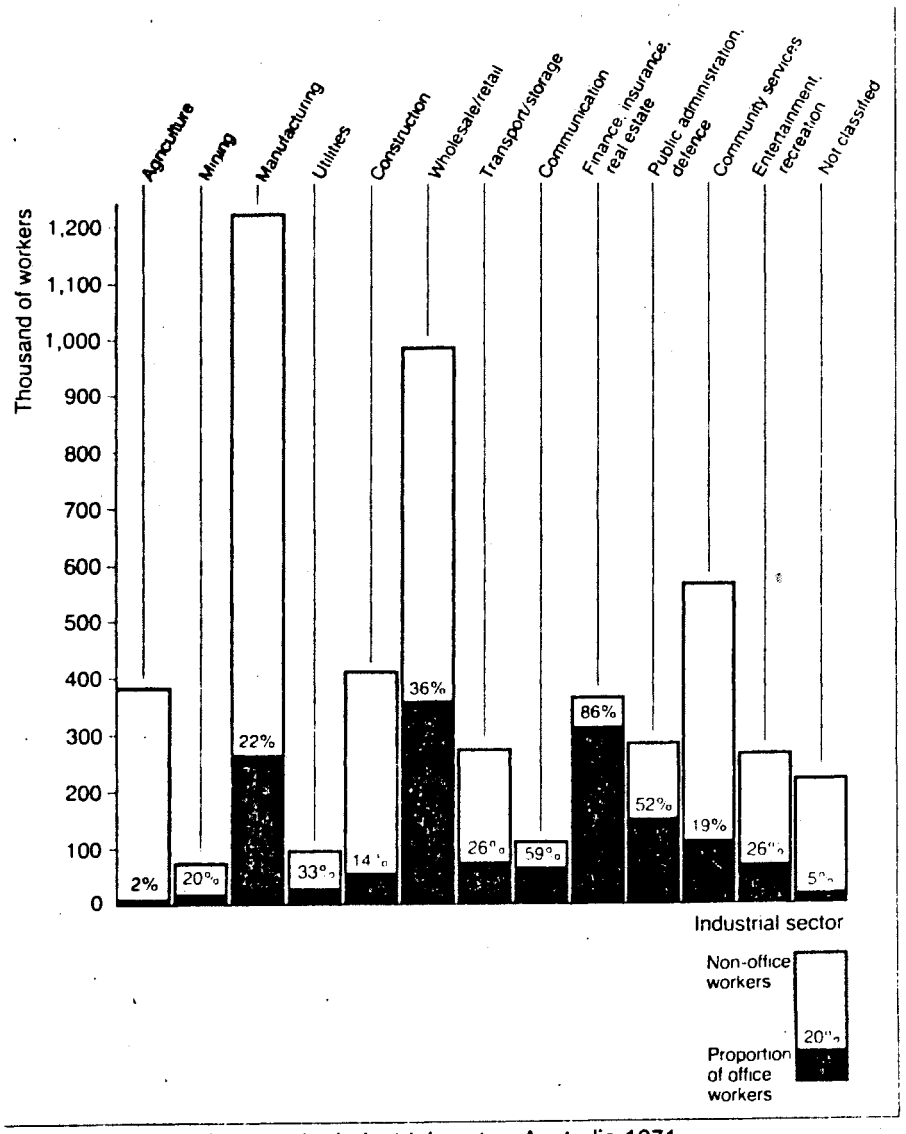
1. Armstrong, R.B. (1972) Op. Cit., p.85

2. Alexander, I. (1978) Offices in the Suburbs: A Survey of Private Office Establishments in Sydney Suburban Centres, pub by Dept. of Environment Housing and Community Development, Canberra, p.408

3. (a) Location of Offices Bureau (1964) Op. Cit., p.6
   (b) Facey, M. and Smith, G. (1968) Op. Cit.

FIGURE 3.3



Office employment by industrial sector, Australia 1971

Source: Alexander, I. (1979) Op. Cit., p.4

accounting, finance, computer services and marketing, reports indicate that businesses have turned more and more to consultants for advice for economic reasons[1]. Additionally even the largest firm could not equip itself internally to deal with the great variety of specialized problems that could occur. Whilst the services sector provide considerable external economies for large headquarters and financial activities, a highly agglomerated market area is available to the service oriented firms together with a location which is accessible to other geographically wide-spread markets.

Some studies have concluded that large offices need to be at the centre of mass transportation to be able to recruit large numbers of staff easily[2], whilst others claim that such firms are located in the core of cities as they are supported partially by the C.B.D.'s unique ability to assemble large pools of clerical and managerial skill[3]. See Appendices 7 and 8 for details of office employment by industrial sector as a proportion of total employment.

Information relating to the office workforce's accessibility to the C.B.D.'s as opposed to other locations was unavailable with the exception of a study pertaining to the Sydney Region[4].

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1. Manpower Programmes Section, Employment Prospects by Industry and Occupation, Feb, 1978, Dept of Employment and Industrial Relations, Aust. Govt. Publ. Service, Canb., 1978, p.151

2. (a) Hoover, E. and Vernon, R. (1959) Op. Cit., pp 81-90
   (b) Lichtenberg, R.M. (1968) Op. Cit., pp 154-155
   (c) Robbins, S.M. and Terleckyj, N.E. (1960) Op. Cit.

3. Armstrong, R.M. (1972) Op. Cit.

4. Plant Location International and Nairn, R.J. and Partners, Towards a Suburban Centres Study, Unpublished, 1980

The conclusions reached in this study were intended to form the basis of a suburban office centre policy but are considered relevant in this context. It was found that taking all modes of transport into account the C.B.D. of Sydney was not the most accessible employment centre and hence the shortest journey to work for the majority of office workers although historically this may have been the case. This was due primarily to the extensive shifts in population that had occurred over the last century and to increased ownership of motor vehicles.

Whilst a suburban or non central location is quite convenient for executives it is often a burden for lower-level office workers in the United States as these workers frequently cannot afford to live where the jobs are and companies competing for labour supplies in the suburbs frequently have had to make extra recruiting efforts[1]. Whilst the economic activity is low, Gooding points out there is little difficulty in recruiting staff but during peak periods companies have been observed to offer services and amenities not required in the city to attract and hold onto workers[2] who are unwilling to cross commute because the high costs amount to a disproportionate share of their income[3]. However it is considered that insufficient data is available in this instance to form any reliable conclusions. Labour factors are reconsidered in the following chapter.

In American metropolitan areas the attractiveness of the C.B.D. as a pool of labour supply is reinforced by the fact that whilst the geographical differentials of labour costs may favour the suburbs, the advantage is quite small. These savings of between 4 and 6 per cent are often more than offset by the cost of moving an office from the central city as various costs such as disrupted work, probability

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1. Gooding, J. (1972) "Roadblocks Ahead for the Great Corporate Move Out" in Fortune, Jun. 1972, pp 78-83

2. Ibid, p.84

3. Ibid, p.84

of lost staff and the cost of marketing an unexpired lease[1]. Exceptions to the above statement occur in those American suburbs where certain types of labour are more expensive than in the central city; these cases have occurred mainly in the wealthier suburbs where a rapid expansion of office activities has recently caused local labour supplies to be outstripped by demand[2].

In Sydney, staffing factors have been found to bear some relationship to the distances office based firms are prepared to locate from the city centre. Generally firms are encouraged to move short distances only to enable firms to retain a high proportion of existing staff especially amongst clerical labour[3]. In a survey recently carried out in Sydney[4] the availability of employees ranked ninth out of fourteen important factors found to be influencing office location decisions in the case of firms located in the C.B.D. and eighth in respect of North Sydney/St Leonards based firms. Thus although employee availability is not seen as the most important reasons for the firms location it is generally seen as important. In a similar type of survey carried out in London factors such as the supply of staff were infrequently given by firms in Central London as their prime reason for location and accounted for only 7.9 per cent of the prime reasons; as a third priority this factor fared much better (17 per cent)[5].

Despite the above claims by Alexander some doubt remains as to whether the above example is a sufficiently representative sample of office location behaviour in Sydney and whether other factors such as minimization of risk associated with the development

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1. Manners, G. (1974) Op. Cit., p.99
2. Ibid, p.99
3. Alexander, I. (1979) Op. Cit., p.53
4. Plant Location International (1972) Op. Cit., pp 63-65
5.

of office blocks (for renting or sale purposes) prevented moves from occurring further afield. As regards the survey results obtained by a questionnaire method it is pointed out that such means of obtaining information are less reliable than observation of actual events. The relative importance of labour requirements in relation to other factors is assessed in the ensuing chapter dealing with economic considerations.

THE GEOGRAPHICAL AREA OF EXTERNAL MARKETS AND CENTRALITY OF OFFICE HEADQUARTERS

Since these early studies of office location, a number of other studies have concentrated on facets other than the financial sector. In addition to labour requirements, ready access to information vital in the daily functioning of the firm and the need to be generally attuned to the activity scene in the city centre, perceived advantages of a central location by managers, protection of vested interests in the C.B.D., inter-firm linkages, the historical origin of a centre, the type of market and geographical extent of that market appear to constitute strong centralizing forces which largely influence the location of office activities. The importance of each of these forces as discussed below varies with different types of firms which are not all subject to the same degree of attraction to the city centre.

As only the internal money market had previously been analyzed and non financial activities and their market areas only briefly been alluded to, there existed little, if any, knowledge of market areas, market types and their influence on office location until Armstrong[1] carried out a study of office headquarters in New York and realized the importance of the externality of the market area. In contrast Lichtenberg et alia had considered only the internal market such as the relationship between insurance companies and brokers in the city centre. However not all parts of the office industry are subject to the same centralizing forces. Armstrong illustrates this concept by analyzing office functions according to their economic base or export of services. In summary he has divided the office market into three types on the basis of geographical extent of market area; headquarters, middle market and local market[2].

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1. Armstrong, R.B. (1972) Op. Cit.

2. Ibid, p.18

All headquarters offices export their services from any one metropolitan area; these types of jobs are often national or international in scope. Headquarters jobs have a high degree of complexity in their operations and include headquarters of industrial 'giants' and large manufacturing, trade, service, financing and transportation business concerns. Only the highest order of urban centre is capable of providing the ancillary services, specialized labour and inter-firm contact required by this level of office function (Armstrong has included national and international scale government functions in this category of jobs). Those financial activities such as the Stock Exchange, headquarters banks and the top insurance headquarters which perform a nation-wide service and are dependent upon part of the New York Region's export base fall into this category.

Regional, subregional and national back office operations including activities and headquarter serving functions such as advertising and public relations constitute the middle-market activity. Although a branch may occasionally serve more than one region, Armstrong has concluded that there are few export office type jobs. Large influences on the location of these types of offices are generated by national population distribution and the location of headquarters operations and usually serve a large region such as New York Region or smaller areas down to about the 150,000 population level. A constraint on their location is the need for a sizeable labour supply of white collar workers. Included in this group are the population oriented insurance services in non centralized and suburban areas and the banking institutions which tend to rely on the growth potential of the subregional environment. In the securities industry member organizations of the Stock Exchange would be classified amongst the middle market functions.

Local market offices serve areas of approximately 150,000 population and less and tend to be located in the proximity of

those populations that they serve. These activities are the least likely to require clustering benefits due to their more routine activities and include branch banks, real estate offices, solicitors (in general practice), and offices of small municipalities. 'Shop front' banking service would also fall into this market area category. The main points which emerge from the preceding discussion on market area are summarized in Figure 3.4 which gives a simplified account of the relationships between type of office, market area served and location. This model, however, does not take account of inter-industry differences or the urban area size which render the situation a good deal more complex than is illustrated in the diagramatic model of office location.

FIGURE 3.4

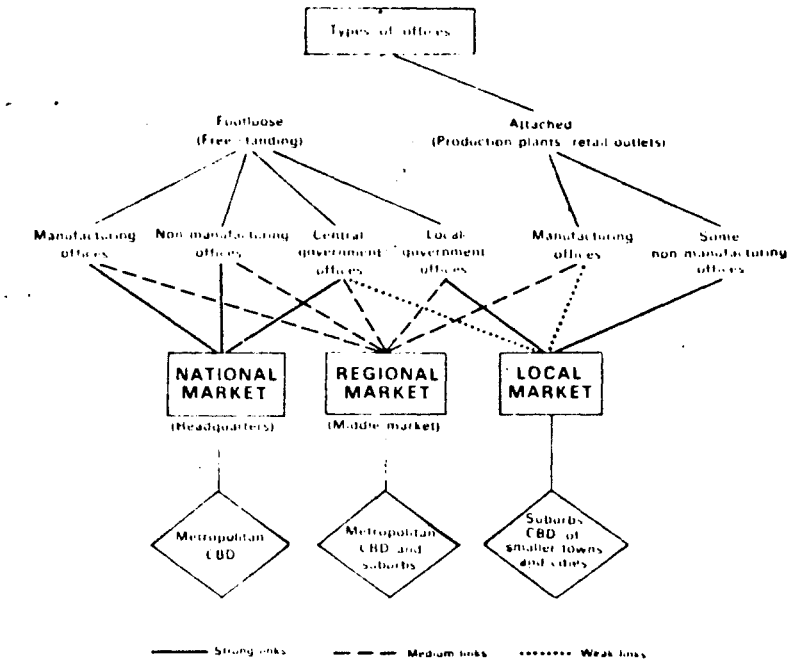

Fig. 31 Relationship Between Types of Office, Markets Served, and Location

Source: Daniels, P.W. (1975) Op. Cit., p.127

INDUSTRY OF OFFICE ACTIVITY AS AN INFLUENCE ON OFFICE LOCATION

The relationship between the location and geographical extent of these markets and their influence on the location of a particular industry of office activity has been further expanded by Armstrong who in his studies of metropolitan America has shown that the location requirements of an office based firm depends also upon the type of market, that is, the type of company.

Product lines appear to offer an explanation of the headquarters strong central location preference. In New York twice as many non-durable industries as durable locate greater than average shares of their headquarters offices in the C.B.D.[1] The top six industry groups are all producers of non-durable items; the top three with the exception of food, are the major producers of goods which earn the larger part of their receipts in consumer markets[2]. (See Table 3.5). As may be seen from this table, four of the other five groups produce durable goods, one being a processor of end product durables, whilst two (transportation and manufacturing) sell the leading although not the majority of their goods to private customers. Not having strong ties to the consumer the primary metals industry is unique.

Thus as twice as many durables as non-durable goods sectors lie below the overall mean of central location tendency and they produce goods which are usually sold to intermediate consumers (industrial consumers), Armstrong has concluded that the more consumer oriented and/or non-durable is a firm's product, the stronger is its desire or need to locate headquarters in a central location.

Of those groups of industries in New York that are strongly

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1. Ibid, p.70

2. Ibid, p.78

TABLE 3.5

Central Administrative Office Employment for Selected Industries in the New York SCA, 1958–1963

	1958		1963		
	Number	Share of nation	Number	Share of nation	% change 1958–1963
Manufacturing	107,831	23.9%	117,779	22.8%	9.2%
Nondurable goods	62,591	29.0	71,244	29.3	13.8
Food	11,912	21.9	13,578	22.5	14.0
Textile	7,221	58.6	6,174	38.3	−14.5
Apparel	3,015	46.8	3,101	36.1	2.9
Paper	5,566	26.7	6,366	27.8	14.4
Printing and publishing	2,892	52.1	3,178	34.0	9.9
Chemicals	20,893	32.5	27,045	36.7	29.4
Petroleum and coal	11,092	21.3	11,802	22.6	6.4
Durable goods	32,622	21.9	35,847	19.9	9.9
Stone, clay, glass	2,823	15.7	2,994	12.0	6.1
Primary metals	3,819	11.7	4,281	11.6	12.1
Fabricated metals	7,671	28.9	5,076	25.7	−33.8
Nonelectrical machinery	7,950	26.5	8,913	21.4	12.1
Electrical machinery	9,403	26.6	13,330	28.1	41.8
Instruments	956	15.6	1,253	13.1	31.1
All other manufacturing	12,618	14.7	10,688	11.6	−15.3
Selected services	4,453	29.6	9,310	35.2	109.1
Business services	1,576	35.8	3,642	42.1	131.1
Wholesale trade	14,858	14.5	18,752	15.8	26.2
Retail trade	27,374	18.4	32,505	20.3	18.7
Total	154,516	21.6	178,346	21.7	15.4

Source: Armstrong, R.B. (1972) Op. Cit., p.63

TABLE 3.6

The Location of Manufacturing Headquarters Ranked by Descending Order of Centrality in the Region, 1963

	Central administrative offices by ring as a percentage of industry totals					
Industry	Manhattan CBD	Rest of core	Inner ring	Intermediate ring	Outer ring	Total
Leather	94.1%	5.9%	—	—	—	100.0%
Apparel	93.7	2.5	1.3%	2.6%	—	100.0
Tobacco	90.0	—	10.0	—	—	100.0
Textile	84.6	4.6	4.6	6.2	—	100.0
Petroleum and coal	83.9	—	3.2	9.7	3.2%	100.0
Paper	83.8	8.1	2.7	5.4	—	100.0
Furniture and fixtures	83.3	8.3	8.3	—	—	100.0
Transportation	82.6	—	13.0	4.4	—	100.0
Primary metals	81.3	9.4	3.1	6.2	—	100.0
Rubber and plastics	80.0	6.7	—	13.3	—	100.0
Ordnance and miscellaneous	80.0	8.0	4.0	8.0	—	100.0
Total Manufacturing	72.4	7.2	11.2	8.8	.4	100.0
Chemicals	71.7	3.9	16.5	7.9	—	100.0
Fabricated metals	71.4	7.2	11.9	9.5	—	100.0
Printing and publishing	64.1	3.1	21.9	10.9	—	100.0
Food	62.8	11.6	19.8	5.8	—	100.0
Stone, clay, glass	62.2	10.8	16.2	8.1	2.7	100.0
Electrical machinery	55.6	15.9	7.9	19.0	1.6	100.0
Instruments	50.0	6.3	31.2	12.5	—	100.0
Nonelectrical machinery	48.9	10.6	12.8	27.7	—	100.0
Lumber and wood	25.0	50.0	25.0	—	—	100.0

Source: Armstrong, R.B. (1972) Op. Cit., p.69

associated with each other through inter-industry purchases, proximity among the headquarters operations and central location are often the characteristics exhibited but the durable goods component even amongst these industries is under-represented among headquarters located in the Manhattan C.B.D.[1]. As illustrated in Table 3.6 the chosen location distance from the centre varies among these industries, for example, headquarters of electrical and non-electrical machinery are represented at least twice as often in the intermediate ring than in the inner ring whilst the reverse is true for instruments, stone, clay and glass headquarters. In fact the majority of these industries exhibit weaker ties to the C.B.D., for example, chemicals and printing chose inner ring locations.

Output for the bulk of manufacturing activity is directed more towards other producing units than towards private households, the government or other type of final demand[2]. As final demand does not account for more than 50 per cent of income earned by any of these manufacturing industries it would be likely that they would spend less per unit of output on media advertising than the industries concerned with end products. Technologies imperatives play an important role in seller-buyer relationships and market interests are served by close contact with both complementary and competitive firms and their purchases and suppliers[3]. Face-to-face or personal contact produces the best results when the market is characterized by few buyers.

On the other hand, when the market is made up of a large number of dispersed households, imagery or product identification through advertising is probably the best means of overcoming the distance between the seller and purchasers and influencing end

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1. Ibid, p.76

2. Ibid, pp 70, 71

3. Ibid, pp 70-72

product demand[1]. Thus the numerous advertising, marketing and media services in Manhattan is an important external economy for headquarters of these firms with a wide consumer market area and consequently draws these firms toward the C.B.D., the point at which the consumer market is most accessible. Haig's work, although it did not deal specifically with market areas, implied that they were relevant location factors in this proposition that accessibility was an important reason for the location of firms in the C.B.D.[2]

Consequently it may be seen that central offices with above average preferences for central location derive most of their income from sectors which also tend to locate in the centre or are in some way strongly identified with it through say centralized services such as public relations or advertising or through the civic and business role played by a corporation.

Apart from the relationship between office location and ties with purchasers, it has been found that plant distribution has some influence on the location of front offices. According to a measure such as factory employment, durable goods processing plants are predominant in the suburban rings while in the C.B.D. non-durable production is by far the leading form of manufacturing; in the rest of the core the non-durable and durable mix of activities appear to be in balance[3]. Perhaps this pattern has developed historically when the office and factory function were carried out together and because of the large capital investment in the plant have remained. Additionally social problems and urban decay in New York City would constitute a holding force as land values would not be so high as to force the industry to relocate as would be the case in cities such as Sydney.

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1. Ibid, p.70

2. Haig, R.M. (1927) Op. Cit.

3. Ibid, p.72

In his studies relating to the location of headquarters of industrial companies in Britain Evans[1], like Armstrong, maintained that the type of office industry was related to office location. Companies dealing in standardized products (such as the British steel companies prior to nationalization) did not exhibit patterns of concentration in the London area[2]. The management of each company not having to deal with 'unstandardized' problems did not need 'to locate close to a pool of outside specialists and outside sources of information'[3].

Results of other studies of metropolitan America also confirm Armstrong's conclusions. Manners found that in the metropolitan areas of the United States those office activities related to production oriented manufacturing were more inclined to leave the central city than the consumer oriented counterparts[4].

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1. Evans, A.W. (1973) "The Location of the Headquarters of Industrial Companies" in Urban Studies, Vol. 10, pp 387-395

2. Ibid, p.390

3. Lichtenberg, R.M. (1968) Op. Cit., p.156

4. Manners, G. (1974) "The Office in Metropolis: An Opportunity for Reshaping Metropolitan America" in Economic Geography, Vol. 50, No. 2, p.100

MULTI-VARIATE ANALYSES OF SPATIAL RELATIONSHIPS BETWEEN OFFICE ACTIVITIES

More recently multi-variate techniques have been developed in Britain to enable all possible inter-relationship of office activities to be distinguished in order to overcome the limitations of univariate approaches which described the characteristics of every activity in turn.

Patterns of Locational Proximity in the City of London

Employing techniques such as factor analysis, components analysis and cluster analysis Goddard[1] was able to illustrate clear patterns of locational proximity within the City of London.

The study area comprised one square mile (2.5 km^2) of the administrative City of London which included the financial district of the Central Area, the publishing activities of Fleet Street, some manufacturers' headquarters and warehousing and wholesaling associated with the trading function of the financial centre.

His study used data which covered eighty different types of office employment (See Appendix 9). Using an 80 x 80 correlation matrix, factor analysis was applied to reveal sets of offices with similar patterns of relations. It was interpreted that the City's economy could be divided into nine sets of interlocking activities each composed of a number of highly specialized activities. See Figure 3.5 which demonstrates the existence of 'within group' and 'between group' bonds. Of these nine functional groupings only industries and wholesaling did not have strong 'within group' bonds. The most important 'between group' bonds were between shipping, commodities and insurance. There were also a large number of

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1. Goddard, John "Multivariate Analysis of Office Location Patterns in the City Centre: A London Example" in Regional Studies, Vol. 2, 1968, pp 69-85

connections between insurance and banking and between banking and other finance.

Although most of the associations revealed by such an analysis were of some functional significance, some activities showed a spatial association which had no justification. As the object was to isolate meaningful sub sets of activities as opposed to obtaining a high degree of data condensation, factor analytic rotation procedures which concentrated only on the significant patterns of variation (or common factors) were applied. Factor analysis assumes that the eighty original variables are able to be analysed into a smaller number of uncorrelated factors with a residue of unique factors specific to each variable.

The five factors which emerged contained fifty of the eighty office activities. Factor 1 is composed of commodity closely inter-related activities of commodity trading, risk insurance and shipping - the principal functions of the City. The pure finance functions of the City are represented by two factors. Factor 2 contains the capital and investment side of finance and is termed the 'financial ring' factor. Those activities found in the 'financial core' factor (Factor 5) are principally those involved in the daily operation of the money market. Factor 3 is composed of offices whose interests focus on the activities of Fleet Street and the Press. Finally, Factor 4 separates textile trading from the international trading activities of Factor 1. From the results of a second data matrix, Goddard was able to conclude that the unrepresented office types were not fully integrated into the City's activity system.

The office activities not included in the City's network of office activities include:

primary industry, durable manufacturing activities (chemical, metal, vehicles, timber, bricks, glass, cement), rail and road transport, postal services, banks and clearing banks (other than headquarters),

public facilities and consumer services.
These findings bear out Armstrong's findings in the United States that generally the more durable the product, the lesser the need for a centralized location for the related office function.[1] The proposal[2] that internal financial markets existed in city centres is supported by the existence of Factor 5. Lichtenberg's hypothesis that the key to the whole complex of non financial offices in the city centre lies in those activities that directly serve the nation is clearly supported by the existence of Factor 1 - the trading factor.[3] This factor contains the principal export functions of the City.

In order to check that the above conclusions were not the result of the peculiarities of the factor analysis method, a further multivariate procedure cluster analysis was applied to the correlation matrix. Whilst the composition of the eighteen resultant clusters did not exactly coincide with the factor structure broadly similar groupings were produced.

The spatial structure of the City's economy was able to be summarized in a matrix of factor scores which were plotted for each factor using two classes of score to reveal those areas in which particular groupings of offices are to be found. Figure 3.7(d) shows that the City's trading activities are focused on a major institution - Lloyds. The financial core activities form an almost continuous zone around the Bank of England (Figure 3.7(d)) but concentration is broken to the north of the Stock Exchange. Financial ring activities fill this gap adjacent to the Stock Exchange then extend out to the north west of the Bank around the financial core (Figure 3.7(d)). The anticipated concentration of publishing and professional services around Fleet Street is shown in Figure 3.7(a)

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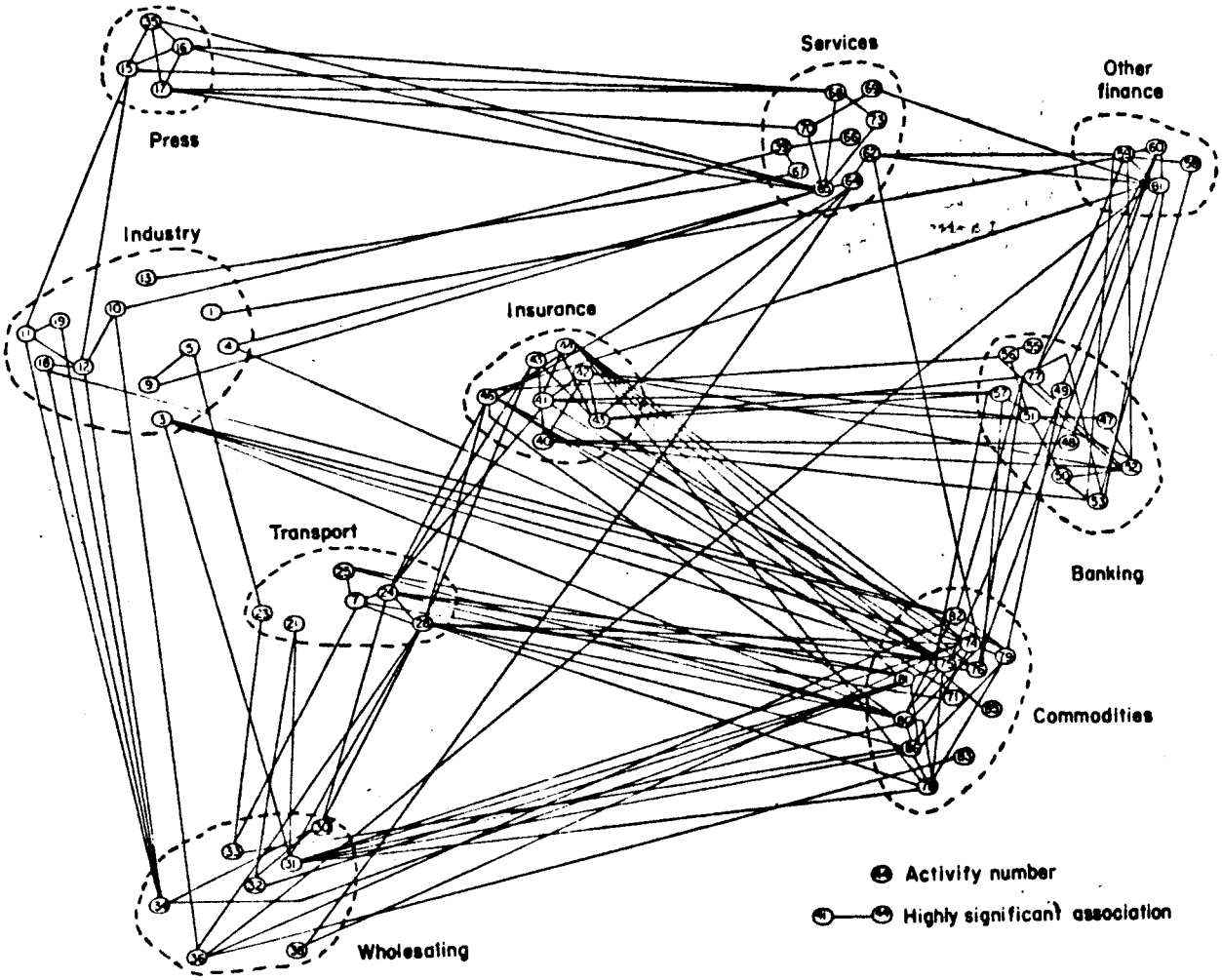
1. Armstrong, R.B. (1972) Op. Cit.

2. Lichtenberg, R.M. (1960) Op. Cit.

3. Lichtenberg, R.M. (1960) Op. Cit., pp 154-155

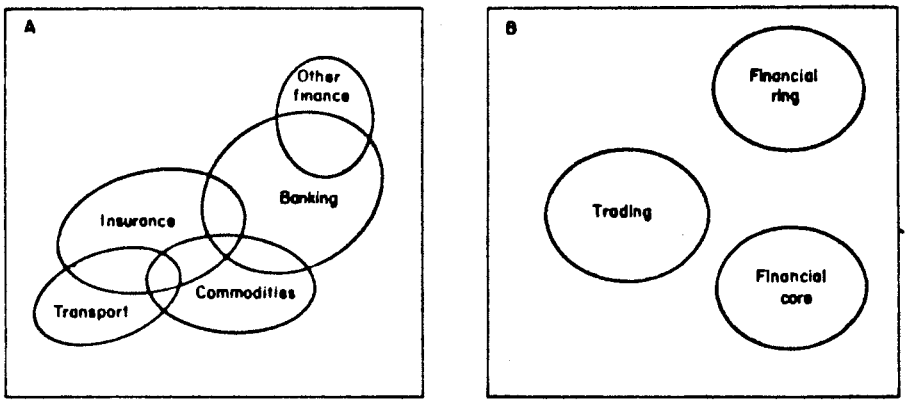
FIGURE 3.5



. Spatial linkages between offices: correlation bonds significant at 0·1 per cent level.

Source: Goddard, J.B. (1967) Op. Cit., p.73

FIGURE 3.6



Office activity sets.

Source: Goddard, J.B. (1968) Op. Cit., p.73

FIGURE 3.7(a)

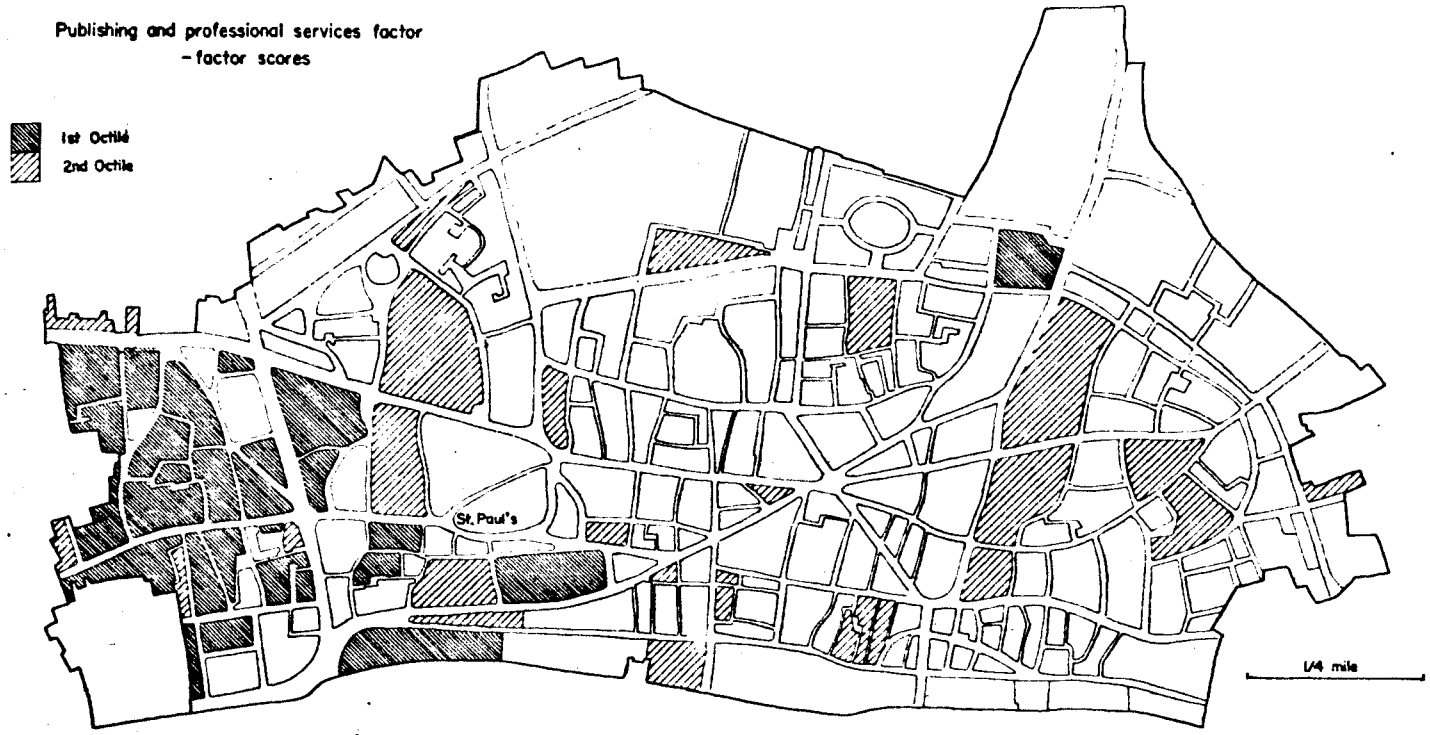
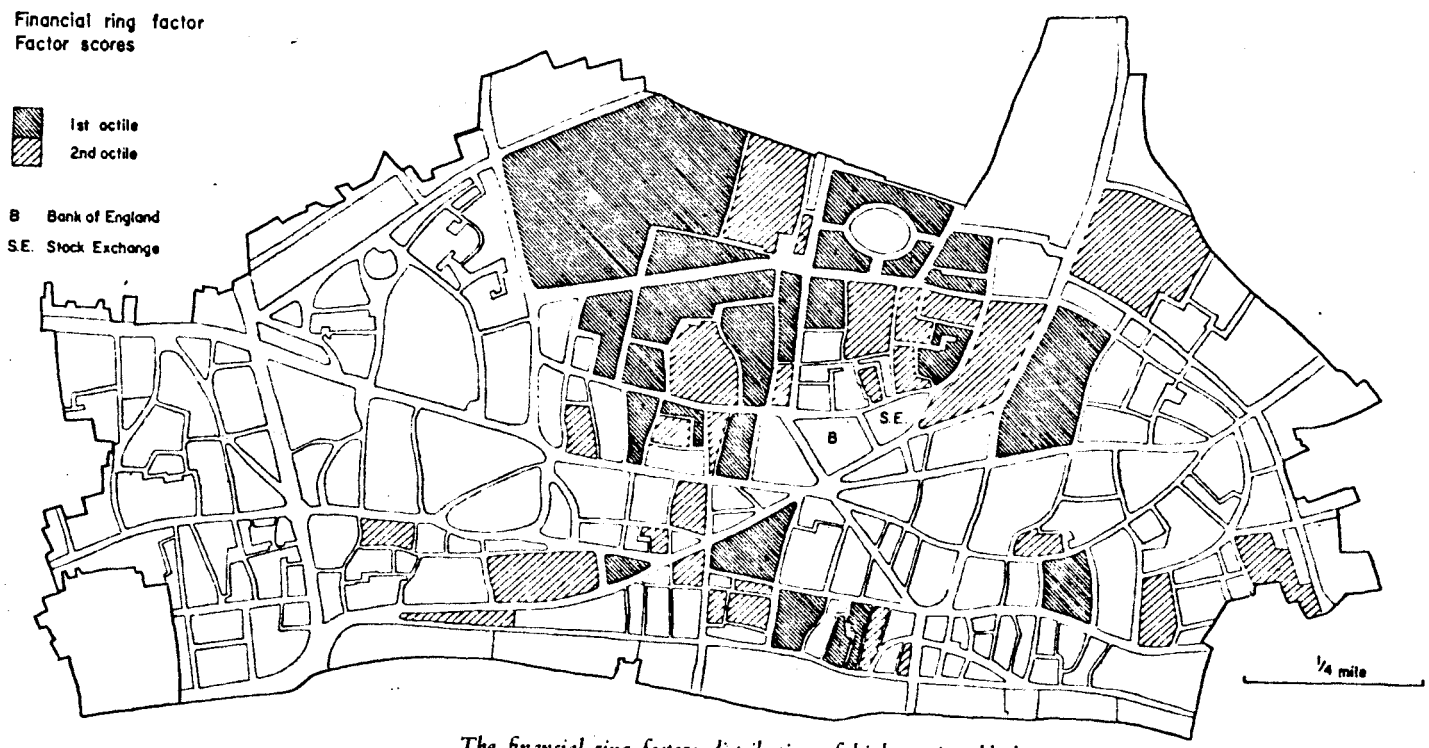


Fig. 8. The publishing and professional services factor: distribution of high scoring blocks.

Source: Goddard, J. (1968) Op. Cit., p.80

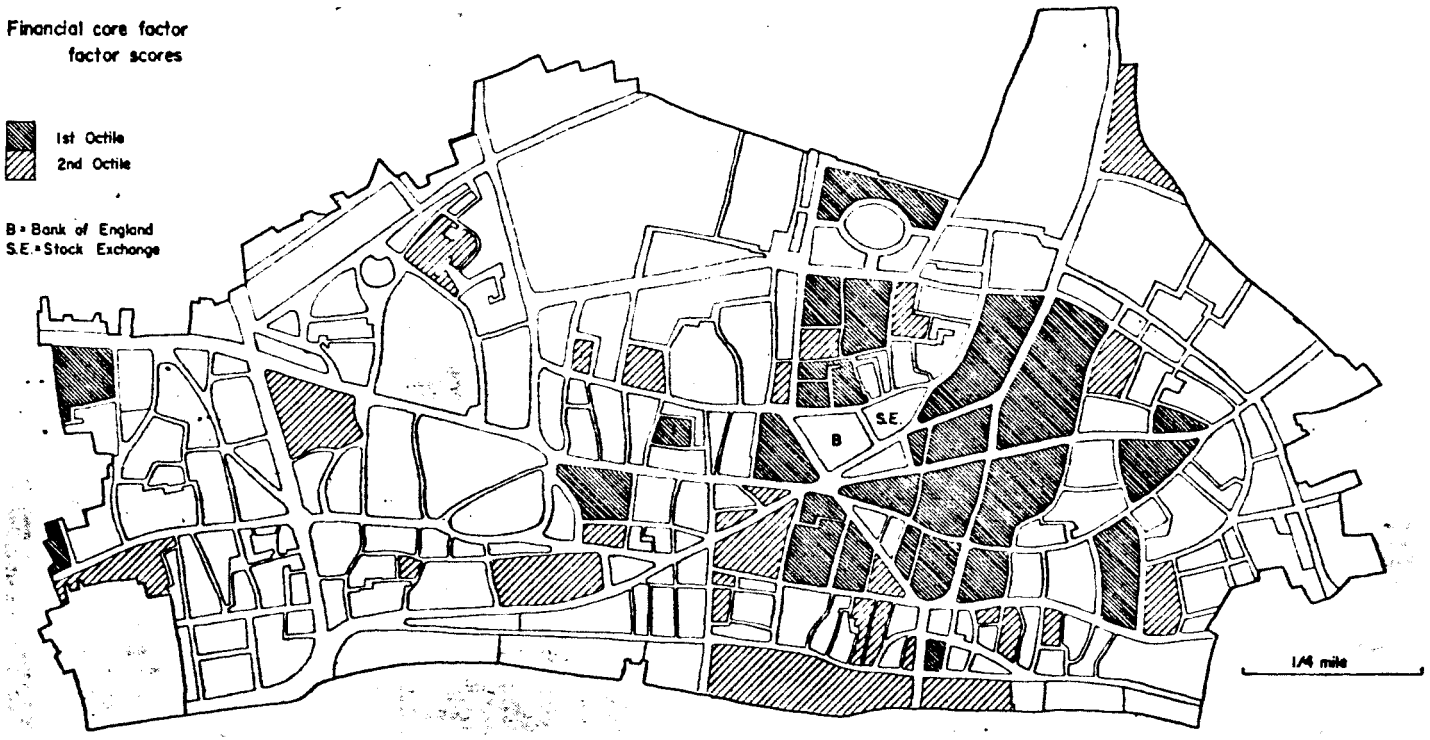
FIGURE 3.7(b)



The financial ring factor: distribution of high scoring blocks.

Source: Goddard, J. (1968) Op. Cit., p.79

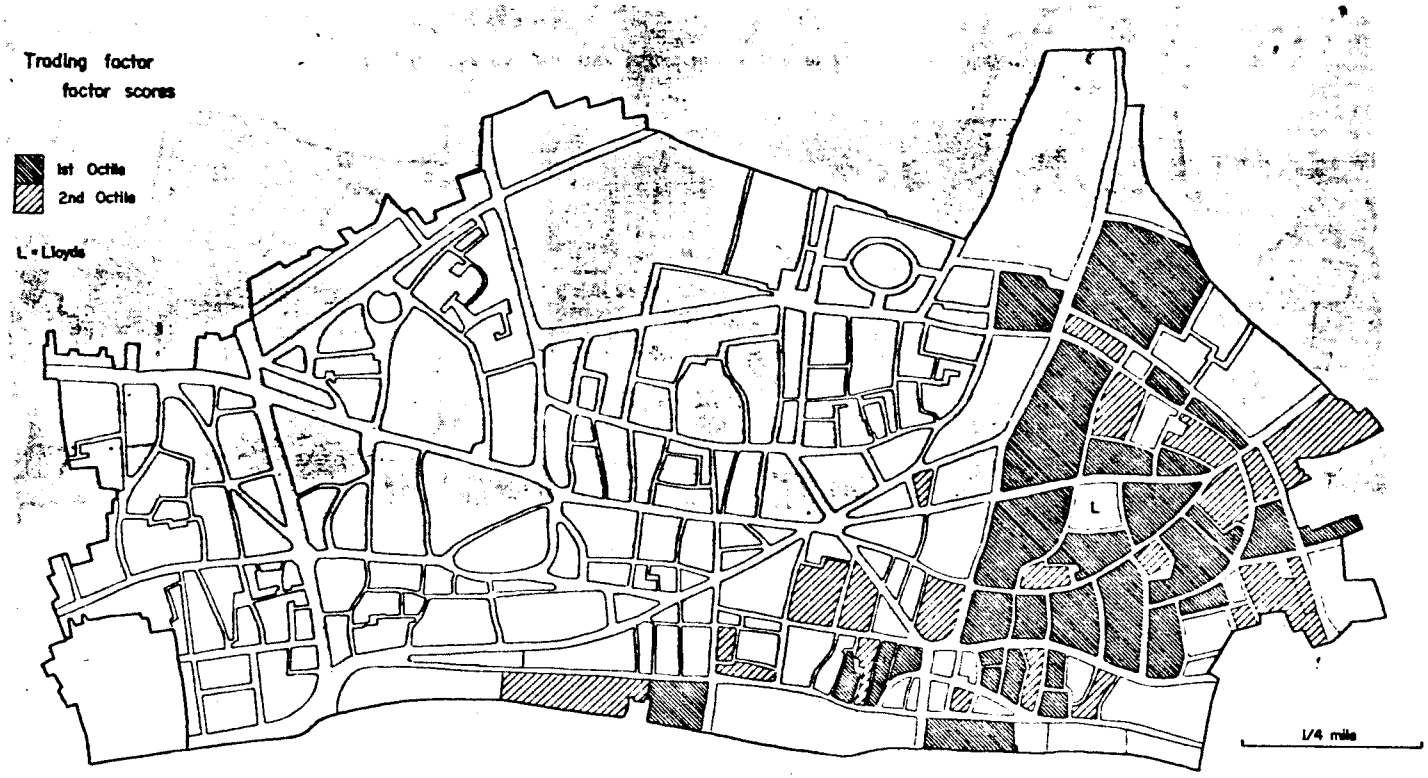
FIGURE 3.7(c)



The financial core factor: distribution of high scoring blocks.

Source: Goddard, J. (1968) Op. Cit., p.78

FIGURE 3.7(d)



The trading factor: distribution of high scoring blocks.

Source: Goddard, J. (1968) Op. Cit., p.77

Whilst underlying dimensions in the variation of employment have been able to be identified by the abovementioned multivariate technique and patterns of locational proximity of certain activities have been identified, there are a number of limitations which this study has not overcome. Historical inertia may be responsible for some of the resultant patterns which may not be truly indicative of economic linkages. Other influences such as vested financial interests and prestige factors may affect the locations of offices in the city centre. Additionally the strength of linkages is unable to be defined by these techniques.

In this instance the basic assumptions of the correlation methods should be examined to ascertain the validity of the study results. Firstly one of the major assumptions of the correlation method is that each observation of a variable is independent[1]. This assumption is violated with a continuous phenomenon such as land use. Thus the correlations that are observed may underestimate the true amount of spatial association.

Bearing these limitations in mind the findings relating to the static structure of the urban area provide the basis for important implications for economic interaction and physical movement.

Spatial Patterns and Employment Structure in Central London

Office Location

The pilot study of the City of London referred to in the preceding pages was later extended by Goddard[2] to encompass the entire

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1. (a) Duncan, O.D. et. al. (1961) Statistical Geography: Problems of Analysing Areal Data", Glencoe

   (b) Neft, D.S. (1966) Statistical Analysis for Areal Distributions, Monograph series, No. 2, Regional Science Research Institute, Philadelphia

2. Goddard, J. (1973) Office Linkages and Location - A Study of Communications and Spatial Patterns in Central London, Pergamon Press, Oxford

Central Area of London. Part of this study was primarily concerned with describing the office employment structure in Central London and the distribution of various types of office employment within the area.

Prior to attempting a description of spatial relationships the location of each type of employment was, in turn, mapped since one of the principal reasons for localization could be involvement in a business cluster. In order to map measures of concentration three different indices of concentration were used. The coefficient of localization, a concentration index based upon the Lorenz curve and the relative standard distance. The first two indices being essentially non spatial are unable to consider the geographical location of each unit of employment - this is achieved by the standard distance[1]. The Lorenz curve index is a better measure of absolute concentration than the coefficient of localization and does not rely on comparisons with a total employment base. The standard distance considers the geographical dispersion of employment about the mean centre or centre of gravity of the distribution.

Many of the differences between the two digit employment sectors were found to ignore significant differences at the three and four digit levels. Figure 3.8 indicates the mean centres of office employment (two digit sectors). However as the mean is very sensitive to extreme values of the distribution, the mean could be located in areas of little or no employment in that category.

A convenient method for depicting the actual areas of concentration is through maps of location quotients which indicate each grid's percentage share of employment in a particular category in proportion to its percentage share of total employment. As illustrated in Figure 3.9 which relates to legal services, the

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1. Bachi, R. (1962) "Standard Distance Measures and Related Measures in Spatial Analysis" in Regional Science Association Papers, No. 10, pp 83-132

FIGURE 3.8

End, north of Oxford Street, and property-owning centred near Charing Cross.

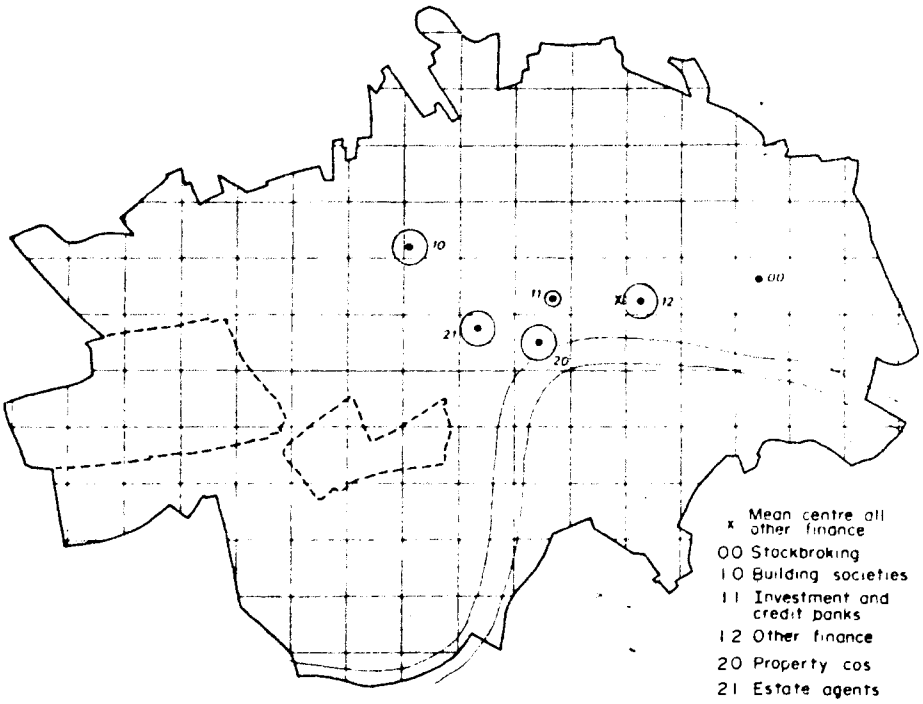

Fig. 4. Mean centres of employment categories within a sector: other finance.

Source: Goddard, J. (1973) Op. Cit., p.133

FIGURE 3.9

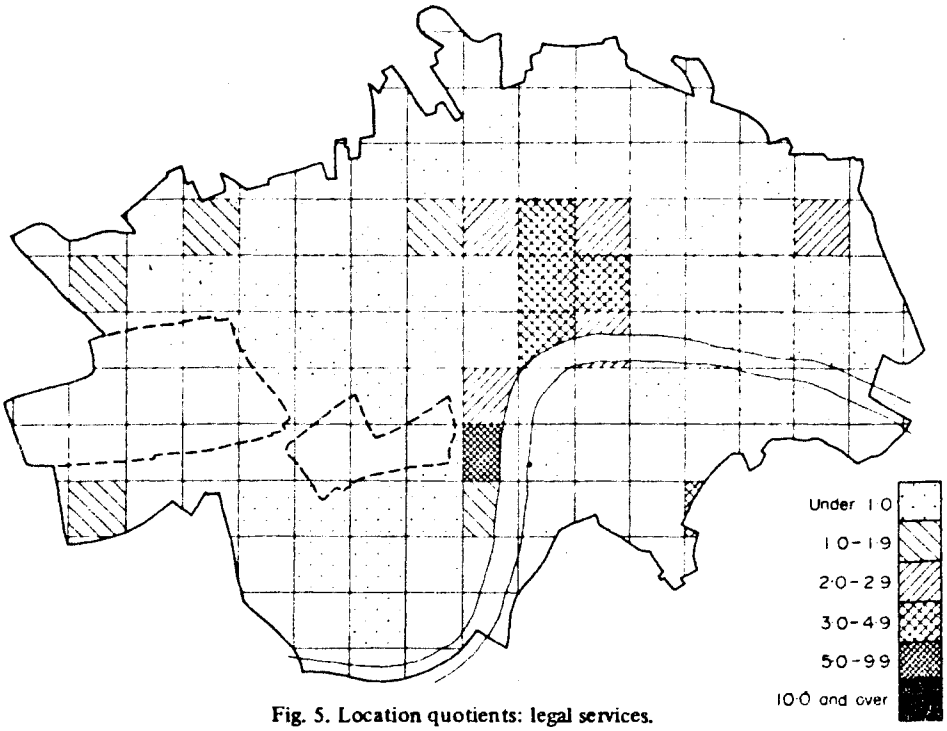

Fig. 5. Location quotients: legal services.

Source: Goddard, J. (1973) Op. Cit., p.133

larger the index the greater the degree of concentration of that activity.

As the location quotient does not take account of absolute amounts of employment a further technique, a modified index of surplus workers had to be employed on a grid cell basis. This index represents the absolute number of workers in each two digit sector in each grid cell over and above those that would be expected on a 'pro rata' basis given the cell's share of all office employment. A complex pattern of highly specialized and highly diversified spatial variation of economic structure emerged. In the core of the City of London only did one or two employment sectors dominate. From one part of the centre to other parts the mix of activities changed in relative importance being added to a basic mix of business and professional services. Publishing ranked high in the western part of the City of London and in Covent Garden, engineering in the Aldwych-Kingsway area, clothing in Soho, insurance, banking, finance and transport in St James, construction and chemicals, societies and associations in Victoria, and engineering and societies in Bloomsbury and the Tottenham Court Road area. Outside of the City distinguishable office districts dominated by a few centres were not evident.

Spatial Linkages of Office Employment

Although it was observed by Goddard[1] that few of the two-digit employment sectors demonstrated distinctive patterns of localization he recognized the fact that it cannot be implied that only highly localized sectors are significantly associated with other activities as linked activities may also show patterns of dispersal. Thus in order to determine similarities in the patterns of spatial variation of office employment he carried out further investigations using correlation analysis, cluster analysis and component analysis techniques. In order to avoid concealing

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1. Goddard, J.B. (1973) Op. Cit., pp 140-141

2. Ibid, pp 141-143

significant associations within the office sector three and four digit levels of employment were examined instead of the broad two digit classification. Using correlation analysis at two levels of sectoral aggregation, a number of basic patterns were able to be identified by Goddard[1]. A limited number of employment categories showed strong associations only with other categories in the same sector and few links with other sectors, for example, in textiles. There were certain categories which had significant links with other activities in the same sector and also with other sectors, for example, in transport and communication. Additionally there were a number of categories that only had associations outside the sector, such as in food, drink and tobacco. A large number of categories had no significant associations at all such as in the chemicals sector. More specifically textiles, leather and clothing exhibited a complex pattern of association within the sector. Publishing was associated with business services such as advertising whilst transport and communication activities were strongly associated with trading activities such as commodity dealing and insurance underwriting. Insurance was associated with banking which was in turn particularly associated with stockbroking and accounting. As regards within group sectors, life insurance has a weak association with risk insurance and in terms of external connections life insurance is more strongly associated with banking and finance and casualty insurance than with shipping and commodity dealing. It should be noted however, that with correlation analysis the measures of association apply only to the system of areal units which constitute the observations for the comparison of the employment variables and that the coefficients derived are only a measure of intra-cell associations[2].

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1. Ibid, p.141

2. (a) Duncan, O.D., Cuzzon, P. and Duncan, B. (1961) Statistical Geography: Problems of Analyzing Area Data, Free Press, Glencoe

   (b) McCarty, H.H., Hook, J.C. and Knos, D.S. "The Measurement of Association in Industrial Geography" in Dept of Geography. Report No. 1, State Uni. of Iowa, Iowa. Cited in Goddard, J. (1973) Op. Cit., p.140

Cluster analysis may be used to unravel this complex pattern of associations and is used to identify a small number of basic employment groups; this involves searching the four digit correlation matrix for the two most highly correlated categories of employment and combining these into a new group; the number of activities is thus reduced by one[1]. Correlations of this new group with all other single categories are then computed and the reduced correlation matrix searched for the next most highly correlated pair which are likewise combined into a group. Eventually all categories are combined into one group. An advantage of this technique is that the development of grouping can be examined at different values for the correlation coefficient[2].

Only four large clusters of employment can be distinguished with a correlation cut off of r = 0.65, namely:

1. Commodity trading
2. Shipping and marine insurance
3. Banking and other finance
4. Clothing and textiles

(See Table 3.7)

At the 0.55 level a number of additional groups emerged and other activities were also assigned to the basic clusters. At the 0.45 level two of the basic groups, commodity trading plus transport services and insurance joined into one group. At the 0.35 level all the financial and trading activities of the City combined into a group independent of West End activities of which the core was made up of clothing and textiles but even at this general level there were many activities unable to be assigned to any group.

As cluster analysis is a stepwise, hierarchical procedure, the misallocation of an individual category to a group could upset all subsequent grouping stages. It is useful to apply components

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1. Parks, J.M. (1966) "Cluster Analysis Applied to Multivariate Geological Problems" in Journal of Geology, Vol. 68, pp 703-715

2. Goddard, J. (1973) Op. Cit., p.142

TABLE 3.7

Cluster Analysis: Membership of the Four Largest Groups
(Four-digit Employment Categories)

Group 1: Commodity trading

Plantation house commodity dealers; grain merchants; other transport services; sugar and confectionery; other food products; agriculture, forestry and fishing; general wholesale merchants; tea and coffee merchants; property owning and developing companies; merchant banks.

Group 2: Shipping and marine insurance

Other insurance – re-insurance, insurance adjusting; underwriters and underwriters' agents; sea transport; postal services and telecommunications; insurance brokers; shipping and forwarding, freight broking, etc.; fire, marine and other casualty insurance; metal brokers and dealers.

Group 3: Banking and other finance

Other banks; bill discounting and foreign exchange; London clearing banks – other special departments; life and casualty insurance combined; stockbroking and jobbing; London clearing banks – head offices; other finance; accounting, auditing and bookkeeping; miscellaneous commodity brokers.

Group 4: Clothing and textiles

Footwear; dresses, lingerie; production and costing consultants; other clothing; clothing and footwear wholesaling; made-up textiles; drawing services, drawing office; scientific, surgical and photographic instruments, watches and clocks; women's tailoring and outerwear; direct-mail advertising circular services.

Note: Cluster inclusion limit $r = 0{\cdot}55$.

Source: Goddard, J. (1973) Op. Cit., p.142

analysis followed by Varimax rotation of the leading components to the correlation matrix to enable simultaneous identification of basic clusters of employment variables[1]. Goddard carried out an analysis on the correlation matrix based upon three and four digit levels of sectoral aggregation and different systems of areal units. The emerging component structures were similar enough to support the idea that the regularities identified in the spatial distribution had some real significance. The five component structures referred to were:

Trading
Clothing and Business Services
Banking and Finance
Civil Engineering
Publishing
(See Table 3.7).

Dunning and Morgan's[2] study of the City of London also evidences a distinct spatial separation between the trading and the banking and finance sector. This analysis identified five groupings of employment categories that are mutually independent in statistical terms since components analysis forces out non overlapping clusters (See Figure 3.6). However these basic groups rather than being independent were inter-related at a higher level. In order to allow for inter-relationships between basic clusters and higher order groupings, Goddard relaxed the constraint that the components should be statistically independent in applying an oblique Promax rotation[3] to the four digit component analysis. Three new higher order rotated components were extracted. The first component combined the trading and

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1. Ibid, p.143

2. Dunning, J. and Morgan, E. (1971) Op. Cit.

3. See Hendrickson, A.E. and White, L.O. (1964) "Promax: A quick method of rotation to oblique simple structure" in British Journal of Statistical Psychology, Vol. 17, pp 65-70

TABLE 3.7

Components Analysis: Three-digit Employment Categories by Grid Square and Traffic Zones

	Varimax rotated Component loadings	
	Grid square	Traffic zone
Component 1: Trading		
Transport services	−0·89	−0·93
Commodity brokers	−0·85	−0·94
Other insurance	−0·44	−0·94
General wholesale merchants	−0·77	−0·83
Food wholesaling	−0·66	−0·74
Agriculture, forestry and fishing	−0·63	−0·83
Food manufacturers	−0·61	−0·69
Export and import merchants	−0·58	−0·67
Transport industries	−0·55	−0·68
Explained variance	16.8%	18.5%
Component 2: Clothing and business services		
Clothing and footwear wholesaling	−0·77	−0·74
Clothing and footwear manufacture	−0·74	−0·66
Management consultants	−0·72	−0·79
Drawing and photographic services	−0·64	−0·57
Drugs, chemicals and other non-food wholesaling	−0·62	−0·74
Advertising and public relations	−0·61	−0·59
Textile manufacture	−0·59	−0·69
Leather, leather goods and fur	−0·58	−0·58
Vehicle manufacture	−0·55	−0·57
Architects	−0·51	*
Timber and furniture	−0·50	*
Miscellaneous manufacturing	*	−0·53
Property	*	−0·53
Explained variance	9.9%	12.7%
Component 3: Banking and finance		
Stockbroking and jobbing	−0·88	0.89
Insurance companies	−0·87	0.81
Central banking	−0·86	0.86
Other banking	−0·80	0·86
Accounting	−0·78	0·94
Other finance	−0·76	0·76
Legal services	−0·72	0·60
Office services	*	0·63
Head offices, overseas companies	*	0·60
Explained variance	6·4%	6·8%
Component 4: Civil engineering		
Metal manufacturers	−0·63	*
Consulting engineers	−0·56	−0·78
Specialist contractors	−0·54	−0·54
Electrical engineering	−0·53	*
Architects	−0·53	−0·53
Mining and quarrying	−0·51	*
Bricks, pottery, glass and cement	*	−0·78
General construction and contracting	*	−0·60
Other specialist consultants		−0·65
Employers' trade associations	*	−0·82
Professional membership organizations	*	−0·59
Charities		−0·74
Explained variance	5·2%	7·5%
Component 5: Publishing		
Printing and publishing	*	−0·73
Paper, stationery and book wholesaling	*	−0·62
Drawing and photographic services	*	−0·51
Explained variance	*	5·3%
Total variance accounted by:		
Four components	37.3%	
Five components		50.8%

Note: Only loadings greater than ± 0.50 are listed. A separate publishing component could not be identified in the grid square analysis

Source: Goddard, J. (1973) Op. Cit., pp 143-144

TABLE 3.7 cont..

Office employment in the three-digit sectors loading above ± 0.50 in the traffic zone analysis

Component	Employment (000's)	Central London total (%)
Trading	93.8	14.3
Clothing – business services	52.1	7.9
Banking and finance	155.9	23.7
Civil engineering	47.6	7.3
Publishing	38.8	5.9
TOTAL	388.2	59.1

Source: Goddard, J. (1973) Op. Cit., p.145

financial activities of the City which set this area apart from the rest of London. Clothing and professional business services localized in the West End were combined by the second component. The third higher order component combined publishing and professional and business services which were localized in the area between the City and West End. Despite these overlaps it appears that Central London is divided into a number of quite distinctive office areas but the bulk of office employment making up these complexes is highly localized in the city area.

Given that similar groupings of employment emerged at all scales of analysis, both geographically and by sector, it would appear likely that office clusters are of some functional significance. In spatial terms it appears that the bulk of office employment is highly localized in the City of London and is far less structured elsewhere in Central London. The basic set of activities which constitute the fundamental office complexes are trading, finance and banking, printing and publishing, clothing and textiles, and civil engineering.

In addition to Goddard's work a study employing multivariate techniques has been carried out in relation to the spatial structure of Sydney's central area. In the Sydney central area a principal components analysis of a matrix of land use and land value area moments* indicated that its structure was composed of four fundamental dimensions[1]:

goods handling - community services
financial - professional - high land values
retailing and consumer services and
general business.

These components together accounted for 62 per cent of variation in the spatial structure of the central area and represented different

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1. Whipple, R.T. (1975) Op. Cit., p.10.56

* A site's areal moment values measure the extent to which land uses and land values are dispersed about it.

movement and accessibility. At a high level of abstraction (where large areal units such as street blocks are used in defining functional areas) it was demonstrated by Whipple that each of the four components was associated with distinctive sections of the central district having different accessibility characteristics. He explained major areas of overlap in terms of the invasion - succession process.

"At this level, and considering one component at a time, the patterns indicate a marked degree of spatial organization which enables inter-actions and economies external to the firm to take place"[1]. Whipple found that as the level of abstraction was lowered and the components studied separately the central area a limited number of peak intensity zones emerged and many of these peaks were physically separated but inter-actions occurred reasonably efficiently between them because of the high levels of accessibility of the district and its compactness. As Whipple's results indicate at a low level of abstraction conceptual clarity can be dimmed.

Having defined ten groups of street blocks which effectively divided the central area into three zones:

goods handling - community services (western corridor)
retailing and consumer services (south of Market Street)
financial - professional - high land value area (north of Market Street)

Whipple[2] found that a far greater degree of real differentiation existed in the zone north of Market Street. This was evidenced by varying combinations of mean component scores for each of its areas, the more extensive land value area being the financial - professional land value area. In the northern zone the retail-consumer services area was found to be contracting as a result of

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1. Whipple, R.T. (1975) Op. Cit., p.10.57

2. Ibid, p.10.59

invasion by the financial - professional component[1].

It is pointed out by Whipple that areal units are an incomplete basis for studying spatial structure as the resulting functional areas become a compromise between loss of detail and level of abstraction unless such a study encompasses different levels of abstraction and spatial covariations such as land value. However he also recognizes that an areal classification based on areal moment measures permits inductions to be made; few inductions would be generated with the use of discrete site characteristics. Whipple's study of Sydney's Central Area did investigate the broad structure of the financial - professional sector but his emphasis on methodology is of value in this study.

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1. Ibid, p.10.60

INFORMATION FLOWS AND FUNCTIONAL LINKAGES OF OFFICE ACTIVITIES

In order to assess how far geographical groupings corresponded to functionally linked office activities and to measure the strength of these linkages, Goddard[1] undertook an analysis of information flows through face-to-face meetings and personal telephone contacts.

The study covered the Central London area within which the communication patterns of a limited number of firms in different office sectors were examined through the use of contact diaries in which each contact event was separately recorded. The multi-variate techniques described in the preceding pages were employed in this study of contacts.

For the purpose of this analysis 42 office sectors were identified - see list at bottom of Figure

Isolating Office Complexes by Contact Flows

These sectors represent a considerable aggregation of the three digit classification. Despite the small sample size, the complexes of offices isolated showed a high degree of correspondence with the spatial clusters identified in the preceding section of this chapter. All of the factors derived from the functional analyses appear to have spatial equivalents except the fuel and public agency factors derived from the analysis of telephone contacts. The activities associated with commodity trading, banking and finance, civil engineering and publishing, together with certain business services such as advertising appear to have functional relationships which also require close spatial proximity.

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1. Goddard, J.B. (1973) Op. Cit., Part II pp 153-184

Contacts Within and Between Group Linkages

As neither factor analysis nor transaction flow analysis can define a complete assignment of sectors to groups, conventional factor analysis was adapted in this study by Goddard to suggest incipient groups and transaction flow analysis used as a guide in assigning residual sectors to groups. It is suggested by Berry[1] in his original work on commodity flows that factor analysis is a suitable technique for identifying functional groups. High factor loadings identify the common chosen sectors and high factor scores the choosing sectors. The transaction flow model requires a comparison of the actual flows between two sectors with that which would be expected given the chosen sectors share of all contacts.[2] Expected contacts that exceed specified thresholds would be assumed to have a strong interconnection relative to the whole system.

Using the above methods of analysis Goddard found that six factors provided the best description of the inter-sectoral telephone contact network: Factor 1 - Civil Engineering; Factor 2 - Fuel and Oil; Factor 3 - Banking and Finance; Factor 4 - Publishing and Business Services; Factor 5 - Official Agencies; Factor 6 - Commodity Trading. (See Table 3.8 for detailed classification of chosen and choosing sectors of office employment included within each factor.) It is noted that due to the sample size, Fuel and Oil may have been over-represented and that the factor score for such may represent an overestimation. It is also pointed out that as some office groups were not included in the sample, they would not be recorded as major choosers; hence in reality more groups may have initiated contacts than are indicated.

The best description of the inter-sectoral meeting network

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1. Berry, B.J.L. (1966) Commodity Flows and the Spatial Structure of the Indian Economy, Dept of Geog. Research Paper III, Uni. of Chicago.

2. Brams, S.J. (1966) "Transaction Flows in the International System" in American Political Science Review, 60, pp 880-898

TABLE 3.8

Factor Analysis of Inter-sectoral Telephone Contacts (columns as receiving or chosen sectors)

Factor 1: Civil engineering

Chosen sector	FL	Choosing sector	FS
Architects	0·868	General construction	5·103
General construction	0·844	Consulting engineers	1·463
Consulting engineers	0·833	Bricks, pottery, glass and cement	1·309
Specialist construction	0·763		
Metals and metal goods	0·689		
Primary industry	0·673		
Bricks, pottery, glass and cement	0·662		

Explained variance: 12·54%

Factor 2: Fuel and Oil

Chosen sector	FL	Choosing sector	FS
Fuel and oil	-0·904	Fuel and oil	5·858
Non-profit services	-0·904		
Transport and communications	-0·876		
Mechanical engineering and machinery	-0·797		
Central and local government	-0·648		
Office services	-0·516		

Explained variance: 12·25%

Factor 3: Banking and finance

Chosen sector	FL	Choosing sector	FS
Stockbroking	-0·885	Banking	-3·876
Property	-0·870	Property	-4·300
Banking	-0·862		
Legal services	-0·848		
Other finance	0·658		
Accounting	-0·524		

Explained variance: 10·95%

Factor 4: Publishing and business services

Chosen sector	FL	Choosing sector	FS
Chemicals and pharmaceuticals	0·881	Chemicals and pharmaceuticals	4·518
Retailing	0·859	Advertising and public relations	2·696
Food, drink and tobacco	0·805	Paper, printing and publishing	2·100
Other special services	0·747		
Paper, printing and publishing	0·716		
Advertising and public relations	0·691		

Explained variance: 10·56%

Factor 5: Official agencies

Chosen sector	FL	Choosing sector	FS
Electrical engineering	-0·906	Entertainment	-5·454
Entertainment	-0·901	Paper, printing and publishing	-1·663
Societies and Associations	-0·711	Miscellaneous business services	-1·191
Miscellaneous business services	-0·675		

Explained variance: 9·05%

Factor 6: Commodity trading

Chosen sector	FL	Choosing sector	FS
Food wholesaling	-0·790	Export and import merchants	-4·980
Textiles, leather, and clothing	-0·772	Property	-1·438
Export and import merchants	-0·609	Commodity brokers	-1·426
Transport services	-0·600	Food wholesaling	-1·181
		Retailing	-1·064

Explained variance: 6·70%. Total explained variance: 62·05%

Note: Only factor loadings greater than ± 0·50 and factor scores greater than ± 1·00 are shown.

FL = factor loading. FS = factor scores.

Source: Goddard, J.B. (1973) Op. Cit., pp 168-169

was: Factor 1 - Banking and Finance; Factor 2 - Entertainment; Factor 3 - Fuel and Oil; Factor 4 - Publishing and Business Services; Factor 5 - Civil Engineering; Factor 6 - Trading. (See Table 3.9 for details of classification of chosen and choosing sectors of office employment relating to each factor).

Total explained variance of the inter-sectoral telephone contacts was 62.05% whilst a lower level of explanation of variance, 53.18% was achieved which suggested that the meeting network was not as structured as the telephone contacts. Factors associated with civil engineering, publishing and business services and banking and finance appear to be the most readily identifiable contact subsystems as these three factors can be equated with similar groupings in the telephone and meetings contacts analysis. See Table 3.9 which describe the meeting networks.

The banking and finance group is the most inter-connected group in the meeting contacts, but ranks third according to telephone contacts. It would appear on this basis, that the latter group has more meeting contacts than other groups. Factors relating to civil engineering and fuel and oil appear to make the most use of the telephone network.

The contact network for telephone contacts and meetings is shown in Figures 3.10 and 3.11 respectively. In these diagrams the heavier lines indicate two way linkages whereas the lighter lines indicate a one way connection.

The pattern of within and between group linkages is summarized in Figures 3.12 and 3.13 and in greater detail in Table 3.9. It can be seen that within group linkages exceed the number of linkages to any other group - 54.2% of telephone contacts are within groups and 10% of meetings. It seems that the meeting network is less inter-connected because contacts are tightly confined to several sectors only. As regards telephone contacts the most internalized group is the financial sector with 71.2% of contacts originating in the group

TABLE 3.9

Factor Analysis of Inter-sectoral Meeting Contacts

Factor 1: Banking and finance

Chosen sector	FL	Choosing sector	FS
Stockbroking	0·908	Banking	5·895
Banking	0·870		
Office services	0·806		
Legal services	0·754		
Other finance	0·658		

Explained variance: 11·21%

Factor 2: Entertainment

Chosen sector	FL	Choosing sector	FS
Entertainment	0·756	Entertainment	5·781
Electrical engineering	0·825		
Non-profit services	0·820		
Other specialist wholesaling	0·805		
Food wholesaling	0·633		
Societies and associations	0·563		
Food, drink and tobacco	0·533		
Transport and communications	0·513		

Explained variance: 10·36%

Factor 3: Fuel and oil

Chosen sector	FL	Choosing sector	FS
Fuel and oil	−0·882	Fuel and oil	−5·609
Mechanical engineering	−0·745		
Other specialist consultancy	−0.692		
Societies and associations	−0·617		
Accountancy	−0·530		

Explained variance: 9·74%

Factor 4: Publishing and business services

Chosen sector	FL	Choosing sector	FS
Advertising and public relations	−0·847	Paper, printing and publishing	−3·000
Paper, printing and publishing	−0·795	Advertising and public relations	−3·310
Retailing	−0·735	Chemicals	−3·173
Chemicals	−0·651	Precision engineering	−1·005
Miscellaneous business services	−0.527		

Explained variance: 8.91%

Factor 5: Civil engineering

Chosen sector	FL	Choosing sector	FS
Consulting engineers	0·807	General construction	3·076
General construction	0·783	Property	2·651
Architects	0·612	Architects	2·640
Specialist contracting	0·783	Consulting engineers	2·290
		Office services	1·212

Explained variance: 7.40%

Factor 6: Trading

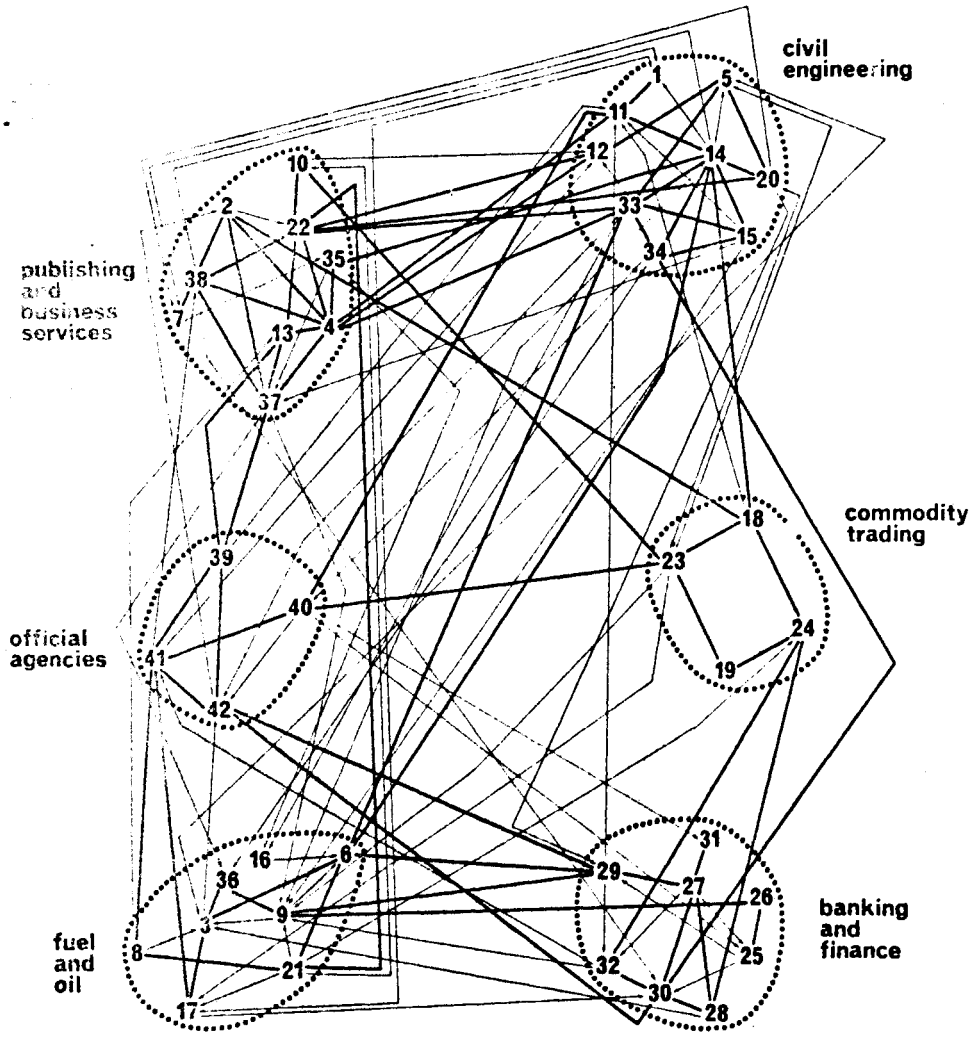
Chosen sector	FL	Choosing sector	FS
Transport equipment	−0·732	Export and import merchants	−4·218
Textiles, leather and clothing	−0·652	Transport equipment	−1·792
Accountancy	−0·639	Other insurance	−1·569
		Precision engineering	−1·263

Explained variance: 5·56%

Total explained variance: 53·18%

Source: Goddard, J.B. (1973) Op. Cit., pp 170-171

FIGURE 3.10

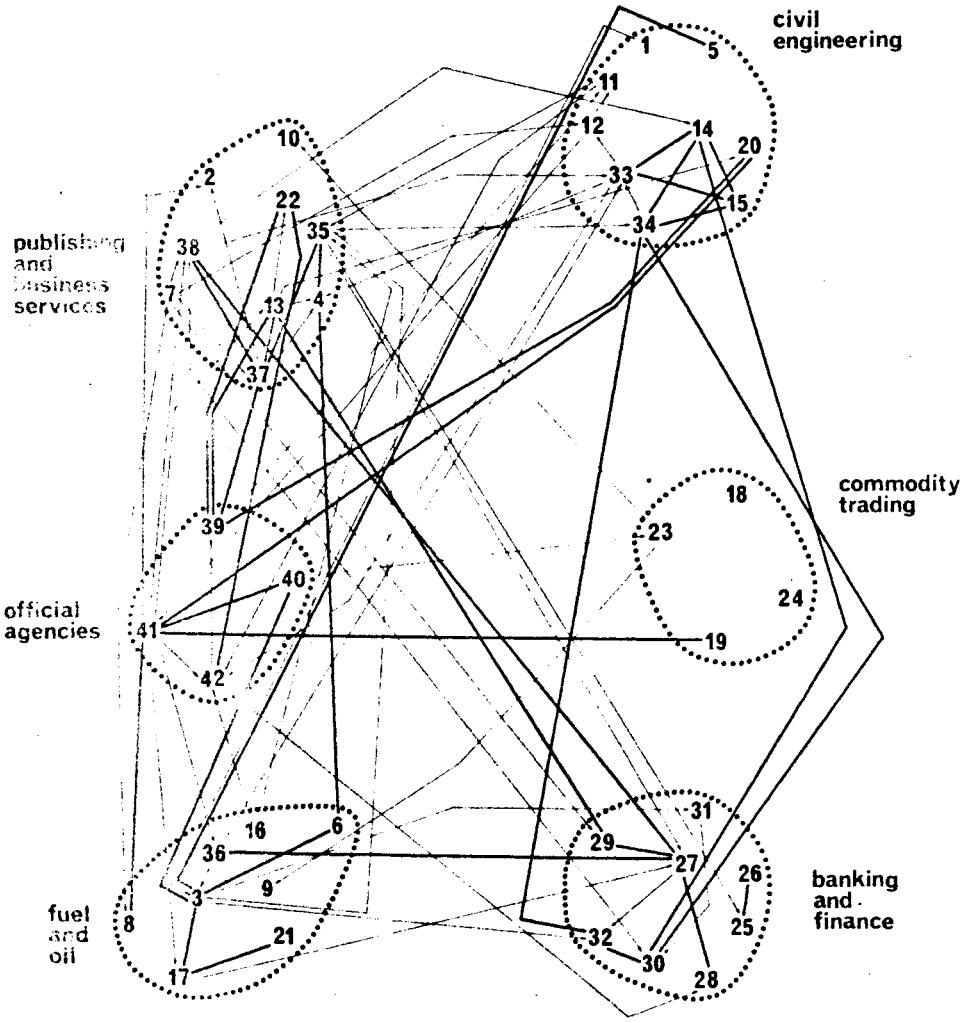


Telephone contacts: salient transactions.

Key to Fig. 1, Primary industry. 2, Food, drink and tobacco. 3, Fuel and oil. 4, Chemicals. 5, Metals and metal goods. 6, Mechanical engineering and machinery. 7, Precision engineering. 8, Electrical engineering. 9, Transport equipment. 10, Textiles, leather and clothing. 11, Bricks, pottery, glass and cement. 12, Other manufacturing. 13, Paper, printing and publishing. 14, General construction. 15, Specialist contracting. 16, Gas, electricity and water. 17, Transport and communications. 18, Transport services. 19, Food wholesaling. 20, Other specialist wholesaling. 21, General wholesale merchants. 22, Retailing. 23, Export and import merchants. 24, Commodity brokers. 25, Insurance companies. 26, Other insurance. 27, Banking. 28, Stockbroking and jobbing. 29, Other finance. 30, Property. 31, Accounting. 32, Legal services. 33, Consulting engineers. 34, Architects. 35, Other specialist consultancy. 36, Non-profit services. 37, Advertising and public relations.

Source: Goddard, J.B. (1973) Op. Cit., p.175

FIGURE 3.11



. Meetings: salient transactions

Key to Fig. . 1, Primary industry. 2, Food, drink and tobacco. 3, Fuel and oil, 4, Chemicals. 5, Metals and metal goods. 6, Mechanical engineering and machinery. 7, Precision engineering. 8, Electrical engineering. 9, Transport equipment. 10, Textiles, leather and clothing. 11, Bricks, pottery, glass and cement. 12, Other manufacturing. 13, Paper, printing and publishing. 14. General construction. 15, Specialist contracting. 16, Gas, electricity and water. 17, Transport and communications. 18, Transport services. 19. Food wholesaling. 20, Other specialist wholesaling. 21. General wholesale merchants. 22, Retailing. 23, Export and import merchants. 24. Commodity brokers. 25, Insurance companies. 26, Other insurance. 27, Banking. 28, Stockbroking and jobbing. 29, Other finance. 30, Property. 31, Accounting. 32, Legal services. 33. Consulting engineers. 34, Architects. 35, Other specialist consultancy. 36, Non-profit services. 37. Advertising and public relations.

Source: Goddard, J.B. (1973) Op. Cit., p.177

being destined for other sectors within the group. Civil engineering however, has only 43.1% of its contacts internal to the group with a large volume of external contacts to the financial and the publishing and business services group i.e. the links are to property companies in the financial group from architects in the civil engineering group and chemical manufacturers in the business services group to the consulting engineers in the civil engineering group.

Generally meetings were found to occur far less frequently than telephone contacts; the financial sectors with their high frequency of meetings tended to boost the frequency of meetings. These results correspond with those arrived at by Thorngren (1973) and discussed in the preceding chapter.

Characteristics of Linkages and the Requirement for Close Spatial Proximity

Before developing a locational policy based on linkage some account has to be taken of the strength of such linkages in terms of the degree to which close spatial proximity is demanded. Thus Goddard's work on characteristics of existing links is particularly relevant to ascertain whether any features of sub-optimality are exhibited[1].

By including features such as length of contact, number of people involved and subject matter discussed, in the analysis of inter-office communication some weighting of these linkages in terms of the need for contacts to take the form of face-to-face meetings is possible. Such weighting is suggested not only by a classification of contacts relating to the mode of communication but also to the fundamental organizational processes to which these contacts are connected. In order to provide a fundamental dimension along which the likely impact of relocation on communication can be measured it is just necessary to classify contacts themselves measured in terms of

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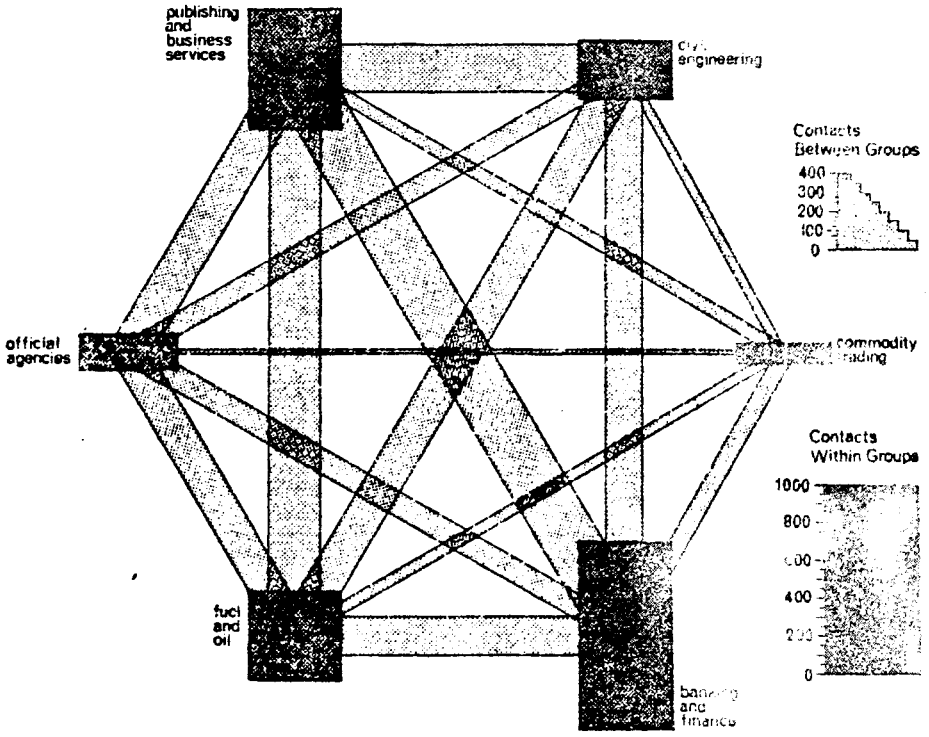
1. Ibid, pp 183-199

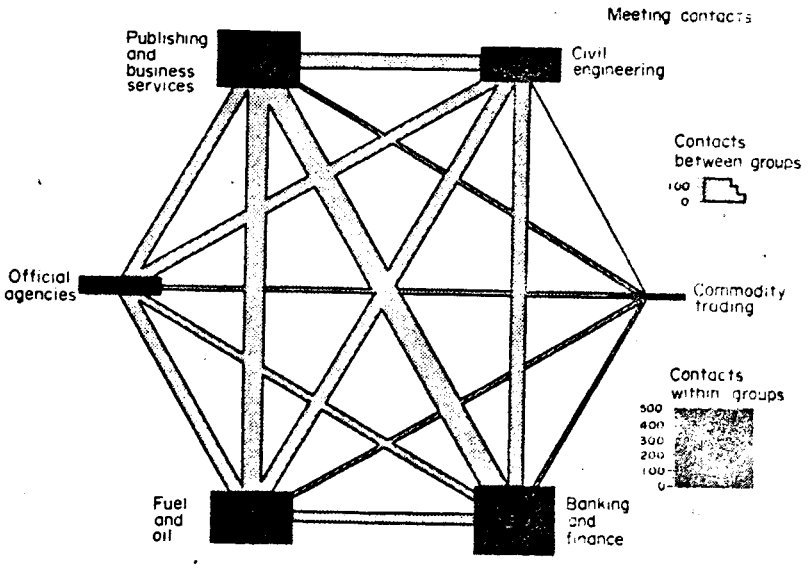
FIGURE 3.12



. Telephone contacts: between groups flows.

Source: Goddard, J.B. (1973) Op. Cit., p.176

FIGURE 3.13



Meetings: between group flows.

Source: Goddard, J.B. (1973) Op. Cit., p.178

features such as mode (telephone or face-to-face), length, frequency and subject matter discussed. Different types of contacts have different organizational significance in terms of the information passing through them. As discussed in the preceding chapter, three types of processes and related contacts are able to be distinguished using latent profile analysis - orientation, planning and programmed activities.

The following variables in contact patterns derived from the body of office contact studies which have been discussed in the preceding chapter dealing with administrative systems constitute a useful and rigorous means of examining the contact patterns of office firms or sections of office firms such as departments:

type of media used; volume of contacts; geographical distribution of contacts; the degree of connectivity (degree of involvement in functional complexes); in terms of inter sectoral and intra sectoral links; ease of adjustment of contact network to a new environment; proportions of high (orientation) and low level (programmed) contacts.

The nature of communication ties described above appeared to vary according to a number of characteristics of firms which could be generally described as:

a. the industrial sector
b. the type of department
c. the status of the individual job.

Variation of Contact Pattern by Industrial Sector

An analysis of studies dealing with office activity contacts within a number of centres points to the existence of distinctive patterns of inter-sector information flows. The inter-sector contacts occurred mainly between sectors concerned with: trading and finance; publishing and related business services; civil engineering and activities relating to the clothing trade. The telephone and meeting contact characteristics of these sectors are summarized below.

Banking and Finance: This sector exhibited the highest intensity of contacts both by telephone and face-to-face. The majority of meetings originating from banking and the majority of telephone calls originating from property and banking on a geographical basis contacts were generally concentrated in the central business area of the capital city. Within this sector, banking and other insurance (other insurance includes brokers, underwriters, reinsurance but excludes fire, marine and life insurance) exhibited the highest geographical concentration of meetings which took place in the central business area of the capital city.

Although the banking and finance sector appeared to be highly inter-connected with other sectors, a closer inspection of the contact patterns of sub-sectors reveals that banking has the highest degree of connectivity with other sectors, that is, has dispersed contacts, numerous indirect connections and high group involvement. Other finance which includes stock broking and jobbing, building societies, investment banks and property exhibited a very high proportion of meetings with overseas firms. This sector tends to conduct the majority of its meetings and telephone calls with other firms in the same sector. As regards the degree of inter-sector connectivity, insurance (life, fire and marine insurance) has little involvement in any of the groups whilst banking has a high group involvement. Other finance and property (real estate agents, developers, valuers, surveyors) are moderately connected with other sectors as they have concentrated patterns of contact flows, numerous indirect connections and relatively weak involvement in any group. Insurance and other insurance are very weakly connected to the contact network as they have few indirect linkages and little involvement with any of the groups. The proportion of orientation contacts varied with sub-sectors in the banking and finance sector - banking rated above average with 17 per cent of its contacts being of the orientation type. Insurance and other finance rated below average.

Publishing and Business Services: Business services (advertising,

office services, drawing services) and professional services exhibited the same high level of contact intensity as firms in financial sectors whilst printing and publishing exhibit a relatively low intensity of contact.

On terms of both meetings and telephone contacts the geographical distribution of business services was concentrated whilst professional services displayed a more dispersed pattern of contacts including some overseas contacts. The printing and publishing sector's contacts were more centralized than professional services but less centralized than business services. Professional and business services rated moderate to high in terms of inter-sector connectivity; publishing and printing rated high. Additionally, a sizeable proportion of contacts originating from all of the other sectors were directed at the publishing/business services sector. The publishing/business sector exhibited a moderately high degree of intra-sector contacts. Professional services and printing/publishing have an above average number of orientation contacts whilst business services had a below average proportion of orientation contacts.

Civil Engineering: The intensity of contact in this sector was moderately high in terms of both telephone and face-to-face contacts. Although both telephone and face-to-face contacts exhibited only a minor degree of centralization, contacts were spread throughout London, the South East region and the rest of the United Kingdom and had an above average number of overseas meetings. In terms of inter-sector connectivity civil engineering, which is composed of consulting engineers, contracting bricks, pottery, glass and architects, has about half of its telephone contacts and meetings internal to the group with substantial volumes of communication to the financial group and the publishing and business group. It is thus highly connected to the contact network. All of the other sectors have a small proportion of their contacts with civil engineering. A below average proportion of orientation contacts is characteristic of this group.

Commodity Trading: Intensity of contact in terms of both meetings and telephone contacts in this group is very low. The geographical distribution of contacts for this sector which includes the export and import merchants, commodity brokers, merchants and dealers was not able to be ascertained. Commodity trading is not highly concentrated in terms of intra sector contacts and constitutes a weak connection in the meeting networks most of its small number of contacts being with public agencies and fuel and oil sectors. Other sectors have very little contact with commodity trading. As regards the proportion of orientation contacts in this group, a below average number have been recorded.

Fuel and Oil: A moderately high intensity of telephone contacts and meetings have been recorded in this sector. Approximately half of its telephone contacts and meetings are centralized whilst the remainder are distributed throughout the rest of the United Kingdom - an above average number of meetings are conducted overseas. The fuel and oil sector was highly connected with the meeting network having dispersed contacts, numerous indirect connections and high group involvement. All of the other sectors had established contacts with the fuel and oil sector. The number of orientation contacts with this sector was high.

Official Agencies: A low intensity of contacts for both telephone media and meetings has been evidenced by this group whilst generally its geographical distribution of contacts was dispersed. Intra-sector contacts within this group were not highly concentrated and inter-sector contact were widespread, thus official agencies recorded a high degree of connectivity in the meeting and telephone contact network. All of the other sectors had some contact with the official agencies sector but in comparison very few contacts originated from the official agencies sector. As regards the proportion of orientation contacts in this sector no information was available.

Clothing Trade: The clothing and textiles sector exhibited

a number of highly concentrated contact flows. In the meeting network this sector was contacted in the main by commodity trading activities such as export and import merchants, whilst in the telephone network two way flows existed between the clothing trade and retailing and commodity trading groups. Few indirect linkages and little involvement in any other groups generally showed the clothing sector weakly connected with the business contact network of large cities.

Having examined the communication ties that apply to office jobs in different industrial sectors, several conclusions might now be drawn as to which sectors could be decentralized. It would seem that a suitable candidate for decentralization would be a firm with few orientation contacts, a geographically dispersed network of contacts, a low level of connectivity to the contact network (especially the meeting network) and a low intensity of contacts with other firms. A central location in a capital city should not be essential to these types of office from a contact viewpoint.

Many firms appear to rely upon central locations in large cities which are 'contact enriched' to obtain information speedily and to generate new ideas and new contacts which are essential to the firm. Those industrial sectors which rated low in terms of proportion or orientation contacts were insurance and other finance in the banking and finance sector, business services in the publishing and business services sector, construction in the civil engineering sector, commodity dealing in the commodity trading sector and other manufacturing (bricks, pottery, glass, cement; timber and furniture; miscellaneous manufacturing) in the manufacturing sector.

The removal of firms from an environment in which most of its contacts were concentrated could result in the loss of clients and the need to establish new contacts where possible. A firm with a widely dispersed network should theoretically be more suitable for decentralization. Those firms with geographically dispersed contacts

were professional services, construction in the civil engineering sector, central and local government in the official agencies sector, other manufacturing in the manufacturing sector. Although from a contact point of view decentralization might be possible. It should be emphasized that suitability of the transportation network and the additional cost of communication may be limiting factors here.

Firms which have a small volume of contacts should, subject to these contacts not being geographically concentrated and not being of the orientation type, be able to function in decentralized locations. Firms which have large volumes of contact may be able to transfer some of these contacts to potential decentralization locations over time but initially the cost of relocating may appear prohibitive to a firm. Thus although those firms with large volumes of contacts many of which are programmed or routine, may not wish to bear the initial cost of decentralizing such a move would probably not disrupt its communication links. Those sectors which initiate few contacts with other firms are commodity trading and public agencies.

Connectivity of business sectors also constitutes a gauge for measuring the potential of a firm to be decentralized. These firms which are highly connected to the business sector network if removed from their locations may cause considerable disruption as they may have been highly involved with other sectors, or not highly involved with other sectors but well connected to the network through indirect links. Although a firm may not generate contacts as is the case with official agencies other firms may generate contacts with them. Thus firms which are weakly connected to the contact network could probably be decentralized. If on a combined basis it was possible to decentralize a large proportion of firms to a new location then it is likely that the multiplier effect of these firms would be a significant factor in effecting strong growth in the new centre. Export and import merchants and commodity brokers merchants and dealers in the commodity trading sector, insurance companies (life, fire and marine) and other insurance (insurance brokers underwriters, reinsurance) in the finance and banking sector generally have weak connections to the contact network.

TABLE 3.10

INDUSTRIAL SECTOR	Subsector	CONTACT CHARACTERISTICS			
		FEW ORIENT-ATION CONTACTS	HIGH PROP-ORTION DISPERSED CONTACTS	LOW INTENSITY OF CONTACTS	WEAK NETWORK CONNECT-IONS
Banking/ Finance	Insurance (life, fire marine)	X		X	X
	Other Insurance (underwriting brokers)			X	X
	Other Finance (Bldg Soc, Invest. Banks)	X			M*
Publishing/ Business	Miscellaneous[1] Business Services	X			M*
Civil Engineering	Construction	X	X		
Commodity Trading/ Export Merchants	Commodity Dealing	X	Not Known	X	X
Manufacturing Bricks, Pottery, Timber, Furniture	Other Manufacturing	X	X		M*
Professional Services			X		
Official Agencies	Central and Local Government		X	X	

*Note: Moderate network connections are indicated by M

Upon the basis of the above analysis it would seem that the least amount of 'communications damage' would be encoutered if commodity dealing and insurance were decentralized. Other decentraliz-

1. Includes news agencies and press services, equipment rental and leasing services and business services other than office, drawing, photographic, advertising and public relations services

Table 3.10 summarizes the decentralization potential of firms according to industrial sector contact characteristics. As it has been shown that there are locational influences additional to contact requirements of office firms in central locations, the remainder of this chapter examines patterns of decentralization to assess the relevance of other forces operating in the environment.

DECENTRALIZATION OF OFFICE ACTIVITY

Having identified those types of office activities which operate in highly structured networks in central business areas, the spatial patterns and contact characteristics of those office activities which function in decentralized locations are examined below with a view to identifying those activities which are capable of operating in environments such as suburban or peripheral locations. From the viewpoint of the public policy maker, these results would provide useful guidance as to the type of office activities and associated employment that could be expected to develop in a suburban centres policy. The effectiveness of government decentralization policies could be assessed in communication terms and regionalization of government offices could also be rationalized on the basis of such data. To achieve this objective some of the social, political and economic factors and physical accessibility conditions which influence the recloation or the location of office activities in decentralized locations are identified below and the characteristics of decentralized office activities examined. It is then proposed to assess the degree to which the above influences constitute office locational requirements for the various activities.

Changing Patterns

In metropolitan areas throughout the world, it appears that as large cities increase in size and density, congestion in the C.B.D. increases and those types of offices with the least need for such a central location begin to decentralize their activities. New firms may be establishing in the outer urban areas in response to the increases of concentration in the C.B.D. and in response to newly developing markets. For the purposes of the ensuing discussion, the term decentralization is employed in the broadest sense. This term was originally seen as an antonym of centralization or the even distribution of population over a landscape so as to reduce the drift to the cities[1], however, the term has broadened considerably

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1. Simons, P.L. and Lonergan, N.G. (1976) "The Mythical Arguments for Decentralization" in McMasters, J.C. and Webb, G.R. (Eds) in Australian Urban Economics, pub. A.N.Z. Book Co., pp 433-445

and now refers to functional expansion at the periphery of a city linked to relative or absolute functional decline in the C.B.D.

The present century has seen a succession of waves of people in retailing, wholesaling, manufacturing and research oriented activities move out of the central city to suburban location. This pattern of relocation and differential growth was not however, followed by office activities for some time. In the majority of cases, population shifted earlier and more completely than employment and indeed there were many individual cases where decentralization of population was accompanied by an actual centralization of employment; for some areas this persisted into the 1960's. Employment in Britain decentralized less rapidly with population than was the case in the United States due partly to urban containment planning controls and the natural pursuit of self-interest by the cities. Decentralization processes, as they relate to office activities in these countries and Australia are identified and explained in the ensuing pages of this chapter.

Environmental Factors Contributing to Decentralization of Office Activities

Social problems and financial problems of the city government which existed in New York appeared to act as a push factor causing headquarters and other levels of office activities to relocate to the more desirable suburban areas. These factors did not exist in the case of Britain and Australia. In the United States factors such as low taxes in some cities, living conditions and complete lack of planning controls appear to have provided incentives to office activities. In London, planning controls aimed at decentralization of office activities increased the cost of office space in Central London such that many activities were unable to locate or remain there. Physical accessibility of different parts of cities also appeared to influence the

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1. Clawson, M. and Hall, P. (1973) Planning and Urban Growth, An Anglo American Comparison; Resources for the Future, John Hopkins Uni. Press, Baltimore, pp 98-101

location of decentralized offices. In the United States the extensive grid highway system encouraged the location of offices on virgin sites and in office parks. In Britain and Australia the radial network does not offer the same degree of accessibility to suburban or peripheral locations. Existing nodes on public transport routes in Britain have tended to redevelop to accommodate further office activity while in Australia comparatively little decentralization has occurred due in part to the reduced level of accessibility in the suburbs and to over-supplies of office space which have until now existed due to investment patterns in the C.B.D. Both Britain and Australia have experienced some regionalization of government office activities as a result of government commitment to decentralization policies. Due to the political structure in the United States and the more regionally oriented distribution of resources office activities appear to be more evenly decentralized.

By 1972 approximately half of the office floorspace of New York, Houston and Dallas metropolitan centres was outside the C.B.D.; in the Twin Cities and Atlanta metropolitan areas, the suburbs provided 56 and 59 per cent respectively of freestanding office space[1]. In just the last decade over 70 per cent of the new office space built in Twin Cities, 65 per cent of that in Atlanta and nearly 60 per cent of that in Houston had been constructed in the suburbs; offices may be found in some of the inner suburbs of the larger metropolitan areas; for example, in Brooklyn (New York), Evanston (Illinois) and Brookline (Massachusetts)[1]. During the period 1956 to 1974 over 55 of the top 500 headquarters left New York City - 70 per cent of these companies relocated in the surrounding suburbs[2]. Quante points out that New York's experience was not unique when compared to the country's nine other leading headquarter centres. These metropolitan areas gained headquarters in their suburbs.

Not only did the large metropolis areas lose headquarters to the suburbs but to other cities such as San Francisco, Los Angeles,

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1. Manners, G. (1974) "The Office in Metropolis: An Opportunity for Shaping Metropolitan America" in Economic Geography, Vol. 50, No. 2, pp 95-96

2. Quante, W. (1976) The Exodus of Corporate Headquarters from New York, Special Studies in U.S. social, economic and political issues, Praeger, N.Y., p.79

Dallas and Houston whose low taxes, living conditions, reduced construction costs and in the case of Houston, complete lack of planning controls acted as incentives. These cities had in excess of 2 million in population and were located in rapidly growing sectors of the nation[1].

Generally the type of suburbs to which offices were attracted were newer and higher income housing areas whilst airports and suburban shopping centres proved to be favoured locations for suburban office growth and prestige office buildings have sprung up around regional shopping centres[2]. Airports have also been a magnet for both owner-occupied and speculative office development; O'Hare in the case of Chicago and Hartsfield in the case of Atlanta are important examples[3]. The principal factor in the location of out of town offices is access to the highway system, the largest developments being adjacent to major freeway intersections and the most significant type of development is the office park[4]. These parks have at least 250,000 ft^2 of floorspace in landscaped surroundings, every employee being guaranteed parking space adjacent to the office. On site facilities such as shops, restaurants and golf courses are not unusual. Figure 3.14 shows the distribution of office parks in metropolitan Atlanta. Generally the decentralization of office activities in the United States results in economic activities being reinforced by one another into commercial nodes.

Suburbanization of office employment has been observed to be a feature of changes in British conurbations since 1951. As manufacturing and wholesaling moved out of the main centres of London, Birmingham, South Lancashire and Glasgow total employment was only maintained between 1961 and 1966 by the expansion of service industry employment in the same areas. But office employment also began to

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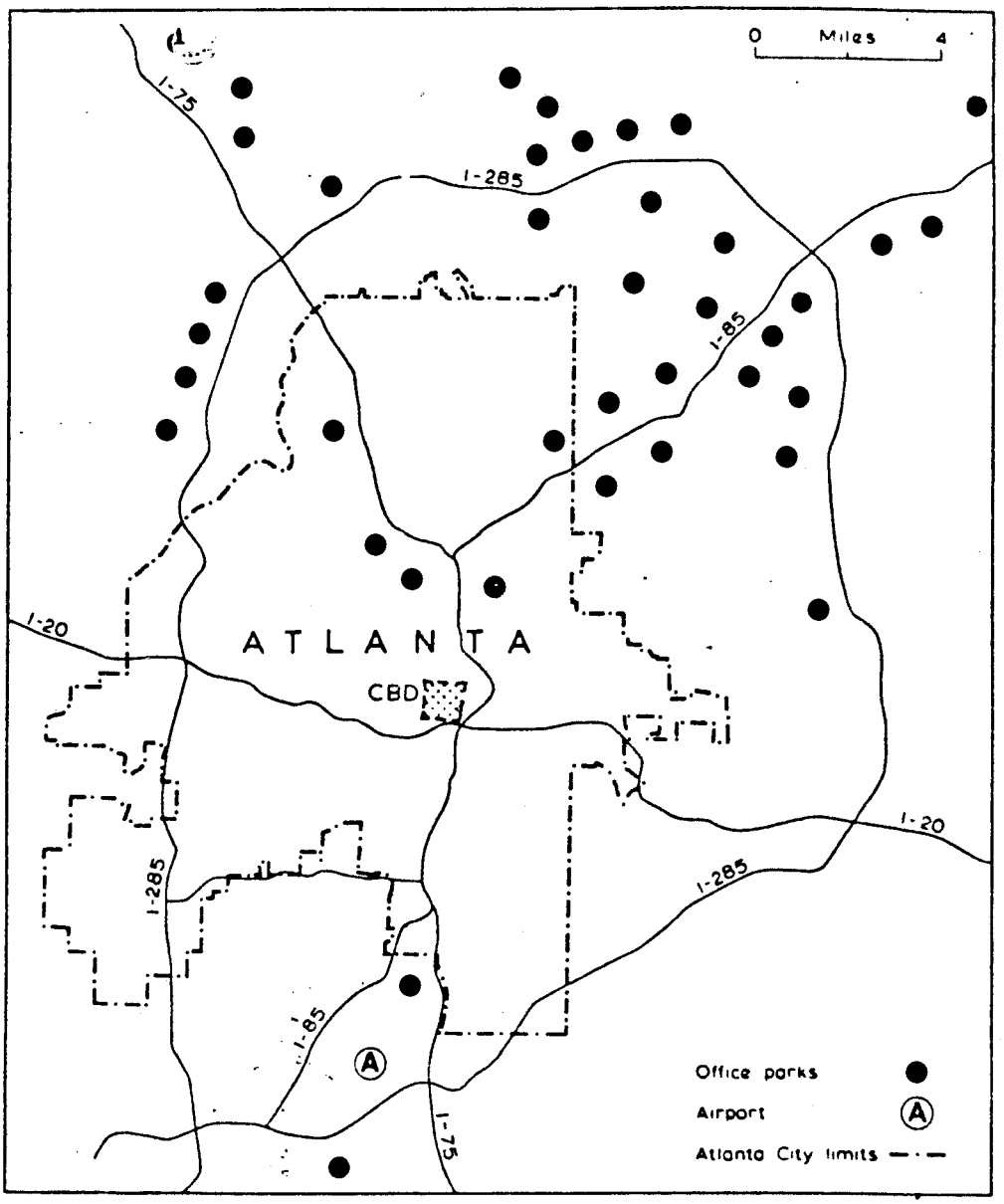
1. Daniels, P.W. (1975) Op. Cit., p.190

2. Jones, D. and Hall, R. (1972) "Office suburbanization in the United States" in Town and Country Planning, Vol. 40, No. 10 pp 470-473

3. Manners, G. (1974) Op. Cit., p.96

4. Jones, D. and Hall, R. (1972) Op. Cit., p.471

FIGURE 3.14



Major office parks in metropolitan Atlanta, 1972 (source: Hartshorn [11]).

Source: Manners, G. (1974) Op. Cit., p.97

shift outwards from the centre of all the conurbations during the 1960's causing the lag effect to gradually diminish[1].

Whilst Central London had a surplus of offices which it was able to decant to the suburbs, this was not possible in the provincial conurbations[2]. Retarded growth in these centres would have been deleterious to the economic well being of the regions and would have reduced their success in attracting new office activities. Suburban office centres such as those in Manchester depend less on dispersal from the C.B.D. than those in London and a good deal more on offices moving in from outside the conurbations[3].

In the early 1960's when concern grew about the planning problems in London, the government adopted office decentralization as a planning policy to relieve some of London's long journey to work and congestion problems. Thus the development of an office decentralization policy stemmed from the imbalances and pressures created within the South-East by the concentration of office jobs in Central London. The removal of the firm became of prime importance and its location secondary[4]. From 1963 to 1969 it is estimated that between 16 and 22 per cent of office jobs in Central London had left with few of the effects of office decentralization accruing outside of the South-East[5].

Table 3.11 below shows Hall's finding that over half of the jobs estimated to have moved out of Central London remained in Greater London; 13 per cent moved more than 80 miles (almost half being government moves as a consequence of a government commitment to

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1. Daniels, P.W. (1977) "Office Location in the British Conurbations: Trends and Strategies" in Urban Studies, Vol. 14, p.262

2. Facey, M. and Smith, G. (1968) Op. Cit.

3. Daniels, P.W. (1977) Op. Cit., p.269

4. Hall, R.K. (1972) "The Movement of Offices from Central London" in Regional Studies, Vol. 6, pp 371-384

5. Hall, R.K. (1972) Op. Cit., p.390

TABLE 3.11

Distances moved by decentralizers

	Complete moves		Partial moves 50 +		Partial moves under 50		Government moves	Total of jobs			
	Upper	Lower	Upper	Lower	Upper	Lower		Upper (No.)	Upper (%)	Lower (No.)	Lower (%)
G.L.C. Area	53,639	33,172	26,342	20,905	7545	5937	3065	90,591	55·8	63,079	52·8
G.L.C.—19 miles	5722	3538	1549	1230	2434	1915	30	9735	6·0	6713	5·6
20–39 miles	5722	3538	10,330	8198	7545	5937	2480	26,077	16·0	20,153	16·9
40–59 miles	2860	1770	1549	1230	2920	2298	1180	8509	5·2	6478	5·4
60–79 miles	1430	884	3099	2459	1704	1341	1194	7427	4·6	5878	4·9
80 +	2146	1327	8781	6968	2191	1724	7110	20,228	12·4	17,129	14·4
Totals	71,519	44,229	51,650	40,990	24,339	19,152	15,059	162,567	100·0	119,430	100·0

Notes: The totals exclude the 5000 jobs attributed to the Nationalized Industries.
It is assumed that each firm took the same number of jobs as other firms in its category.
The totals are calculated by analysing the distance moved by the firms in the samples.

Source: Hall, R.K. (1972) Op. Cit., p.390

decentralization). Not many of these jobs were located in the development areas.

Whereas in the United States decentralization firms tended to move to spacious office parks on virgin sites fringing suburban communities, in Britain, they located in established town or suburban centres where sites were redeveloped[1]. This was due perhaps to the lack of established centres in the United States, increased mobility (in terms of completed freeway networks) and the different planning control philosophies in the two countries.

Examples of suburban expansion in a pre-existing suburban centre are Croydon, Hounslow or Kingston-upon-Thames[2]. Croydon is a prominant and accessible shopping centre approximately 15 minutes from Central London by fast train[3]. The British planning concept has been to identify preferred locations for office development identified in such a way that the number, location and variety of job opportunities are related to the size and structure of the population and accessibility[4]. This system of preferred locations means that on an individual basis suburban office centres are of a greater scale than the American office parks.

While decentralization of office jobs is occurring in large cities in the United States and in Great Britain in the case of London, in Australian cities the distribution of office jobs and detached office building has remained highly centralized. By 1971 Sydney, Melbourne and Perth, the central areas, accounted for similar proportions of office jobs - about 50 per cent in each city

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1. Jones, D. and Hall, R. (197) Op. Cit., p.473

2. Daniels, P.W. (1977) Op. Cit., p.268

3. Daniels, P.W. (1975) Office Location: An Urban and Regional Study, G. Bell & Sons, Lond., p.201

4. Daniels, P.W. (1977) Op. Cit., p.268

whilst the surrounding inner suburban areas accounted for a further 10-15 per cent in each city[1]. This trend is evidenced in the spatial distribution of office employment and even more so in the distribution of office centres.

The spread of residential areas in Australia has in recent years been followed by employment. Between 1961 and 1971 the majority of expansion of employment opportunities occurred in suburban areas which (as defined in Figures 3.14 , 3.15 and 3.16) in Melbourne and Sydney absorbed over 80 per cent of metropolitan job increases, and 65 per cent in Perth. Employment in the C.B.D. areas fell in both Sydney and Melbourne whilst employment in the broader central areas remained static. However in Perth all three subdivisions in the inner city area - the C.B.D., central area and inner ring experienced increases in jobs but growth in the suburban areas was much greater[2].

In the white collar job area the central and inner areas only accounted for a minority of regional growth as may be seen from Table 3.12. However such trends would have been due in part to the suburbanization of jobs in the retail and wholesale trades which had been occurring for some time[3]. It is clear that the expansion of office jobs was as rapid in the suburban areas as it was in the inner city areas.

In Australia the pattern of detached office buildings is highly centralized - in Sydney between 1960 and 1972 the central area accounted for 82 per cent of the value of new metropolitan office buildings whilst in Melbourne the figure was 85 per cent between 1963

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1. Alexander, I. (1979) Office Location and Public Policy, Longman, Lond., p.91

2. Alexander, I. (1977(a)) City Centre and Region: Alternative Futures, Paper delivered at 48th ANZAAS Conference, Aug. 1977, Urban Res. Unit, School of Social Sciences, A.N.U., Canberra

3. Alexander, I. (1977(a)) Op. Cit., p.10

TABLE 2 INNER CITY VS. METROPOLITAN WHITE AND BLUE COLLAR JOB GROWTH, SYDNEY, MELBOURNE AND PERTH 1961-71.

	GROWTH IN EACH SECTOR								Total Jobs In Inner City		Proportion of Metropolitan	
	CBD		Central Area		Inner Ring		Total Inner City					
	No.[c]	%Metro.	No.	%Metro.	No.	%Metro.	No.	%Metro.	1961	1971	1961	1971
WHITE COLLAR JOBS[a]												
SYDNEY	10	6	33	20	34	20	66	40	285	351	69	61
MELBOURNE	Nil.	-	23	18	20	16	43	34	255	298	76	65
PERTH	14	24	18	31	9	15	27	46	74	133	72	61
BLUE COLLAR JOBS[b]												
SYDNEY	-26	-	-41	-	6	4	-61	-	399	338	73	55
MELBOURNE	-23	-	-44	-	2	3	-41	-	305	264	68	52
PERTH	+ 2	5	+ 2	5	8	17	10	21	43	54	51	41

a. Defined as:
1. Professional, Technical and related workers.
2. Administrative, Executive and Managerial workers.
3. Clerical workers.
4. Sales workers.

b. Defined as:
1. Rural and Mining Workers.
2. Transport and Communications Workers.
3. Craft and Process Workers.
4. Service, Sport and Recreation Workers (including armed services).

c. To nearest thousand jobs.

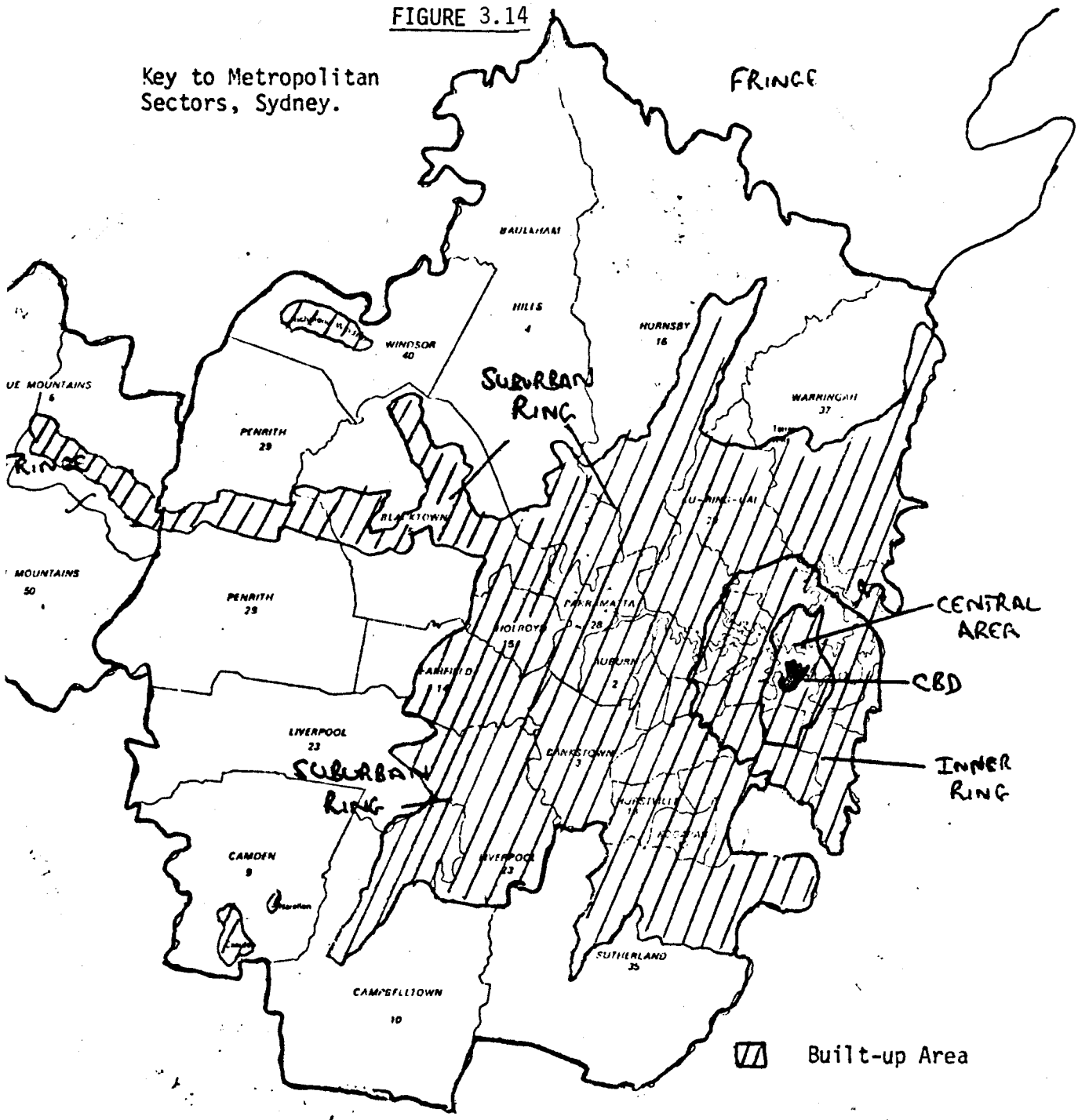
Source: As for Table 1.

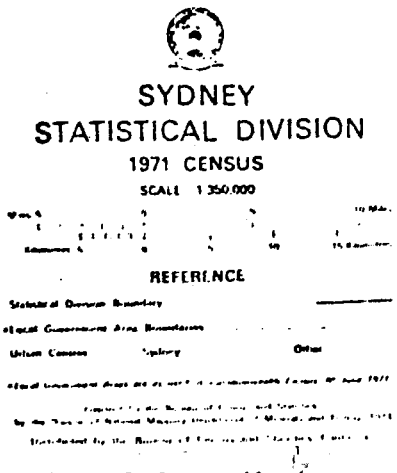
TABLE 3.12

Source: Alexander, I. (1977(a)) Op. Cit., p.9

FIGURE 3.14

Key to Metropolitan Sectors, Sydney.

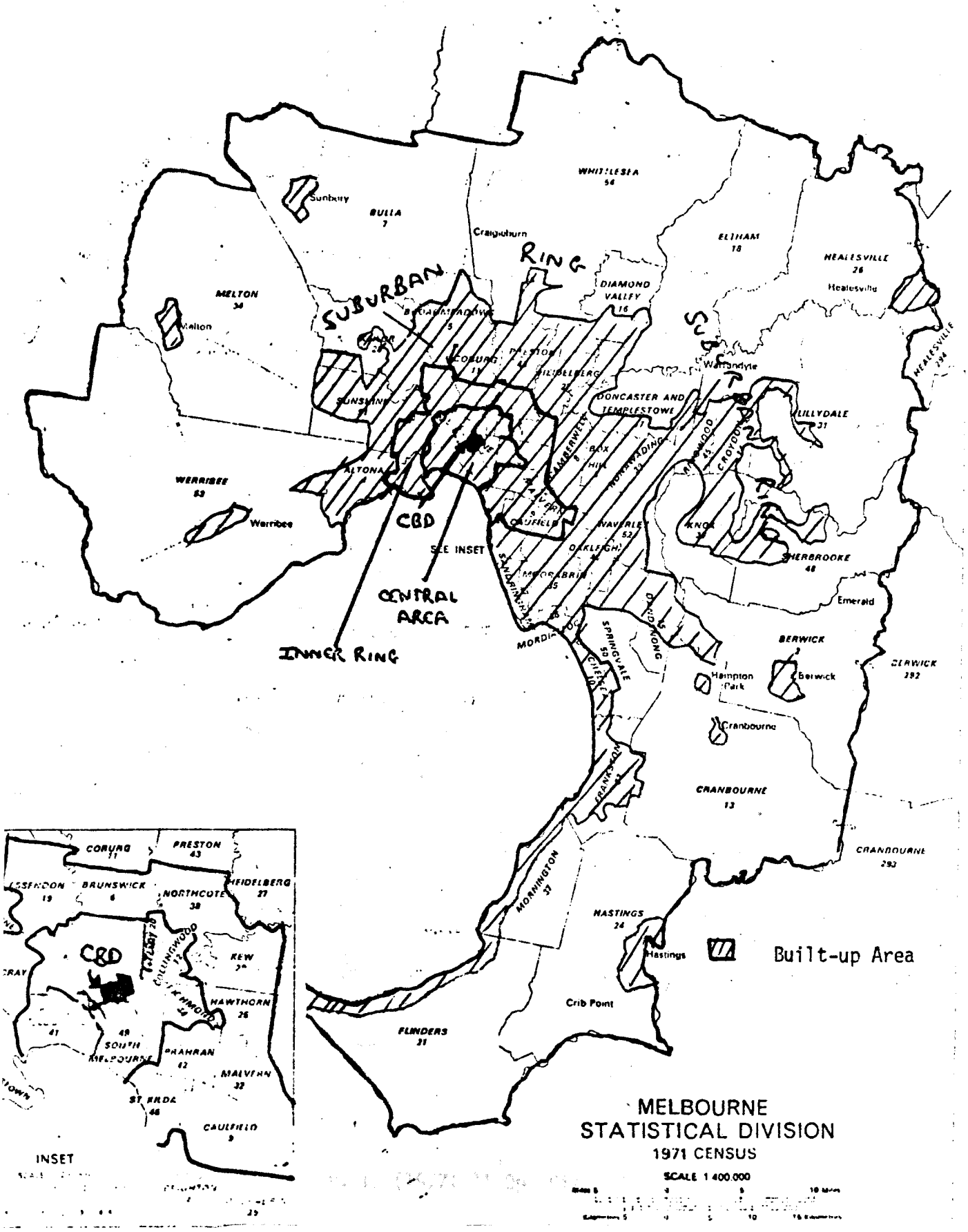




Source: Alexander, I. (1977(a)) Op. Cit., Fig. 1 Appendix

FIGURE 3.15

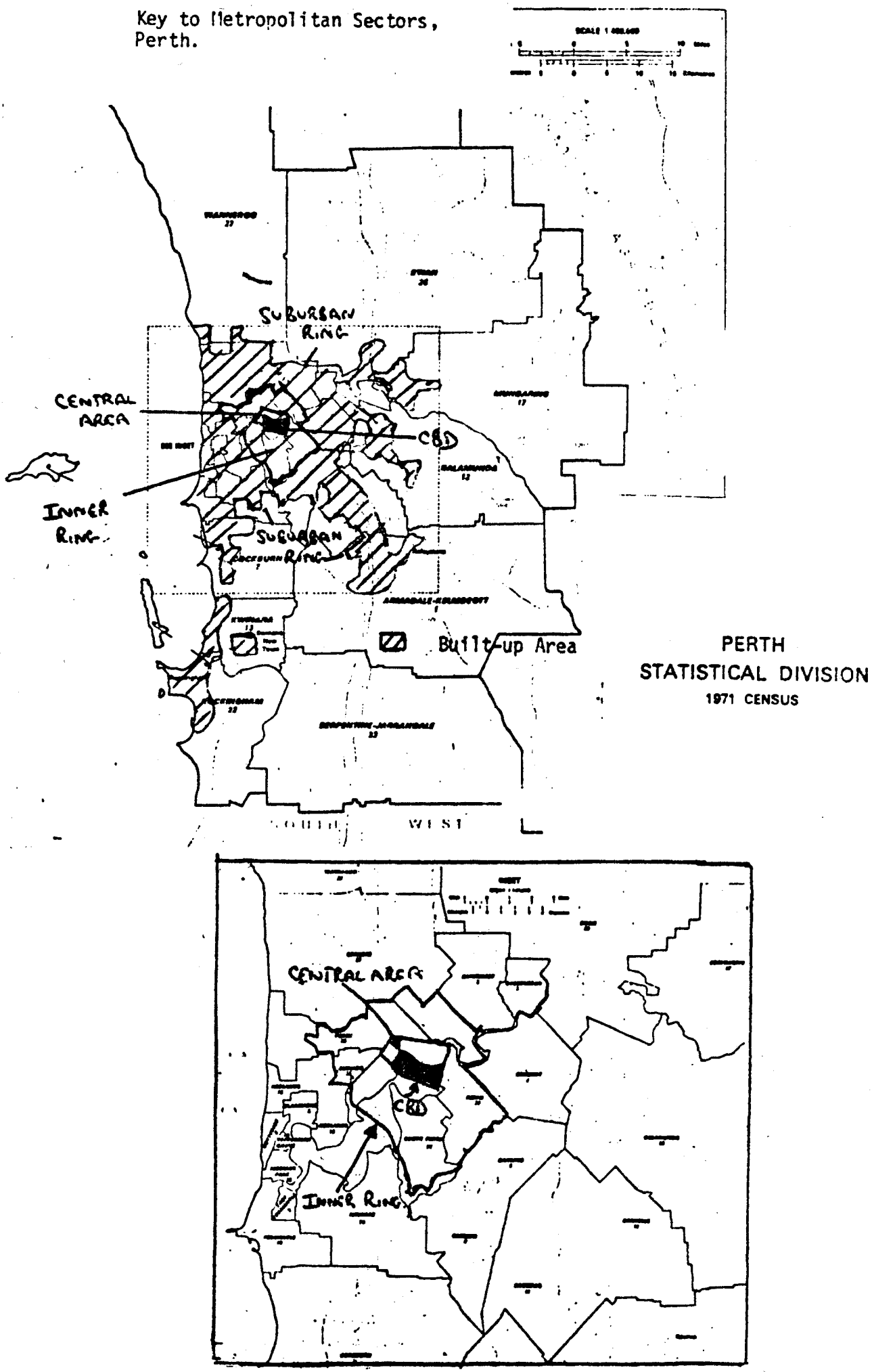
Key to Metropolitan Sectors, Melbourne.



Source: Alexander, I. (1977(a)) Op. Cit., Fig. 2 Appendix

FIGURE 3.16

Key to Metropolitan Sectors, Perth.



Source: Alexander, I. (1977(a)) Op. Cit., Fig. 3 Appendix

and 1972[1]. The situation in Perth was similar[2]. Chatswood and Parramatta have emerged as major suburban office centres in Sydney whilst Dandenong has emerged as a major suburban centre in Melbourne but in comparison to the size of the respective C.B.D.'s these centres are not as significant.

Sydney is an appropriate example which could be used to illustrate this point. The distribution of private sector office space within Sydney for 1971-1972 is set out in Table 3.13. These represent the major office centres in Sydney[3], but together they constitute less than 20 per cent of the total floorspace and the only centres which have more than one per cent of the total floorspace are North Sydney (9.6 per cent), Crows Nest-St Leonards (4.3 per cent), Chatswood (2.0 per cent). As the first two centres are so close to the C.B.D., Chatswood and Parramatta are the only regionally significant suburban centres.

This situation has changed little since 1971 as the value of office completions in the City of Sydney (which relate in the main to the C.B.D.) accounted for an average of 49 per cent of the metropolitan total during the 1971-1974 period; the same figure was 71 per cent over the 1965-1970 time span[4]. Since 1974 the value of C.B.D. office completions as a percentage of value of completions in the Sydney region has remained at %. Until the oversupply of office space in the C.B.D. can be taken up it is likely that the existence of low cost office space in the C.B.D. will reduce the incentive to construct office space in the suburbs.

It seems that the location of office employment cannot be

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1. Alexander, I. (1979) Op. Cit., p.38

2. Alexander, I. (1977 (a)) Op. Cit., p.8

3. As defined by Plant Location International Pty Ltd and W.D. Scott & Co (1972) The Office Space Market - Sydney 1972-80, Report for Study Subscribers, Sydney

4. Alexander, I. (1976) Op. Cit., pp 192-193

TABLE 3.13

TABLE 11.2: OFFICE FLOOR SPACE IN CENTRAL BUSINESS DISTRICT AND MAJOR SUB-CENTRES, SYDNEY REGION 1971-72[a]

Centre	Mining, manufacturing, distribution, transport, construction firms			Finance, insurance, real estate firms			Business, professional, household services			Total private sector			Community service and government[b]			Grand total[e]		
	Floor space 000m²	Per cent Row	Per cent Column	Floor space 000m²	Per cent Row	Per cent Column	Floor space 000m²	Per cent Row	Per cent Column	Floor space 000m²	Per cent Row	Per cent Column	Floor space 000m²	Per cent Row	Per cent Column	Floor space 000m²	Per cent Row	Per cent Column
CBD[c]	592.1	27.7	83.1	539.5	25.3	85.3	342.4	16.0	65.3	1,474.0	69.1	78.4	659.8	30.9	86.9	2,133.8	100.0	80.4
North Sydney	63.4	28.5	8.9	26.5	11.9	4.2	91.1	40.9	17.4	181.0	81.3	9.6	41.7	18.7	5.5	222.7	100.0	8.4
Crows Nest-St Leonards	36.5	43.0	5.1	9.1	10.7	1.4	34.9	41.1	6.7	80.5	94.8	4.3	4.4	5.2	0.6	84.9	100.0	3.2
Chatswood	10.2	23.4	1.4	9.9	22.7	1.6	17.2	39.4	3.3	37.3	85.6	2.0	6.3	14.4	0.8	43.6	100.0	1.6
Parramatta	4.8	8.7	0.7	16.0	29.1	2.5	11.5	20.9	2.2	32.3	58.7	1.7	22.7	41.3	3.0	55.0	100.0	2.1
Liverpool	1.3	6.3	0.2	6.9	33.2	1.1	5.8	27.9	1.1	14.0	67.3	0.7	6.8	32.7	0.9	20.8	100.0	0.8
Bankstown	0.9	6.7	0.1	4.1	30.6	0.6	3.3	24.6	0.6	8.3	61.9	0.4	5.1	38.1	0.7	13.4	100.0	0.5
Burwood	0.3	2.3	0.0	6.0	45.1	0.9	6.5	48.9	1.2	12.8	96.2	0.7	0.5	3.8	0.1	13.3	100.0	0.5
Hurstville	nil	-	-	5.7	46.3	0.9	4.0	32.5	0.8	9.7	78.9	0.5	2.6	21.1	0.3	12.3	100.0	0.5
Blacktown	0.6	5.1	0.1	n.a.	-	-	n.a.	-	-	11.0	93.2	0.6	0.8	6.8	0.1	11.8	100.0	0.4
Fairfield	0.3	2.7	0.0	4.3	38.7	0.7	1.5	13.5	0.3	6.1	55.0	0.3	5.0	45.0	0.7	11.1	100.0	0.4
Bondi Junction	1.6	15.7	0.2	3.6	35.3	0.6	4.0	39.2	0.8	9.2	90.2	0.5	1.0	9.8	0.1	10.2	100.0	0.4
Penrith	0.2	3.8	0.0	0.8	15.1	0.1	1.9	35.8	0.4	2.9	54.7	0.2	2.4	45.3	0.3	5.3	100.0	0.2
Other[d]	n.a.	-	-	n.a.	-	-	n.a.	-	-	n.a.	-	-	n.a.	-	-	17.2	100.0	0.6
TOTAL[e]	712.2	26.8	100.0	632.4	24.0	100.0	524.1	19.8	100.0	1,879.1	70.8	100.0	759.1	28.6	100.0	2,655.4	100.0	100.0

a Floor space measured as net rentable area.

b Community services includes education, social welfare and society offices.

c CBD defined as all of Central Sydney north of Central Railway Station and west of Commonwealth Avenue, Hyde Park and Macquarie Street.

d Other includes Kings Cross, Woolloomooloo and Edgecliff.

e Figures may not sum to total shown because of rounding.

Sources: Clark, 1974; Cities Commission, 1975a.

Source: Alexander, I. (1976) "The Suburbanization of Private Sector Office Development: Fact or Fiction?" in Ed. Linge, G. Restructuring Employment Opportunities in Australia, Dept. of Human Geography, A.N.U., Canberra p.190

equated with the location of office buildings[1]. What are regarded as the major office centres in Sydney (and other capital cities the situation is similar) which represent the majority of freestanding office buildings only accounted for 45 per cent of the suburban office employment. There must be a considerable amount of office employment located in non office buildings such as factories, warehouses and shops and other similar establishments[2]. Whilst the suburbanization of office employment as a whole is occurring in response to the spread of residential population the suburbanization of office centres is not occurring to any great extent.

The Characteristics of Decentralizing Offices Activities

Office activities function effectively in decentralized suburban or on urban fringes where variables such as the functions of the firms, accessibility to the market and the size of the firm and city permit. The functional requirements of the firm depend upon the level and type of contacts required which in turn are related to different departments, the degree to which the firms' product is population oriented, the industry type and its job component. The occupational structure of firms is a useful indicator in this regard. The size of the market area and the degree to which the industry directly services a population determines the number of headquarters, regional or branch or local offices. The size of a firm is relevant to locational requirements as partial decentralization or decentralization of departments with routine contacts is feasible only for large firms capable of supporting departments, which function as individual units of the firm.

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1. (a) Plant Location International Pty Ltd and W.D. Scott & Co (1972) Op. Cit.

   (b) Australian Bureau of Statistics - Value of Non Residential Building Completion Statistics (Office Buildings) 1956-1980

2. Alexander, I. (1976) Op. Cit., p.205

Contrasts in the location of offices are a function of the structure of each office industry, the mix of occupations, the vertical component (or department) of the firm and to the size of the firm unit and to an extent the size and function of the city. Each of these variables is in turn a function of the external contact requirements of an office activity.

In the United States, two office industries which have exhibited a commitment to the central areas are banking and finance[1]. Whilst banking in the outer areas of American cities accounted for as much as 80 per cent of total increase in banking outlets during 1946 and 1956, however they accounted for only 24 per cent of the total percentage increase in value of deposits[2]. Branch banking is non competitive with central banking and represents an additional function. Banks serve various customers groups and market areas. Market areas for household customers tend to be confined to the neighbourhood of the bank office. Large corporations that operate across the country and whose credit demands exceed legal lending limits of many banks have national market areas for bank services[3]. Bies found that bank offices in 50 Standard Metropolitan Statistical Areas in the United States were more suburbanized than population and other industrial sectors as measured by employment. The greatest concentration of deposits which come mainly from large corporate accounts occurs in the C.B.D. bank offices. Those banks located in outlying areas are often located on state or interstate highways attached to commercial districts on these routes[4]. Finance sectors have realized that only through major reinvestments in and around the central city could many of their existing investments retain their

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1. Manners, G. (1974) Op. Cit., p.100

2. Horwood, E. and Boyce, R. (1959) Studies of the C.B.D. and Urban Freeway Development, Uni of Washington Press, Seattle p.93

3. Bies, Susan (1977) "The Future of C.B.D.'s as Financial Centres of Metropolitan Areas: A Demand Analysis" in Journal of Regional Science, Vol. 17, No. 3, pp 432-440

4. Horwood, E. & Boyce, R. (1959) Op. Cit., p.93

value and are unlikely to decentralize their activities to suburban locations[1].

The insurance sector has exhibited a tendency towards relocation or location in the suburbs. Although the locational preference of life insurance is distinctly an urban one in the New York Region, a few headquarters offices of smaller life insuring groups are situated outside the core[2]. But their needs are more regional than national and appear to best be met by suburban centres such as East Orange, Mineota and New Haven. Whilst the field offices of major headquarters supplement the population more related insuring services are in non centralized suburban locations[3]. Non life insurance offices seem to prefer the agglomeration advantage of 'downtown'. As early as the 1950's the insurance sector exhibited signs of decentralization. Between 1946 and 1958, in most large American cities the insurance industry had decentralized approximately 40 per cent from the C.B.D. core and 30 per cent from combined central locations (C.B.D. core plus C.B.D. frame)[4] due to the establishment of regional offices and increased realization that proximity to pedestrians and other businesses was not of primary importance for insurance operations[5]. As communication services such as telephone services and mail delivery were increasingly able to be supplied in outer areas, many of the requirements of the insurance company could be met in the outer areas. Horwood and Boyce suggest that perhaps an important factor preventing insurance firms (large firms) was the ownership of central buildings which are not easy to liquidate. O'Meara reports that Boston lost only one major corporation to the suburbs in the early 1970's but other corporations notably insurance companies, have moved out various segments

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1. Manners, G. (1974) Op. Cit., p.95
2. Ibid, pp 92-96
3. Armstrong, R.B. (1972) Op. Cit., p.85
4. Horwood, E. and Boyce, R. (1959) Op. Cit., pp 69-70
5. Ibid, p.70

of their headquarters operations[1].

Generally the out of town offices are for the most part locally oriented services such as utilities or population oriented business and personal services[2].

It appears that not all industrial headquarters are attracted to the C.B.D. to the same degree as some national market oriented firms have moved their headquarters out of the C.B.D. of New York[3]. Armstrong[4] has classified offices into three levels - headquarters (the highest order of urban offices with national market areas), middle market offices (with regional market areas serving above 150,000 population) and local market offices (serving populations of less than 150,000). Each of these are ranked in descending order of preference for a central location as the first step towards explaining the types of firms likely to succumb to decentralization forces.

In the case of the first group, the headquarters, Armstrong undertook a study of industrial headquarter location in the New York Region to explain why these types of offices which are usually attracted to large urban agglomerations were able to decentralize. He found that the main clue to locational preferences of firms in New York was the product line - twice as many non durable product oriented offices (see Table 3.14) as durable located greater than average shares of their headquarters offices in the C.B.D. The bulk of the receips of non-durable goods were in consumer markets and durable goods sectors usually sold goods to intermediate customers, often, industrial consumers. Thus the less consumer-oriented and more durable the firm's product the weaker was its need to be headquartered in a central location. The heavier durable goods producers account for 44 per cent

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1. O'Meara, J. (1972) Corporate Moves to the Suburbs: Problems and Opportunities, Conference Board, N.Y.

2. Jones, D. & Hall, R. (1972) Op. Cit., p.413

3. Armstrong, R.B. (1972) Op. Cit., p.88

4. Ibid, pp 19-20

TABLE 3.14

Central Administrative Office Employment for Selected Industries in the New York SCA, 1958–1963

	1958		1963		
	Number	Share of nation	Number	Share of nation	% change 1958–1963
Manufacturing	107,831	23.9%	117,779	22.8%	9.2%
Nondurable goods	62,591	29.0	71,244	29.3	13.8
Food	11,912	21.9	13,578	22.5	14.0
Textile	7,221	58.5	6,174	38.3	−14.5
Apparel	3,015	46.8	3,101	36.1	2.9
Paper	5,566	26.7	6,366	27.8	14.4
Printing and publishing	2,892	52.1	3,178	34.0	9.9
Chemicals	20,893	32.5	27,045	36.7	29.4
Petroleum and coal	11,092	21.3	11,802	22.6	6.4
Durable goods	32,622	21.9	35,847	19.9	9.9
Stone, clay, glass	2,823	15.7	2,994	12.0	6.1
Primary metals	3,819	11.7	4,281	11.6	12.1
Fabricated metals	7,671	28.9	5,076	25.7	−33.6
Nonelectrical machinery	7,950	26.5	8,913	21.4	12.1
Electrical machinery	9,493	26.6	15,330	26.1	41.5
Instruments	956	15.6	1,255	13.1	31.1
All other manufacturing	12,618	14.7	10,686	11.6	−15.3
Selected services	4,453	29.5	9,310	35.2	109.1
Business services	1,576	35.8	3,642	42.1	131.1
Wholesale trade	14,858	14.5	18,752	15.8	26.2
Retail trade	27,374	18.4	32,505	20.3	18.7
Total	154,516	21.6	178,346	21.7	15.4

Source: U.S. Census, *Enterprise Statistics: 1958 and 1963*, Special tabulation.

Source: Armstrong, R.B. (1972) Op. Cit., p.63

of detached central offices located in the suburban rings of New York[1]. This finding is substantiated by Manners whose studies of metropolitan America show that production oriented and manufacturing enterprises are more inclined to relocate than consumer oriented industry[2].

As regards the geographical distribution of occupation mix some office occupations such as computer operators and machine billers are growing fastest in the suburbs. In particular it is those occupations with a considerable routine or repetitive component that are severing their ties to the central city; other jobs demanding more specialized information and frequent decision making continue to function mainly in the C.B.D.[3] O'Meara has observed that large companies with headquarters in New York City now have from 10 to 50 per cent as many employees working on corporate staff and clerical jobs in the outer suburbs as they have in New York City[4]. Those offices primarily responsible for the growth of outlying office activity are the more routine labour intensive functions.

Offices which took part in the decentralization movement were able to be identified according to the function of the department of the firm when partial decentralization of office activities occurred. Branch and regional offices are often located in outer urban areas in response to population or market area movements[5], or the locally oriented services[6]. Armstrong found that suburban offices were mainly district sales and service centres and product divisional units which were less skilled and labour intensive. Research

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1. Armstrong, R.B. (1972) Ibid, p.72
2. Manners, G. (1974) Op. Cit., p.100
3. Ibid, p.100
4. O'Meara, J. (1972) Op. Cit., p.1
5. Manners, G. (1974) Op. Cit., p.100
6. Jones, D. & Hall, R. (1972) Op. Cit., p.473

facilities were physically separate from head office and often located in the suburbs.

As in the United States office decentralization in Great Britain has been industrially selective. (Table 3.15). This table illustrates that the greatest number of office jobs per firm occur in the service industries, that is, insurance, banking and finance which represented over 25 per cent of the jobs decentralized from Central London since 1963. There are many routine departmental functions in these offices which makes them suitable for relocation away from the central areas such as London[2]. The preceding table also illustrates that as a whole service industries have moved more office jobs (twice as many) than manufacturing industries. Most of the long distance moves have been made by insurance and professional scientific services[3]. Outside the South East very few national companies have established headquarters in regional office centres while growth in Manchester, Liverpool, Bristol, Leeds and elsewhere has been almost exclusively of a local and regional character, particularly in the field of banking, insurance and finance[4]. In most provincial cities suburban office development is rather different from suburban decentralization in Central London and consists mainly of purely local offices displaced in redevelopment schemes[5]. Most insurance companies have located branch offices in Leeds and Dublin to provide general insurance for clients as contact tends to be customer oriented. The banking and finance offices are also regionally and locally oriented[6]. Although a number of firms belonging to the

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1. Armstrong, R.B. (1972) Op. Cit., pp 72-75

2. Daniels, P.W. (1975) Op. Cit., p.187

3. Ibid, p.187

4. Wright, M. (1967) "Provincial Office Development" in Urban Studies, Vol. 4, pp 218-251

5. Ibid, p.223

6. Fernie, J. (1977) "Office Linkages and Location: An Evaluation of patterns in three cities" in Town Planning Review, Vol. 48 pp 78-79

TABLE 3.15

OFFICES DECENTRALIZED FROM LONDON 1963-73 AND NON-MOVERS 1963-73 – BY INDUSTRY

	Offices moved and moving			Non-movers		
Industry[1]	No. of firms	No. of jobs	Mean size (Jobs/offices)	No. of firms	No. of jobs	Mean size (Jobs/offices)
Food, drink, tobacco	361	4259	118	24	3145	131
Chemicals, allied industries	84	12311	147	54	5175	95
Engineering, electrical goods	153	10125	66	111	8203	74
Office machinery/furniture	33	6262	190	10	699	70
Textiles, leather goods, etc.	18	1115	62	17	717	42
Paper, printing, and publishing	72	8105	113	82	6658	81
Other manufacturing industries	92	5318	58	54	2421	45
Construction	36	4440	123	15	1613	107
Distributive trades	128	7631	60	100	6073	61
Insurance	146	20651	141	55	5513	100
Banking and finance	51	8361	164	32	3271	102
Professional/scientific services	177	9166	52	157	7626	49
Miscellaneous services	103	7253	70	112	6684	60
Trade associations	55	1101	20	43	2149	50
Transport and communications	88	10390	118	45	6634	147
Totals	1272	116488	92	911	66581	73

Note: 1. Industry groups do not coincide with the S.I.C. classification but have been devised to fit the requirements of L.O.B.

Source: Location of Offices Bureau, *Annual Report, 1972–73* London: Location of Offices Bureau, 1973), Table 7, p. 37.

Source: Daniels, P.W. (1975) Op. Cit., p.187

finance industry have decentralized in terms of the financial activities still in Central London, this industry has generally remained in the central area of London[1].

Given that the main functions of an insurance company are:

(a) the underwriting of new business and the settlement of claims; and

(b) the investment of premium income and pension funds and that the locational requirements of these functions and the departments which service them are not necessarily the same

only a small amount of home business related to the first function is initiated in the City (London) but is done in branch offices or 'in the field' throughout the country, the more international business being handled in the City[2]. It has been further demonstrated by Dunning and Morgan that it is the second main function of the insurance companies, particularly life assurance companies that are concentrated in the City but that those departments engaged in the head office activities such as policy making, general administration, settlement of claims, centralized accounting, actuarial and legal services and market intelligence have been the chief candidates for dispersal from the City in recent years[3]. It would seem that more than any other industry it has been the insurance industry which has most decentralized since the War.

As regards offices in the industrial sector it appears that firms had strong reasons for being in London but links with the City itself were not strong; there are at least twice the number of head offices of manufacturing firms in the West End than are in the City[4].

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1. Daniels, P.W. (1977) Op. Cit., p.268

2. Dunning, J. & Morgan, E. (1971) An Economic Study of the City of London, Allen & Unwin, Lond., pp 320-321

3.

4. Ibid, pp 431-432

Evans[1] has noted that headquarters with 'standardized' products such as steel have tended to locate in the region of their plants. The centralization of control increased, however, following the nationalization of this industry. These observations correspond with Armstrong's finding in America. Studies carried out by the Location of Offices Bureau (1967) have shown that those offices most prone to decentralize in the manufacturing sector are offices of chemical and allied industries, engineering and electrical goods, and paper printing and publishing. These types of firm in addition to the insurance and professional/scientific services made most of the long distance moves[2]. With the exception of paper the headquarters locational preferences exhibited in New York[3] corresponded exactly with the locational preferences (non central) of industrial headquarters in London. The fact that paper has been grouped with printing and publishing by the L.O.B. may have distorted the results of the study.

In Britain a good deal of evidence has been gathered which suggests that the firms which have decentralized have been in the main self-contained departments requiring little communication with other firms and that the types of occupations which are employed in these firms for the suburbs are low level jobs such as clerical. As the routine work of collection and processing of data upon which decisions are based increases and its character changes with the introduction of automated process, senior staff find it increasingly difficult and less necessary to remain in close touch when routine office workers were moved out of the city. This began to happen in New York in the late 1950's and a few years later this trend appeared in London[4]. Departments and staff dealing with billing, tabulating, social security, record keeping, division pay roll and sales orders were decentralized. More than 50 per cent of firms which took part

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1. Evans, A. (1973) "The Location of Headquarters of Industrial Companies" in Urban Studies, Vol. 10, pp 387-395

2. Cited in Daniels, P.W. (1975) Op. Cit., p.187

3. Armstrong, R.B. (1972) Op. Cit., p.71

4. Wright, M. (1967) Op. Cit., p.240

in an interview in London agreed that they had departments for which a London address was not essential[1]. Departments considered most suitable for decentralization were accounts whilst records, personnel and sales orders were mentioned frequently.

With the exception of Greater London, all the conurbations had over 50 per cent of clerical workers employed in the suburbs in 1966 and the proportion had increased to over 60 per cent in 1971[2]. Most of the jobs moved to development areas, as a response to the government aid to service industries being introduced, were routine clerical jobs[3]. It seems likely that particular departments would be selected for decentralization on the basis that there was a lack of necessity for contact with external organizations in London and internal departments remaining in London[4]. Dunning and Morgan's studies of London have also found that offices or departments dealing a routine, self contained nature such as accounts, statistics, printing and stationery, have been prone to decentralize[5].

Generally the size of firm decentralizing has been found to be related to the type of office movement - complete and partial. The former involves removing the entire organization from one location to another and is more frequent amongst small offices unable to support the cost of operating two premises[6]. Partial moves involve the separation of the office usually on the basis of departments involved in routine tasks which can operate in a non central location. It is the large offices which tend to engage in partial decentralization and on the average a partial move from Central London has been found to affect

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1. Ibid, p.240

2. Daniels, P.W. (1977) Op. Cit.

3. Quince, R. (1977) "A Regional View on Office Planning" in Town and Country Planning, Vol. 45, pp 21-25

4. L.O.B. (1964) A Survey of Factors Governing the Location of Offices in the London Area, L.O.B., London

5. Dunning, J. and Morgan, E. (1971) Op. Cit., pp 327-328

6. Daniels, P.W. (1975) Op. Cit., p.186

twice as many jobs as a complete move[1]. The Office Development Permit system introduced in 1964 to reduce the amount of office space in Central London greatly influenced the size characteristics of commercial decentralized firms. The O.D.P. systems pushed the price of office space upwards and this combined with increasing unwillingness to let small areas in times of shortages and high prices forced many small firms to relocate or establish in the outer areas of London. At the same time the acute shortage of office space severely restricted the movements of the largest firms. Thus both ends of the market - small and large office firms tended to relocate away from Central London[2].

In terms of numbers the relocations from Australia's largest city, Sydney, are composed in the main of professional firms (49 per cent of total), manufacturing and mining (25 per cent) and distribution firms (17 per cent)[3]. Alexander has commented upon the difficulty in generalizing on office behaviour patterns as an interview survey in Wellington offices pointed to the fact that the most mobile industrial sector in Sydney's case - professional and business services, had little propensity to relocate from the city centre. However, bearing in mind Wellington's population of 150,000 it is likely that decentralization of office activities would be detrimental to the industry and indeed to the centre. An examination of the employment relocation associated with these industries reveals some interesting results. As Table 3.16 shows the financial sector which comprised only nine per cent of the movers contributed almost 40 per cent of the jobs moved whilst the office activities of the manufacturing/mining sector dominated the balance, accounting for 42 per cent of the jobs moved. As has been demonstrated by the L.O.B. in London, the office activities related to the financial and manufacturing sectors offer the greatest potential in employment redistribution. Firms or parts thereof with a high clerical content, namely financial firms, do not have as great a need for a central location as a firm or part of a firm with a high executive content.

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1. Rhodes , J. and Kan, A. (1971) Office Dispersal and Regional Policy, Dept of Applied Economics Occasiona Papers, No. 30, Cambridge Press, Lond., p.18

2. Daniels, P.W. (1975) Op. Cit., pp 185-186

3. Alexander, I. (1978) "Office Decentralization in Sydney" in Town Planning Review, Vol. 49, No. 13, pp 404-416

TABLE 3.16

Composition of non-local offices relocating from Sydney central area to suburban centres - 1965 - 1975

TYPE OF FIRM	% FIRMS BY NUMBER	% FIRMS BY EMPLOYMENT	% FIRMS TO INNER CENTRES	
			Chatswood	Burwood
Manufacturing, Mining, Service Industry	25	42	60	10
Distribution	17	13	90	-
Financial	9	38	45	55
Professional and Business Service	49	7	70	20
TOTAL	100%	100%	64%	21%

Source: Alexander, I. (1978) Op. Cit., p.408

Most of these moves have been to the inner suburban areas especially Burwood and Chatswood which have absorbed over 85 per cent of such moves and have been within distances of 10 kilometres[1]. Also dispersal was limited to centres close to areas of executive residences such as Gordon/Pymble.

A check on the process of private office suburbanization over 1965-1975 was undertaken by Alexander who checked the head office addresses of all companies listed in the 1965 edition of Business Who's Who of Australia and then checked in 1975 for a non C.B.D. address[2].

1. Alexander, I. (1978) Op. Cit., p.409

2. Alexander, I. (1975) Offices in the Suburbs: A Survey of Private Office Establishments in Sydney Suburban Centres, Dept of Environment Housing and Community Development, Canberra, Australia, pp 30-31

Thirty per cent of the 744 firms traced could be said to have decentralized.

It was clear that the manufacturing and distribution industry groups were the most mobile with 52 per cent and 40 per cent respectively, of the firms in these groups leaving the C.B.D. - North Sydney area over the period. Only 9 per cent of the insurance companies and 15 per cent of the finance companies had relocated away from the C.B.D. - North Sydney area. The head offices of the manufacturing and distribution firms constituted almost 50 per cent of all the firms leaving a central location over the period but Alexander found that the majority of these moves were to industrial areas and estates outside the suburban centres. In some cases office and factory/warehouse made a joint move or an office operation joined a factory.

The professional and business service firms in the directory showed a marked tendency to move to North Sydney or to the Crows Nest/ St Leonards area and in total 50 per cent of the listed business services and 46 per cent of the professional services left the C.B.D.[1] over the period. There was a tendency for insurance companies to relocate from the C.B.D. to North Sydney, however the C.B.D. tended to be a dominant location for this activity with 62 per cent of life insurance and 73 per cent of accident/fire insurance offices being in the C.B.D. in 1974. Only 16 per cent of the former and 12 per cent of the latter are located in suburban centres with Chatswood and Burwood being the only centres to have a significant number of non local function insurance offices. Total or partial relocations of office operations strongly oriented to routine functions is slowly increasing in the financial sector however the movement of their head offices is much later due not only to contact requirements but also to the large amount of vested interest the sector has in central office development[3].

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1. Ibid, p.32

2. Ibid, p.33

3. Ibid, p.410

Access to clients and customers was found by Alexander to hold more significance for professional and business service organizations in Sydney development companies and others serving a state or metropolitan market[1]. It is likely that many firms have shifted to remain in the centre of their market areas especially those outer suburbs offices of market oriented firms in the development and building business (especially home builders) and related development-orientated professional firms - architects, engineers and surveyors. These firms require ready access to the metropolitan fringe where residential construction is focussed.

An examination of the structure of market areas of firms in the major suburban office centres in Sydney (Table 3.17) has shown that the vast majority of these, 80 per cent of the total, were classified as serving a district or local market, 18 per cent were classified as serving a metropolitan or state (N.S.W.) market and the remaining 3 per cent as serving an interstate or national market[2]. It is clear that the suburbanization of office activities in Sydney has not involved the relocation of headquarters to any great extent. (The method used by Alexander to classify firms according to their market areas is listed in Appendix 10).

In 1971 the distribution of office jobs was completely dominated by the inner city (City of Sydney, Mosman, North Sydney, Leichhardt, Marrickville and Woollahra Municipalities). Table 3.18 shows that there was a significant amount of growth of office jobs in the suburban areas in clerical, administrative and professional sectors in Melbourne, Perth and Sydney during the period 1969-1971 - over 57 per cent of the total growth of jobs in the latter three employment sectors was absorbed by the suburbs. This is largely the result of the suburbanization of attached offices and local service activity expansion[3]. Increases in the amount of floorspace being built in the

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1. Ibid, p.410

2. Ibid

3. Ibid, p.40

* Figures may not sum due to rounding

TABLE 3.17

SUBURBAN CENTRE OFFICE ESTABLISHMENTS ANALYZED BY THEIR MARKET AREAS [a]

Centre[b]	Market area served											
	Local/district			State/metropolitan			National/interstate			Total[c]		
	Number of establishments	% by Row	% by Column	Number of establishments	% by Row	% by Column	Number of establishments	% by Row	% by Column	Number of establishments	% by Row	% by Column
Chatswood	117	49.6	12.9	91	38.6	47.4	28	11.9	75.7	236	100.0	20.7
Parramatta	155	85.6	17.1	24	13.3	12.5	2	1.1	5.4	181	100.0	15.9
Liverpool	129	90.2	14.2	14	9.8	7.3	nil	-	-	143	100.0	12.6
Bankstown	116	93.5	12.8	8	6.5	4.2	nil	-	-	124	100.0	10.9
Burwood	103	86.6	11.3	15	12.6	7.8	1	0.8	2.7	119	100.0	10.5
Hurstville	120	91.6	13.2	11	8.4	5.7	nil	-	-	131	100.0	11.5
Blacktown	41	89.1	4.5	5	10.9	2.6	nil	-	-	46	100.0	4.0
Bondi Junction	121	91.0	13.3	11	8.3	5.7	1	0.8	2.7	133	100.0	11.7
Ryde	6	60.0	0.7	4	40.0	2.1	nil	-	-	10	100.0	0.9
Gordon-Pymble	1	6.7	0.1	9	60.0	4.7	5	33.3	13.5	15	100.0	1.3
TOTAL[c]	909	79.9	100.0	192	16.9	100.0	37	3.3	100.0	1,138	100.0	100.0

Notes:

a Analysis of market areas based on classification of establishments according to criteria discussed in this chapter.

b Centres in this analysis are comparable to those in Table 2.3 with the exception that Fairfield and Penrith have been omitted because they have a negligible number of non-local offices, while Gordon-Pymble (Ryde Road/Merriwa Street) and Ryde have been included since they contain a relatively high proportion on non-local offices. (See figure 2.1.)

c Figures may not sum to total shown because of rounding.

Source: Based on the author's field survey data, October 1975.

Source: Alexander, I. (1975) Offices in the Suburbs: A Survey of Private Office Establishments in Sydney Suburban Centres, pub. by Dept of Environment, Housing and Community Development, Canberra, Australia, Table 2.5, p.20

non central areas of Sydney indicate that the rate of suburbanization of office jobs to detached buildings in major commercial centres is not occurring at the same pace as office employment. Between 1964 and 1972 detached office space completed in the non central areas of the Sydney Region accounted for only 17 per cent of the total share whilst in the following 4 years to 1976 the non central areas share was raised to 25 per cent.

It seems that much of the growth in the central area has no functional requirement for a central location. Alexander has shown in Table 3.19 the inner core area accounted for 60 per cent of the regions clerical jobs, 50 per cent of its administrative and managerial jobs and 50 per cent of the professional office jobs whilst the outer suburbs accounted for 17 per cent, 24 per cent and 11 per cent respectively. During the period 1961-1971 the central area became increasingly dominated by clerical jobs - their share of office jobs in the C.B.D. - North Sydney area rose from 47 per cent in 1961 to 61 per cent in 1971; there was a slight decline in the number of administrative, executive managerial jobs in the C.B.D. - North Sydney areas and an increase of 29 per cent in respect of professional, technical and related jobs.

Alexander[1] explains the growth of clerical staff (which is contrary to the London situation) by increases in government employment[2] and by the increase in finance activities which employ large number of clerks due to the routine nature of the work involved. A recent survey carried out by the City of Sydney Council[3] in 1976 shows that Public Administration and Defence occupied about 21 per cent of the office

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1. Alexander, I. (1975) Op. Cit., p.29

2. A.B.S. and Analysis of Journey to Work Data evidence that a 35 per cent increase in Public Administration and Defence occurred in the period 1966-1971

3. City of Sydney Council (1978) Central Business District Study, pub. City of Sydney Council, p.7

TABLE 3.18

Table 3.6 Growth of office-type jobs* inner city vs suburbs, Sydney, Melbourne and Perth 1961–71

OCCUPATION	SYDNEY				MELBOURNE				PERTH			
	Growth† 1961–71		% Jobs At 1971‡		Growth 1961–71		% Jobs At 1971‡		Growth 1961–71		% Jobs At 1971‡	
	Inner city	Suburbs	Inner city	Suburbs	Inner city	Suburbs	Inner city	Suburbs	Inner city	Suburbs	Inner city	Suburbs
Professional, technical	+20	+23	59%	41%	+17	+23	57%	43%	+ 8	+ 7	56%	44%
Administrative, managerial	+ 4	+12	57%	43%	− 1	+12	59%	41%	+ 3	+ 6	51%	49%
Clerical	+37	+39	69%	31%	+25	+32	72%	28%	+13	+11	67%	33%
Total office-type	+61	+74	63%	37%	+41	+67	66%	34%	+24	+24	58%	42%

Notes:
* See Table 3.5‡.
† In thousands.
‡ Includes those not stating work place (*c.*4%): these have been reallocated in some proportion as those who did state workplace.

Source: Alexander, I. (1979) Op. Cit., p.39

TABLE 3.19

SUMMARY OF WHITE-COLLAR EMPLOYMENT DISTRUBUTION BY OCCUPATION, SYDNEY REGION, 1961 TO 1971

Metropolitan sector	Professional, technical and related				Administrative, executive and managerial				Clerical				Sales				Total white-collar				Total all employment			
	1961		1971		1961		1971		1961		1971		1961		1971		1961		1971		1961		1971	
	no.	per cent	no.	per cent	no.	per cent	no.	per cent	no.	per cent	no.	per cent	no.	per cent	no.	per cent	no.	per cent	no.	per cent	no.	per cent	no.	per cent
CBD	22,640	24.6	26,863	19.0	20,030	26.6	17,491	18.0	84,950	50.1	95,563	36.8	21,500	27.5	16,126	15.6	149,120	35.9	158,043	25.9	217,080	22.3	207,547	16.9
CBD and North Sydney	25,980	28.2	33,450	23.6	22,090	29.2	21,366	21.9	89,170	52.6	104,752	40.3	23,110	29.6	18,760	18.1	160,260	38.6	178,328	29.6	235,450	24.2	238,982	19.0
Inner core area	47,250	51.3	61,887	43.7	36,870	49.0	42,357	43.5	120,960	71.4	155,258	59.8	37,580	48.1	36,014	34.8	242,660	58.5	295,516	49.1	457,540	47.0	460,680	37.7
Intermediate suburbs	22,000	23.9	34,021	24.0	18,530	24.6	23,909	24.5	25,920	15.3	46,771	18.0	20,770	26.6	27,347	26.4	87,220	21.0	132,048	21.9	223,440	23.0	299,028	24.5
Southeast	2,290	2.5	3,979	2.8	1,480	2.0	2,405	2.5	1,480	0.9	4,065	1.6	1,730	2.2	3,081	3.0	6,980	1.7	13,530	2.2	13,510	1.4	27,778	2.3
Southwest	4,850	5.3	8,935	6.3	3,980	5.3	7,244	7.4	6,120	3.6	13,850	5.3	4,360	5.6	8,707	8.4	19,310	4.7	38,736	6.4	56,330	5.8	102,941	8.4
West	6,290	6.8	11,385	8.0	4,720	6.3	7,680	7.9	7,130	4.2	16,095	6.2	5,620	7.2	9,670	9.3	23,760	5.7	44,830	7.4	65,720	6.8	112,687	9.2
North	4,880	5.3	10,008	7.1	3,630	4.8	6,485	6.7	3,060	1.8	10,113	3.9	3,230	4.1	7,791	7.5	14,800	3.6	34,397	5.7	31,120	3.2	66,505	5.3
Total outer suburbs	18,310	19.9	34,307	24.2	13,810	18.4	23,814	24.4	17,790	10.5	44,123	17.0	14,940	19.1	29,249	28.2	64,850	15.6	131,493	21.8	166,680	17.1	309,911	25.4
Fringe areas	1,070	1.2	1,912	1.3	1,350	1.8	1,513	1.6	1,070	0.6	2,746	1.1	1,410	1.8	2,106	2.0	4,900	1.2	8,277	1.4	10,810	1.1	17,510	1.4
Not allocated	3,410	3.7	9,561	6.7	4,660	6.2	5,810	6.0	3,700	2.2	10,783	4.2	3,420	4.4	8,867	8.6	15,190	3.7	35,021	5.8	114,530	11.8	135,558	11.1
TOTAL [a]	92,040	100.0	141,688	100.0	75,220	100.0	97,403	100.0	169,440	100.0	259,681	100.0	78,120	100.0	103,583	100.0	414,820	100.0	602,355	100.0	973,000	100.0	1,222,687	100.0

Notes:

[a] Figures may not sum to total shown because of rounding

Source: Analysis of journey to work data from 1961 and 1971 censuses.

Source: Alexander, I. (1975) Op. Cit., p.27

floorspace in the C.B.D., finance investment 16 per cent and insurance 9 per cent. It has been estimated that in 1976 the daily continuous employment in finance and business services dominated the employment situation and was closely followed by Public Administration and Defence[1]. (See Table 3.20 and Figure 3.17). Judging by employment patterns in Sydney it would seem that there is greater potential for detached office building dispersal than existing patterns suggest, however the continued pursuit of self interests on the part of finance/ insurance companies[2] and government employee location policies are major reinforcers of this trend.

An examination of patterns of decentralized office activities has demonstrated that these types of activities depend upon direct accessibility to the market but do not require high levels of contact available only in highly contact structured central business areas. Locally or subregionally oriented professional services, financial and insurance activities do not require high levels of contact but rely on attracting greater shares of the market in the immediate environmental structure. Partially decentralized activities such as those departments with low numbers and proportions of orientation contacts do not require spatial proximity to functional centralized business areas. Finance and manufacturing industrial sectors provide the greatest opportunities for partial decentralization due to the routine characteristics of the contacts of some of their departments and due to their large scale recruitments of routine occupations. Depending upon the degree to which regional management functions are delegated by the top management, regional branches of offices activities may require locations in larger suburban commercial centres which are accessible and able to provide a medium range contact intensive environmental structure. In addition to the above factors there are a number of

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1. Ibid, p.27

2. Investigations carried out by Derek Kemp of Dept. of Geography, A.N.U., have revealed that in the last decade insurance/ finance companies as office developers/investors have been responsible for over two thirds of the value of investment in office buildings.

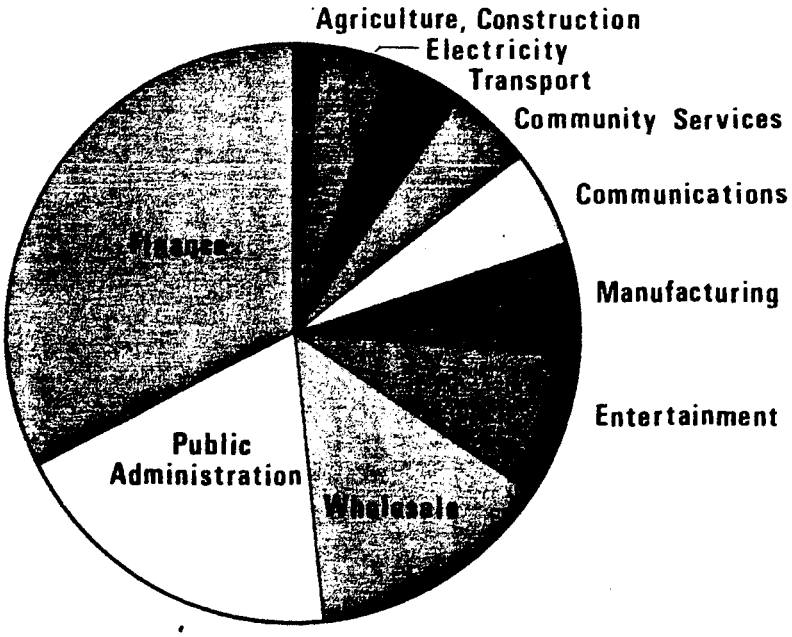
TABLE 3.20

1976 CBD Daily Continuous Employment in Industries

Major Industry Group	Employment No.	%
Agriculture, Mining, etc.	1 534	1.0
Manufacturing	10 744	6.5
Electricity, Gas and Water	6 517	4.0
Construction	828	0.5
Wholesale and Retail Trade	23 161	14.1
Transport and Storage	9 398	5.7
Communication	9 283	5.6
Finance and Business Services	53 949	32.7
Public Administration and Defence	31 416	19.1
Community Services	7 798	4.7
Entertainment, Recreation, etc.	10 171	6.2
Total	164 800	100.0%

Source: City of Sydney Council (1978) Op. Cit., p.27

FIGURE 3.17



1976 CBD Daily Continuous Employment in Industries

Source: City of Sydney Council (1978) Op. Cit., p.27

physical and social environmental factors which may influence office activities to locate in decentralized areas.

Should a suburban centres policy be seen as a socially economically desirable objective by the government, it would be advantageous to be able to identify office activities which are capable of locating in suburban or peripheral locations. At present policy makers are faced with information gaps such as which activities should be guided or encouraged to relocate in decentralized locations, which government initiatives might be useful in terms of which components of government departments could operate successfully and those components of a business environment which are required in order to develop a functional business environment with a diverse range of employment opportunities and with growth potential.

SUMMARY OF FINDINGS

In terms of its contribution to the overall aim of the thesis, this chapter has been succeeded in identifying the opportunities and restrictions experienced by an office activity attempting to carry out essential activities such as contacts which are dependent upon different conditions in the environment. Variations in locational requirements were able to be directly related to the critical functional differences between offices.

This chapter has demonstrated that functional business environments exist in central business areas of cities and has identified the prime users of such. Within this functional business environment, the existence of which depends upon the activities of the prime office activities, clearly identifiable networks of prime and non prime office activities were shown to be operative within and between different industrial sectors. Such conclusions were able to be drawn from analyses of spatial and contact patterns; these methods of analysis also suggested the existence of different networks depending upon the media employed in communication tasks, that is face-to-face or telephone contact. In addition to industrial sectors other variables such as type of department, status for example branch or head office and level of job were found to have a direct bearing on the degree of centrality and hence the location required by an office firm to carry out essential activities.

It was found that the type of market in which the office activity was involved influenced its locational requirements in terms of accessibility and centrality. Internal markets were found to exist between the prime users of office space in the highly centralized business areas of cities thus necessitating extremely high levels of accessibility between these uses. Additionally external market factors of relevance to the locational demands of offices were identified. In this regard, in relation to headquarter activities, the degree of non durability of the product and consumer orientation of the product appeared to influence the centrality requirements of the firm. The

geographical extent of the market served by office activities such as headquarters and professional services was observed to affect the firms choice of location in that firms with large national market areas needed high levels of contact or accessible locations such as those provided by central business districts.

Other firms with regional and subregional market areas are also located in central business areas. These firms were not considered to be prime users of the functional business environment referred to in the preceding paragraph but benefitted considerably from the established environment as they gained access to an agglomerated market area and in relation to their overall market were in a geographically accessible location.

Those firms such as solicitors and accountants which relied upon demand for their specialized skills and services to the prime users including major headquarters and premium investment institutions also provided external economies - an important element in the functional business environment. At this point the relevance of other spatially variable external economies such as accessibility to labour or business services were able to be identified. Whereas the presence of the prime users of the highly centralized functional business environments accounted for the existence of these types of office activities the converse was not the case.

Office activities which were carried out in decentralized that is, suburban or peripheral urban locations were identified as being activities with lower level more routine contact requirements and with low degrees of connectivity with other office activities. These activities included partial decentralization of departments of firms such as computer processing or sales office departments. The regional, subregional or local shop-front offices of insurance, banking or manufacturing industries which were directly serving the surrounding population together with more locally oriented professional services such as architectural and building firms also fitted this category in so far as office location requirements

were concerned. Physical and social environmental conditions, especially in the case of the United States constituted relevant influences on the location of office activities in non centralized locations.

The Prime Users of Functional Central Business Environments

Within the Central Business Districts of large cities the existence of a functional business environment relies upon the presence of prime users of the area and their generation of high level service functions. Some of these activities may operate independently of the money market but some firms require connections with that market as well as the market for their own product. Headquarters of industrial and specialized professional service activities together with central banking functions, the Stock Exchanges, securities industries, brokers, discount and foreign market exchanges and insurance activities such as underwriting and premium investment constitute the prime users of the central business district. The benefits of this functional business environment also extend to the other non prime users of the area.

In the C.B.D.'s of large cities presence of financial office activities features strongly. As in the case of the manufacturing headquarters, the financial firms not only exhibit strong patterns of concentration in the central areas but between them control most of the country's financial assets associated with that sector. Some business centres tend to specialize in financial activities whilst others shared their specialization between finance and manufacturing. Banking in the C.B.D.'s of cities is concerned mainly with the corporate accounts and with the provision of nation-wide services; so too are the financial corporations concerned with national markets. In terms of their specializations New York and Sydney are less renowned than the City of London in the insurance field as London controls the largest international insurance market in the world. Although insurance firms in Manhattan control most of the national life insurance assets it

houses but few of the nation's firms but most of the nation's fire and property insurance firms were located in the C.B.D. due probably to their less population oriented character. In all three countries finance employs a large proportion of the workforce of the C.B.D. (approximately 30%) and occupies a correspondingly large amount of office floorspace. Each C.B.D. appears to have a highly concentrated financial centre composed of insurance (nationally and internationally oriented), central banking, the securities industry closely centred around the Stock Exchange. Other financial activities such as financial corporations exist in the C.B.D. but do not seem to be related to this closely integrated network.

As indicated by the spatial organization of the financial community in the C.B.D.'s of large cities such as New York, Sydney and London there appears to be a structured market internal to the members of the financial community. This community is composed, in the main, of central banking functions, investment or merchant bankers, brokers, the Stock Exchange, the underwriting and premium investment functions of insurance companies, discount exchanges and foreign market exchanges. The relationship between these functions is essential to the operation of the money market functions of the city and indeed the nation.

Banks derive external economies from being close to each other in small districts for cheque clearances, funds and securities transfers, exchange of information and for counsel and advice. Investment bankers need to be near large banks. Corporation offices and investors need to be near each other as co-operation is necessary in the underwriting of financial risks and for purposes of working out the related details. Brokers require locations accessible to clients, near large banking facilities, near each other and the Stock Exchange to make deliveries and clear transactions within strict time limits. In the event of large policies, insurance activities need to be near each other for underwriting purposes as insurance contracts are often under time pressures. In their premium investment role, insurance companies require access to specialized information and advice and to the recipients of such

investment funds. Merchant banks have also to satisfy the latter requirements. Discount and foreign market exchanges are strong cohesive forces for financial institutions involved in overseas transactions.

Most of the headquarters of the nation's top industrial and mining firms located in the C.B.D.'s of the major cities tend to control a disproportionate share of the nation's economic activity. The type of industrial sector represented varies according to the export market or the economic base of the city. In this regard New York is far more highly represented in the manufacturing sector in both spatial and economic terms than were Sydney and the City of London. In smaller city centres such as Leeds in Britain headquarters were rarely represented whereas in cities of equivalent population in the United States small numbers of headquarters did exist. This is due, it seems, to the more even distribution of population and resources in the United States which enables operating economies to be achieved at the regional level as opposed to the national level only of all the major cities studied.

The headquarters of firms located in the C.B.D. are serving a market area of an external nature from the most convenient location in terms of accessibility. These firms have a dispersed national or internal market and are involved in complex financial operations. Therefore a central location is necessary to allow contact with the market being served and to permit conferences between its executives and the large commercial and investment banks.

External Market Factors Affecting Office Locations

The markets of office activities may be divided into three types on the basis of the geographical extent of market area:

headquarters
middle market and
local market.

Central business districts are important locations for the functioning of these offices having a headquarters market, as these offices frequently export their services on a national or international basis and have a high degree of complexity in their operations. The middle market offices are influenced by national population distribution and often by the availability of large numbers of white collar workers. Often the C.B.D. can satisfy these requirements but such establishments are not confined to the central areas of large cities. The latter category of offices with local market areas generally serve urban areas of 150,000 population or less and are not frequently found in the C.B.D.

Product lines appear to offer some explanation in relation to the strong central location preference of some headquarters. Generally the non durable industries with the exception of food tend to locate greater than average proportions of their headquarters in the C.B.D. This may be explained by the tendency for these firms to earn the larger part of their income in consumer markets. Non durable goods sectors usually sell to intermediate consumers (industrial customers). As final demand accounts for most of the receipts of non durable goods it is likely that media advertising, technology imperatives and close contact with complementary and competitive firms is required to influence the product demand. For firms with a wide consumer market the C.B.D. and its numerous external economies provides an important environment.

External Economies and the Non Prime Office Activities in Central Business Environments

Office activities with regionally or subregionally oriented external markets are also found in C.B.D.'s as the necessary levels of accessibility can be achieved and as the service functions generated by the 'prime' users of the area provide a functional business environment.

Other office activities represented in the C.B.D.'s of the major cities referred to above are wholesale, retail, business

services, transportation, communication and utility sectors. These uses do not exhibit high patterns of centralization and concentration as do headquarters of the industrial sector and the financial sector. Professional services do, however, occupy centralized locations within the C.B.D. as they are usually the more specialized services industries which have national and international markets and cater for the complex problems of large corporations and often require consultation between professions. Business services, as opposed to professional services are less centrally oriented, their main locational requirement being accessibility to service markets. Wholesaling office activities are generally located on the fringe of the C.B.D. Many of the large transportation, communications and utility office activities are represented in the C.B.D. but do not exhibit highly concentrated patterns of location. It appears that the categories of office activities referred to in this paragraph require in the main, access to market aggregation and to more basic service needs which are provided as a result of service demands created by the prime users.

Thus the presence of the prominent providers of services such as accountancy, legal, consultancy and advertising firms specializing in the solving of complex problems so characteristic of the corporate headquarters and members of the money market community provides considerable external economies for the prime users and in turn are able to tap a highly agglomerated market which includes the centrally located non prime users; on a geographical basis accessibility to a wider market area is also possible. The other external economy offered by C.B.D.'s, which through historical developments are highly accessible to large populations, may be accessibility to large numbers of suitably qualified labour. In order to assess the importance of labour as an influence on office location it is necessary to consider this aspect in isolation from other influences on locational requirements. In respect of each urban area under consideration it is necessary to obtain data on the location of required labour (in terms of

quantity and qualification) and the accessibility of such labour to alternative business centres. Where differences in accessibility of centres or environmental characteristics of centres exist, calculations relating to additional costs of assembling labour would need to be carried out to weight the labour factor. This aspect is further pursued in the following chapter dealing with the economies of office locations. However given the high levels of accessibility which exist in relation to central business areas accessibility to labour constitutes an added benefit accruing from a central location but probably does not constitute an important locational influence in relation to the other external economies referred to above.

Office Activity Networks

This chapter demonstrated the existence of networks within and between various industrial sectors. More networks are able to be identified by an analysis of spatial juxtaposition of activities and contact patterns. The contact studies demonstrate that spatial patterns are for the most part not historically inert while the spatial studies reinforce the interpretation that contact patterns have spatial implications for locational requirements of office activities.

The application of techniques such as for cluster analysis and components analysis illustrated clear patterns of locational proximity of office activities within the City of London. Five major groups showed a spatial association. Group 1 was composed of commodity trading, risk insurance and shipping - the principle functions of the city. The pure finance functions of the city were represented by two groupings. Group 2 contained the capital and investment side of finance whilst Group 5 contained principally the financial core or money market activities. Group 3 was those offices with interests focussing on publishing and the Press. The fifth group separated textile trading from the international trading activities of Group 1.

Industries and wholesaling office activities did not exhibit strong within group bonds whilst significant between group bonds existed between shipping, commodities and insurance, between insurance and banking and between banking and other finance. Activities which did not appear to be represented in the City's network included:

primary industry, certain durable manufacturing activities (such as chemical, metal, vehicles, timber, bricks, glass and cement), postal services, non head-quarters banks and related clearing houses, public facilities and consumer services.

Further analysis covered not only the city area but the whole of Central London which included the West End area. Using the abovementioned multivariate techniques at various scales of analysis, four large clusters of employment were distinguished:

Commodity Trading (Group 1)
Shipping and Marine Insurance (Group 2)
Banking and Other Finance (Group 3)
Clothing and Textiles (Group 4)

Group 1 included grain merchants, plantation house commodity dealers, merchant wholesale banks, general wholesale merchants and property owning and developing companies. Group 2 contained reinsurance, insurance adjusting, underwriters and agents, sea transport, postal services and telecommunications, insurance brokers, shipping and forwarding, freight broking and fire and marine insurance. Group 3 was composed of London clearing banks (head offices), stockbroking and jobbing, accounting, commodity brokers, other banks, bill discounting and foreign exchange, life and casualty insurance. Group 4 included footwear, clothing, production and costing consultants, wholesaling, textiles, scientific, surgical and photographic instruments and direct mail advertising services.

Given that at varying scales of multivariate analysis, both geographically and by sector, it appears that structured systems of office functions exist in city centres. However an understanding of the relevant contact patterns of the office activities referred to

above is essential to reveal any location patterns which are today a result of historical inertia.

The analysis of intersectoral information flows for face-to-face and telephone contacts confirmed that the spatial groupings described in the preceding part of this chapter represented sets of functionally related offices. All but the fuel and public agency factors derived from the functional analysis of telephone contact appear to have spatial equivalents.

Six factors provide the best description of the intersectoral meeting contacts:

Banking and Finance
Entertainment
Fuel and Oil
Publishing and Business Services
Civil Engineering, and
Trading.

The telephone contact network is best described by the following factors:

Civil Engineering
Fuel and Oil
Banking and Finance
Publishing and Business Services
Official Agencies, and
Commodity Trading

As the telephone network accounted for a higher level of total variance than did the meeting network it is likely that the latter network is less structured than the telephone network. In view of the fact that the leading factors are not identical for each network it is suggested that each communication channel is used for different contact networks. The leading factor (Factor 1) Banking and Finance, is the most inter-connected according to meeting contacts whereas it ranks third according to telephone contacts.

It is not sufficient to measure office networks in terms of spatial association and aggregate contact flows. An assessment of the strength of links tying offices into the functional complexes described above is required in order to provide a fundamental dimension along which the likely impact of location on communication can be measured.

The following variables in contact patterns derived from the body of office contact studies which have been discussed in the preceding chapter dealing with administrative systems constitute a useful and rigorous means of examining the contact patterns of office firms or sections of office firms such as departments:

> type of media used; volume of contacts; geographical distribution of contacts; the degree of connectivity (degree of involvement in functional complexes); in terms of inter sectoral and intra sectoral links; ease of adjustment contact network of contact network to a new environment; proportions of high (orientation) and low level (programmed) contacts.

Both the telephone and meeting contacts are summarized in Table 3.20 below. In this way contact requirements are able to be related to required environmental structure and the locational requirements of office activities.

TABLE 3.20

INDUSTRIAL SECTOR	Subsector	CONTACT CHARACTERISTICS			
		FEW ORIENT-ATION CONTACTS	HIGH PROP-ORTION DISPERSED CONTACTS	LOW INTENSITY OF CONTACTS	WEAK NETWORK CONNECT-IONS
Banking/ Finance	Insurance (life, fire marine)	X		X	X
	Other Insurance (underwriting brokers)			X	X
	Other Finance (Bldg Soc, Invest. Banks)	X			M*
Publishing/ Business	Miscellaneous[1] Business Services	X			M*
Civil Engineering	Construction	X	X		
Commodity Trading/ Export Merchants	Commodity Dealing	X	Not Known	X	X
Manufacturing Bricks, Pottery Timber, Furniture	Other Manufacturing	X	X		M*
Professional Services			X		
Official Agencies	Central and Local Government		X	X	

* Note: Moderate network connections are indicated by M

1. Includes news agencies and press services, equipment rental and leasing services and business services other than office, drawing, photographic, advertising and public relations services

It would seem that a firm with few orientation contacts, a geographically dispersed network of contacts, a low level of connectivity to the contact network (especially the meeting network) and a low intensity of contacts with other firms does not require a highly central location in a capital city to carry out essential activities.

Many firms rely upon central locations in large cities which are 'contact enriched' in order to obtain information speedily and to generate new ideas and new contacts which are essential to the firm. Those industrial sectors which rate low in terms of proportion of orientation contacts are insurance and other finance in the banking and finance sector, business services in the publishing and business services sector, construction in the civil engineering sector, commodity dealing in the commodity trading sector and other manufacturing (bricks, pottery, glass, cement; timber and furniture; miscellaneous manufacturing) in the manufacturing sector. The removal of firms from an environment in which most of its contacts were concentrated could result in the loss of clients and the need to establish new contacts where possible. Those firms with a widely dispersed network could theoretically locate in a decentralized area. Firms with geographically dispersed contacts include professional services, construction in the civil engineering sector, central and local government in the official agencies sector, other manufacturing in the manufacturing sector. Although from a contact point of view decentralization might be possible, it should be emphasized that suitability of the transportation network and the additional cost of communication may also be limiting factors here. These factors are examined in the subsequent chapter dealing with economic considerations.

Firms which have a small volume of contacts should, subject to these contacts not being geographically concentrated and not being of the orientation type, be able to function in decentralized locations. Firms which have large volumes of contact may be able to transfer some of these contacts to potential decentralization locations over time but initially the cost of relocating may appear

prohibitive to a firm. Thus although those firms with large volumes of contacts many of which are programmed or routine, may not wish to bear the initial cost of decentralizing such a move would probably not disrupt its communication links. Those sectors which initiate few contacts with other firms are commodity trading and public agencies.

Connectivity of business sectors also constitutes a gauge for measuring the potential of a firm to be decentralized. These firms which are highly connected to the business sector network if removed from their locations may cause considerable disruption as they may have been highly involved with other sectors, or not highly involved with other sectors but well connected to the network through indirect links. Although a firm may not generate contacts as is the case with official agencies other firms may generate contacts with them. Subject to market restrictions firms which are weakly connected to the contact network could probably be decentralized. If on a combined basis it was possible to decentralize a large proportion of firms to a new location then it is likely that the multiplier effect of these firms would be a significant factor in effecting strong growth in the new centre. Export and import merchants and commodity brokers merchants and dealers in the commodity trading sector, insurance companies (life, fire and marine) and other insurance (insurance brokers, underwriters, reinsurance) in the finance and banking sector generally have weak connections to the contact network.

Not only do locational requirements of office activities vary by industrial sector but by status level and by type of department. Depending upon whether an office activity is carried out at headquarter, branch (regional or subregional) level, contact requirements will vary. The higher the status of the activity the less routine are the contact requirements.

The contact requirements and hence the spatial demands of departments vary according to their functions; some departments involve more orientation contacts than others. The following

departments are above average in terms of the proportion of total contacts able to be classified as orientation contacts and are ranked accordingly:-

Computer services, miscellaneous office services, maintenance, organization and methods, planning, advertising, personnel, market research, marketing, research and development, director and administration, architects, legal and patents, technical design, professional services, engineers, public relations.

Of these departments director and administration, personnel, marketing and advertising had the greatest total numbers of orientation contacts.

Those departments which have below average proportions of orientation contacts and more routine contact requirements are in order of ranking:-

Sales, production, property, insurance, information services, client relations, financial, buying, accounts, export, transport and distribution, company records.

It is likely that large centrally located firms could locate some of the latter departments in non centralized or decentralized areas to offset costs if required. The occurrence of partial decentralization is further discussed in the following section of this chapter.

The Decentralized Office Activities - Push Factors and Locational Requirements

In the case of the United States where urban problems have been occurring on a larger scale, social rather than economic factors have been instrumental in encouraging the outward movement of offices, especially those problems of crime and violence which have come to be associated with American central cities[1]. High property and other local taxes, high costs of construction and long

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1. Jones, D. and Hall, R. (1972) Op. Cit., p.473

journeys to work through congested conditions have also contributed to the outward movement of offices[1] but labour cost differentials, however have proved to have little influence on location decisions[2]. The attractiveness of the suburbs in America was increased by the high degree of mobility of residents reflected in the high rate of car ownership and by the degree of accessibility of the suburbs made possible by a completed freeway network[3]. The suburbs offered better education for executives' families, a more relaxed working area and a valuable source of skilled labour[4]. However it is doubtful that these factors constituted primary influences on the office location decision.

Vernon[5] has suggested, however that decentralized office locations could not expect to benefit much from lower space costs because the provision of support facilities such as parking, restaurants and recreation space would reduce savings accruing from lower land costs. It seems that non business advantages for executives and their families assumed some importance in locational decisions[6]. The cost differential between suburban and central cities is however being gradually eroded as suburban taxes are raised and the cost of living becomes comparable with the central city due to increased demands in the suburbs[7]. Opposition to office location is now beginning to occur from local authorities due to the drastic changes which have occurred in the local environment such as soaring home prices and high levels of traffic congestion[8].

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1. O'Meara, J. (1972) Op. Cit., pp 1-10
2. Rhodes, J. & Kan A. (1971) Op. Cit., p
3. Manners, G. (1974) Op. Cit., pp 96-101
4. Quante, W. (1976) Op. Cit., pp 127-128
5. Vernon, R. (1960) Metropolis 1985, Harvard Uni Press, Cambridge, Mass., pp 19-20
6. Quante, W. (1976) Op. Cit., pp 127-128
7. Daniels, P.W. (1975) Op. Cit., p.190
8. Gooding, J. (1972) "Roadblocks ahead for the great Corporate moveout" in Fortune, Jun., pp 78-83

Perhaps the major attraction of the outer urban areas is the newly developing market areas and the requirement of customer accessibility.

In Britain decentralization has occurred mainly as a result of a different push factor - the high cost of occupying space in the central area of London[1]. Planning controls differed greatly between the two countries. In the United States there were few planning restriction whilst in Great Britain planning played a greater role. In London the 'natural' trend towards dispersal of office activity was actually encouraged by planning controls which arose out of concern about over-concentration of office employment in Central London relative to the national distribution. Some of the major symptoms of this problem were: transport congestion, increasing journey to work distances, uneconomic provision of transport services for peak hour travel required by a dispersing population and rising property values and rents[2]. The provincial conurbations were faced with the need to attract sufficient office employment to redress losses in other sectors[3].

Office decentralization activity reached its peak in London in 1973-1974 when the impact of the Office Development Permit was reflected in an actual and impending shortage of office space in Central London and costly rent services came to fruition. By 1972 office rents in the suburbs were less than half of the rents being achieved in Central London, that is 2.50 compared to 7.50/ft^2*. In 1974 rents were more than double the 1969 level in Central London[4].

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1. Jones, D. and Hall, R. (1972) Op. Cit., p.473

2. Daniels, P.W. (1977) Op. Cit., p.262

3. Ibid, p.262

4. L.O.B. (1972) Office Rents (1) - Outside Central Area 1963-72, Lond. Instit. of Management. Cited in Daniels, P.W. (1975) Op. Cit., p.173

* In Sydney a similar rent differential and exodus of offices occurred in the period 1969-1971 when office space was being let for \$10/\$12/ft^2 in the C.B.D. whilst North Sydney rentals were \$4.50/ft^2.

By 1976, however there was a large oversupply of office space which occurred in response to the previous shortage despite the Office Development Permit system. This situation may act to retard future rates of office decentralization to the suburbs[1]. Office decentralization in Great Britain has not occurred as extensively as in the United States due to greater dependence in most British cities on public transport, lower suburban accessibility and greater investment and inertia as a result of their age[2]. The suburbanization of manufacturing, wholesaling and retailing was not as advanced as in the United States due probably to land use controls applied in the past to prevent the spread of development into peripheral areas[3]. Reasons often given by firms as the basis for their relocation have been: the need for expanded premises, expiry of lease, the high rentals for office buildings, reorganization of firms[4]. However information collated from questionnaires rather than observed patterns of behaviour needs to be treated with caution. Dunning and Morgan found that in London staff related factors such as reduced labour costs in the suburbs, improvements in efficiency and labour availability attracted some office movers[5].

In Australia suburbanization of office development has not paralleled the rate of office dispersal in the United States despite the fact that a similar type of suburban sprawl has occurred in the residential sector. This could perhaps be partly attributed to the lack of a complete freeway network and the existence of a public transport network that is focussed on the C.B.D. Office firms in Australia tend to be much smaller than American and British examples and as they would be unable to build up their own externalities

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1. Daniels, P.W. (1977) Op. Cit., p.271

2. Jones, D. and Hall, R. (1972) Op. Cit., p.473

3. Clawson, M. and Hall, P. (1973) Op. Cit., pp 99-107

4. Cowan, P. et alia (1969) The Office - A Facet of Urban Growth, Heinemann, Lond., pp 106-108

5. Dunning, J. and Morgan, E. (1971) Op. Cit., pp 432-433

would probably be less able to survive in a suburban location[1]. The control of the location of office space by vested interests in the C.B.D. of Sydney, Melbourne, New York and London have also been contributing factors towards the supply of office space being kept in the central areas.

In all three countries - the United States, Great Britain and Australia, a good deal of growth of local and regional market activities have followed population expansion into the suburbs. New and growing areas having proved successful, have given developers confidence. However the extent of office suburbanization appears to be dependent not only upon the structure of the office industry but the size of the urban agglomeration, the economic strength of the capital city, the availability of mass transit facilities, social and economic pressures, managerial preference and the extent of planning control.

Office activities in decentralized suburban or peripheral locations do not require as extensive communication networks as those centrally located activities with high level, non routine contacts. Generally it is those office activities with low level routine or repetitive functions which can operate successfully in the less accessible decentralized locations. The function and level of function may vary by department, by industry type and by the degree to which the office activity is oriented towards directly servicing a population. The market size of an office activity is also an indicator of functional contact requirements as the status of an activity that is whether the firm is operating at the head-quarter, regional, branch or local office level. The size of the firm is also a consideration as larger firms of the type requiring a central location have greater potential to partially decentralize departments of a more routine nature. Although the number of range of decentralized office activities decreases with decreases

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1. Alexander, I. (1979) Op. Cit., p.

in urban centre size, this consideration does not represent a locational requirement in itself as urban size is a proxy for market area.

The office industries which have decentralized their operations most are the insurance, finance and banking service industries and professional and scientific services. The insurance industry has decentralized its operations considerably as communication services such as telephone services, mail delivery were increasingly able to be supplied to outer areas. Most of the underwriting of new business and settlement of claims are done in branch offices or in the field throughout the country - the premium investment and international business being handled in the central business district. These activities represent a large proportion of jobs which have decentralized from the city centres as there are many routine functions in those offices which makes them suitable for relocation or location in non central areas. It is those office activities related to the financial and manufacturing sectors which offer the greatest potential in employment redistribution due to their high clerical labour content. The geographical distribution of occupation mix in the suburbs gives a further clue as to the types of office activities which are developing there however it must be borne in mind that a good deal of office type employment is not contained in free standing office blocks but is attached to activities such as factories and shops. In particular it is those occupations with considerable routine or repetitive component that are severing their ties with the central city for example computer operators and machine billers, district sales and service centres and product divisional units.

The market size and orientation is also related to the locational requirements of office activities. Suburbanization of office activities has not involved the relocation of headquarters to any great extent although social and economic problems in New York have contributed towards the exodus of some corporate headquarters. It is likely that many firms have shifted to remain in the centre of their market areas especially those outer suburbs

offices of market oriented firms in the development and building business and related development oriented professional firms - architects, engineers and surveyors. These firms require ready access to the metropolitan fringe where residential development is focussed. Branch and regional offices are often located in outer urban areas in response to population or market area movements; also predominant in decentralized locations are the local market oriented services such as utilities or population oriented business and personnel services. While national market oriented head offices are usually centrally located in the central business districts of cities, middle market offices serving areas of above 150,000 population are often located in large suburban centres whereas the local market offices generally serve populations of less than 50,000.

The size of a firm is also related to office locational requirements as only the larger firms are able to locate departments with more routine functions in decentralized locations. The smaller firms located in central areas do not have the necessary capital or resources to decentralize such business functions. As discussed in the preceding paragraph the smaller firms locating in decentralized locations would orientate towards local markets only.

Environmental conditions, particularly the distance from central business districts have a significant bearing on communications the effect of which may be related to the spatial structure of office activities involved in decentralization. Thus as the success of a decentralized activity depends in part how the relocated or new unit interacts with its new contact environment, decentralization should not be viewed as a short run economic decision governed by telephone, labour and rental costs but as a process by which organizations can adapt to changing conditions. Perhaps the best method of monitoring this process of adaption to the new environment is through the use of communication surveys.

The dispersal of high level orientation activities to areas containing routine or programmed functions and lacking the planning activities necessary for the development of new possibilities which are identified by orientation processes could result in the loss of the orientation activities in the new location. Thus the success of a decentralization policy depends as much upon the existing occupational structure of the new locations as upon their connections to the national communication system.

It is apparent that a policy of office dispersal would only be successful if it is part of a co-ordinated effort to upgrade the quality of local contact environments in a selected number of proposed development areas serving populations of at least 150,000. Such a policy could be effected through investment decisions, dispersal of large sections of government employment to provide the necessary growth impetus and by local encouragement of appropriate commercial office activities. Such a policy of redistribution of office employment would also have to be justified on social and economic grounds.

Chapter 4 Economic Considerations

Chapter 4 - Economic Considerations

INTRODUCTION

This chapter aims to assess the importance of economic principles as an influence or restriction on the implementation of activities within and between office firms and to determine whether such principles are spatially variable. As both macro and micro economic principles are relevant the chapter is divided into two strands. The first strand deals with macro considerations such as national and regional growth and control patterns. In the latter part of the chpater, micro economic factors relating to the location of individual office activities are considered. In this way it is intended to relate what is happening at the micro level with the fortunes of the regions as a whole.

An explanation of the behavioural characteristics of individual office activities is unlikely to provide the policymaker with sufficient guidance. There is a need for the urban policymaker to understand the complexities of regional economics so that urban growth strategies will not be jeopardized by factors which are unaccounted for. Such factors as structural changes in the economy, increases in scale and complexity of firms, the degree to which office employment is affected by the relative export orientation of urban centres or regions and the relationships which may exist between centre size or level of office activity over time are relevant to the office location problem. Other important considerations are the non local growth impact of large scale investment in growth centres, and information differentials between large urban centres and the rest of the country. This first section of the thesis dealing with macro economic principles is structured in the following manner. A detailed examination of the regional distribution of office employment and floorspace is carried out with a view to identifying relationships relevant to urban or regional policymaking. The concept of the spatial hierarchy of headquarters and asset control is then introduced.

Also relevant to the overall aim of the thesis is the effect of micro-economic considerations on the location of office activities. The profit surfaces of office activities must be comprehended not only to explain the relevance of economic principles to the theoretical framework but to assist the formulation of urban planning strategies which are both economically feasible and of benefit to the community. In order to achieve an understanding of how the profit surfaces of various office activities might be derived, the following steps are proposed. Initially, the possibility of analysing office activity location within the context of industrial location theory and the associated difficulties is to be examined. Despite the fact that the task of applying accounting procedures to office activities is a difficult one, factors of production and cost structures are proposed to be identified for these activities. It is then attempted to identify cost and revenue surfaces of office activities in order to permit profit to be calculated for each location.

In relation to economic principles lack of data and time limitations do not permit a detailed analysis of the opportunities and restrictions influencing the various classes of office activities. However, it is anticipated that the results of this work will permit some useful conclusions to be drawn in respect of office location requirements and will assist in the identification of issues requiring further research.

NATIONAL AND REGIONAL GROWTH AND CONTROL PATTERNS

Without an understanding of office location at the macro scale, that is, the national and regional level, there is the possibility that conclusions may be drawn about office location patterns from localized case studies which are not generally applicable. Just as an understanding of the total economy is necessary before full understanding of the economic function of different activities in different locations is necessary, some knowledge of office location patterns at the macro scale is necessary before a full understanding at the micro scale can be achieved.

This section of the chapter relates to the macro economics of office location and deals with office location patterns at the regional and national level, the size of urban centres as an influence on office activity location at the national and regional level, the spatial complexities of non local control of office activities, the degree to which centres in a region or nation is export oriented and variations in regional and national spatial distribution of control activities by industry. Through this analysis, it is proposed to identify the regional and national locational influences and restrictions operating on office activities. It is also intended to provide an explanation of how office concentrations operate as economic systems seeking to minimize production and distribution costs for office activities and to provide immediate and minimum opportunity cost communications.

Regional Distribution of Office Employment in Great Britain, The United States and Australia

At the regional level the spatial pattern of office based activity displays a marked inequality in terms of distribution. Office employment is making its major contribution in regions where office employment is already concentrated and relatively more important in the overall employment structure and little evidence

exists to suggest that a reversal in this trend will occur. 'Growth centre' and 'growth pole' strategies designed to stimulate regional development in lagging or depressed areas, or to retard the expansion of major metropolitan complexes have met with limited success having regard to the scale of effort involved[2]. Continued increases of spatial concentration of office based organizations would have important implications both economic, in terms of the future behaviour of firms, and social, in terms of the loss of community control of local industries and spatial variations in social class structure. Whether centralization should continue without government intervention or the decentralization of certain control functions of business organizations should be encouraged, is a key policy issue which is beyond the scope of this thesis. The regional growth patterns of office location in the United States, Great Britain and Australia are analysed in the following pages.

In Britain, the counties with more than 15 per cent of the workforce in office work extend from Lancashire, through the Midlands into Southern and South East England[3]. As indicated in Daniels' findings these areas possessed characteristics such as the greatest population concentration and expanding economic activity, particularly growth industries and the areas with less than 15 per cent office employment were Northern England, and Wales (with the exception of the counties in the South West Peninsula) had a limited economic base of declining industries. There was a tendency to lose economically active population through out-migration. Between 1961 and 1966 cities on these less prosperous regions recorded relative and in many cases

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1. Daniels, P.W. (1975) Office Location: an urban and regional study, Bell Books, Lond., p.95

2. Pred, A. (1976) "The Inter-urban Transmission of Growth in Advanced Economies: Empirical Findings Versus Regional - Planning Assumptions" in Regional Studies, Vol. 10, pp 151-171, Pergamon Press.

3. Daniels, P.W. (1975) Op. Cit., p.92

absolute losses in productive functions[1]. Most of the higher order places here were small in comparison to the southern part of the nation. This unequal distribution of office employment is illustrated by Figure 4.1 . Thus whilst only 33.6 per cent of British workers in all occupations were located in the South East Planning Economic Region, 43.4 per cent of British office workers were employed there. In all other regions there was a smaller proportion of office than total employment in Britain.

Two popular hypotheses for explaining the process by which regional spatial inequalities are maintained are - obsolescence of industrial structure and locational disadvantage. The first explanation implies that structural change is occurring in industrial activities and in the economic base while the second consideration implies that production and distribution costs are too high. However recent Swedish research carried out by Pred[2] emphasizes the concept that regional variations in access to specialist information is the principal mechanism through which differentials in rates of economic growth and change come about. Westaway's[3] findings that management functions of a head office nature have become more concentrated in London and the South East and that administrative functions were similarly concentrated in the South East with evidence of dispersal to other parts of England tend to reinforce this concept. The professional and managerial occupations are broadly equated by Westaway with those job levels most involved in contact activities; administrative occupations correspond to job levels with low contact intensity; manufacturing occupations are concentrated in the product-

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1. Westaway, J. (1974) "The Spatial Hierarchy of Business Organizations and its Implications for the British Urban System" in Regional Studies, Vol. 8, pp 145-155, Pergamon Press

2. Pred, A. (1973) "Urbanization, domestic planning problems and Swedish Geographic Research" in C. Board et alia (Eds) Progress in Geography, Vol. 5, Arnold, Lond.

3. Westaway, J. (1973) "Contact Potential and the Occupational Structure of the British Urban System 1961-1966: An Empirical Study" in Regional Studies, Vol. 8, pp 57-73, Pergamon Press

ive sectors of organizations and are not involved in work requiring external personal contact.

The spatial concentration of control functions is explained by Hymer[1] in his work on the multinational corporation and the 'law' of uneven development. He demonstrates that the demands of expanding production and advanced technology have led to the consolidation of many small enterprises into national corporations and that in order to meet the demands of this new organization of production of widely dispersed plants, a horizontal division of management into specialist divisions has been evolved - finance, personnel, purchasing, sales - and a vertical system of control to co-ordinate departments. From this point, Hymer traces the rise of different levels of management, the lowest level being concerned with day-to-day operations, management responsible for co-ordinating the latter type of management and the top management level which determines goals and planning and the framework in which the other levels operate.

An underlying cause of the spatial concentration of head office functions may have been the way in which business corporations have evolved. Increases in scale and complexity of firms first led to the separation of administrative functions from productive functions and, more recently the separation of strategic planning functions from the more routine administrative functions. As shown in Westaway's[2] work the differential between the large urban centres and the rest of the country in terms of information density and quality increases as more and more head office functions move to the large urban centres. In addition, as this movement continues, the demand for a wide variety of services increases and this in turn

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1. Hymer, S. (1972) "The multinational corporation and the law of uneven development" in Bhagwati, J.N. (Ed) Economics and World Order (from the 1970s to the 1990s), MacMillan, London

2. Westaway, J. (1974) Op. Cit., p.148

increases the centres attraction as a location for head offices and a process of circular and cumulative causation which further affects the behaviour of firms is set up[1].

Changes in the distribution of professional and managerial and administrative and manual occupations were analysed by Westaway[1] whose analysis revealed that labour markets in the development areas experienced a negative shift in their share of managerial and professional occupations; major cities like Manchester, Leeds and Glasgow were not receiving the share of the growth of high level office jobs that their size in the urban hierarchy would suggest. Looking at corporate organizations as a whole rather than just head office functions Goddard[2] found that more office type functions than production plants were located in the South East; the South East contained more firms involved in research and development and more than its share of civil service employment such as ministerial offices and supporting policy making divisions and other divisions with functions of a national character. Decentralization of the lower order administrative functions such as clerical activities has been occurring in the largest cities such as London, Manchester, Liverpool and Glasgow, Leeds and Sheffield which accounted for 80 per cent of this shift[3]. The South East region would appear to be a favourable environment for a range of office activities not just head office functions. In Great Britain the growth of office activities has occurred in a limited number of prosperous regions, the expansion of office employment being a key factor in the growth of the South East region.

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1. Ibid, pp 146-147

2. Goddard, J.B. (1975) Office Location in Urban and Regional Development, Oxford Uni. Press, pp 6-7

3. Westaway, J. (1974) Op. Cit., p.65

FIGURE 4.1

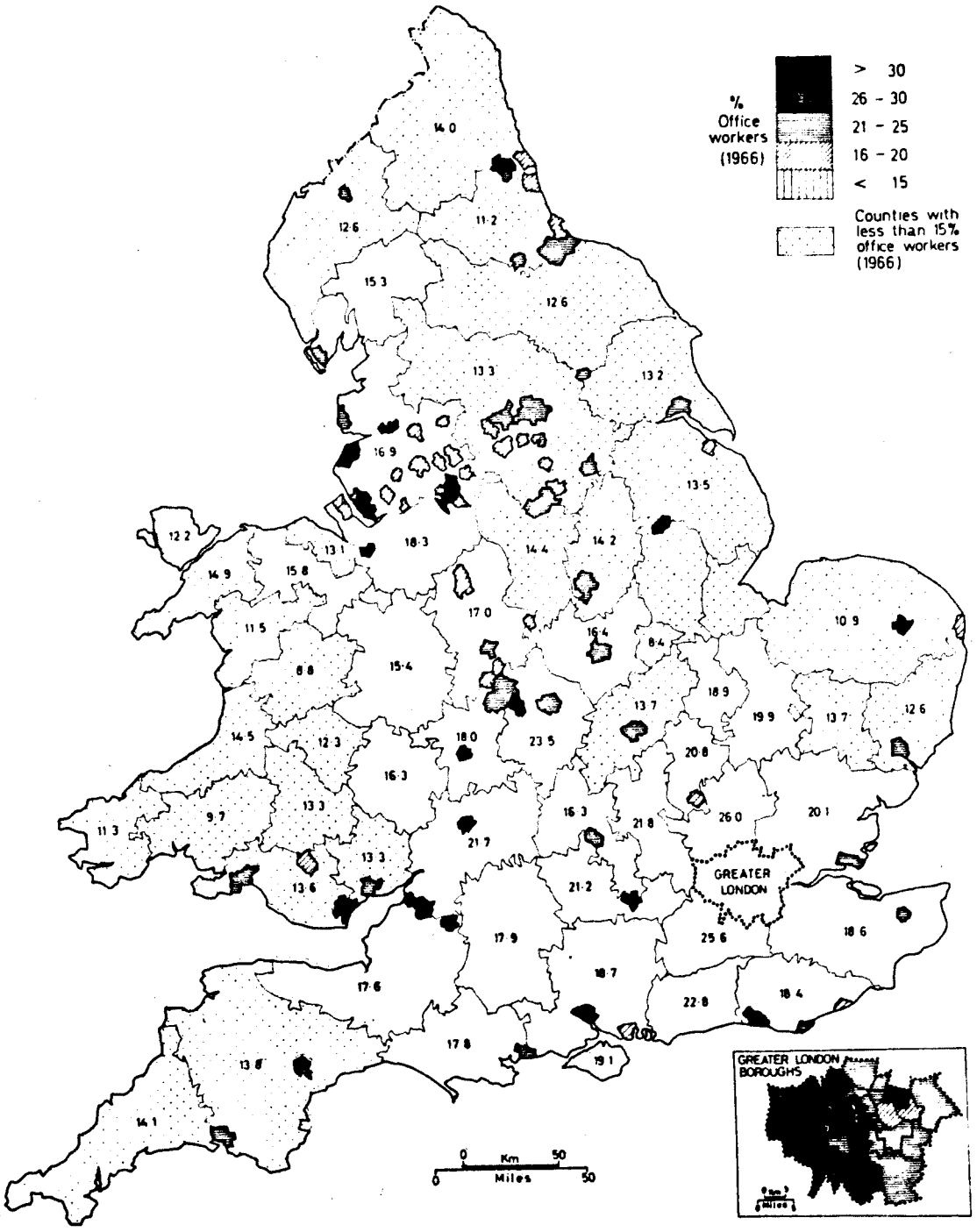

Fig. 21 Distribution of Office Employment in England and Wales—By Administrative Counties and County Boroughs, 1966 (Data: General Register Office, *Sample Census 1966, England and Wales*, 1968)

Source: Daniels, P.W. (1975) Op. Cit., p.93

Of the 24 million workers in office type occupations in the United States, in 1960, 9.3 million (39 per cent) were located in the 24 Standard Metropolitan Statistical Areas (SMSA's) with over 1 million population. New York, Los Angeles and Chicago SMSA's housed 8.6, 4.8 and 4.3 per cent respectively of the country's office workers. Detroit, Philadelphia and Boston, all located on the heavily industrialized North Eastern Seaboard also had a large share of office based occupations[1]. As may be seen from Armstrong[3] a large proportion of office activity is concentrated into several regions (the North East and the West Coast) as is the case in Britain. It may also be seen that there are only 22 national office centres in which the number of office jobs per capita is above the national average of 12.2 office jobs per 100 population.

The SMSA's with a population over 1 million have a 15.2 average whilst SMSA's with a strong orientation towards export oriented office jobs have values in excess of 15.2 and include New York, Washington, Boston, Minneapolis - St Paul, and San Francisco. See Table 4.1. As suggested by Armstrong[2] the export success of an area appears to explain this distribution. The import of capital acts as a major stimulus to regional growth and to related service employment. This in turn stimulates population increases, export viability increases and growth and diversification of local services occurs. In the most prosperous and larger areas the diversification of services begins to cater for adjacent urban areas, the surrounding region and in some cases the nation. A similar exercise has been carried out for Britain (see Table 4.2), which has on a national basis 10.3 office jobs per 100 population. This represents a lower number of office jobs per capita than is the case in the United States. The South East British Economic Planning Region (BEPR) with 14.1 jobs per 100 population, the

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1. Armstrong, R.B. (1972) The Office Industry: Patterns of Growth and Location, Regional Plan Assoc., N.Y., pp 23-24

2. Armstrong, R.B. (1972) Op. Cit., pp 23-26

3. Armstrong, R.B. (1972) Op. Cit., p24

TABLE 4.1

Table 2.2. Estimates of "Surplus" Office Activity in Metropolitan Areas with Populations over 1 Million, 1960

	Population rank	Jobs in office occupations per 100 population	Share of jobs in office occupations in export ("surplus") activities
SMSA			
Washington	10	20.4	over 35%
New York	1	17.6	over 35%
Dallas	20	16.7	over 35%
Boston	7	16.6	over 35%
Minn.–St. Paul	14	16.3	25%–35%
San Francisco	6	16.2	25%–35%
Seattle	19	16.1	25%–35%
Los Angeles	2	15.6	25%–35%
Kansas City	22	15.4	25%–35%
Atlanta	24	15.3	25%–35%
Chicago	3	15.1	25%–35%
Newark	13	15.1	25%–35%
Cleveland	11	14.2	15%–25%
Houston	16	14.2	15%–25%
Milwaukee	17	14.1	15%–25%
Cincinnati	21	14.1	15%–25%
Philadelphia	4	13.3	15%–25%
Baltimore	12	13.2	15%–25%
St. Louis	9	13.1	15%–25%
Buffalo	15	12.3	5%–15%
San Diego	23	12.3	5%–15%
Detroit	5	12.1	5%–15%
Pittsburgh	8	11.7	5%–15%
Paterson	18	11.5	5%–15%
SCA*			
New York–N.E. N.J.	1	16.2	25%–35%
Chicago–N.W. Ind.	2	14.7	25%–35%

Source: U.S. Census, *Journey to Work: 1960.*
* Standard Consolidated Area.

Source: Armstrong, R.B. (1972) Op. Cit., pp. 25-26

region with the highest concentration of office jobs proves also to be the most export-oriented office region. Generally the distribution of office employment in the United States was more even than the distribution of office workers in Great Britain which suggests that regional scales of economy could influence the location of offices.

In the United States, those cities with a high proportion of office workers per 100 population and with a strong office orientation towards export activities, namely New York, Houston, Dallas and Washington had more than 60 per cent of their office employment concentrated downtown. Other SMSA's which had between 35 and 50 per cent of office employment downtown are comparable with statistics relating to the centres of the British conurbation centres. See Table 4.3. This statistical information suggests that office employment is greater in those areas where export viability is increasing.

The proportion of the Australian workforce employed in office type jobs is 32.2 per cent in 1970 whilst the proportions in the United States and Great Britain are 38.4 and 31.7 per cent respectively[1]. In Australia each state capital with the exception of Tasmania is primate[2] and as can be seen from Figure 4.2 Sydney is the largest city closely followed by Melbourne. Office jobs have become increasingly concentrated in the state capitals as shown in Table 4.4 below.

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1. Alexander, I. (1979) Office Location and Public Policy, pub. Longman, Lond., p.29

2. Johnston, R.J. (1966) "The Australian Scene: Commercial Leadership in Australia" in The Australian Geographer, Vol. 10, pp 49-52

TABLE 4.2

DISTRIBUTION OF OFFICE OCCUPATIONS IN GREAT BRITAIN - BY ECONOMIC PLANNING REGIONS, 1966

Region		Total occupations	% of national total	Office occupations[2]	% of national total	% of regional total	Office jobs per 100 population
Northern	M[1]	928920		128180		13·8	
	F	247430		111430		45·0	
	T	1176350	4·9	239610	4·4	20·4	7·3
Yorks and Humberside	M	1412010		211700		15·0	
	F	754770		180130		23·9	
	T	2177780	9·1	391830	7·3	18·0	8·4
North West	M	1926950		339260		17·6	
	F	1154230		310970		26·9	
	T	3081180	12·9	650230	12·1	21·1	9·8
East Midland	M	996820		149170		15·0	
	F	527220		123020		23·3	
	T	1524040	6·4	272190	5·0	17·9	8·3
West Midland	M	1561130		257320		16·5	
	F	852610		233460		27·4	
	T	2413740	10·1	490780	9·1	20·3	10·0
East Anglia	M	466340		62340		13·4	
	F	218510		54460		24·9	
	T	684850	2·9	116800	2·2	17·1	7·6
South East	M	5076890		1250510		24·6	
	F	2964810		1090010		36·8	
	T	8041700	33·6	2340520	43·4	29·1	14·1
South West	M	1018320		164640		16·2	
	F	517180		138110		26·7	
	T	1535500	6·4	302750	5·6	19·7	8·5
Wales	M	758020		99580		13·1	
	F	336800		82140		24·4	
	T	1094820	4·6	181720	3·4	16·6	6·8
Scotland	M	1432800		203080		14·2	
	F	805070		205200		25·5	
	T	2237870	9·3	408280	7·6	18·2	7·9
Great Britain	M	15578200		2865780		18·4	
	F	8378630		2528930		30·1	
	T	23956830	100·0	5394710	100·0	22·5	10·3

Notes: 1. Males, females and total occupations by workplace.
2. Office occupations by workplace.

Source: General Register Office, *Sample Census 1966, England and Wales, Economic Activity Sub-Regional Tables* (London: Her Majesty's Stationery Office, 1968), Table 2.

Source: Daniels, P.W. (1975) Op. Cit., p.94

TABLE 4.3

OFFICE OCCUPATIONS IN THE CONURBATION CENTRES - ENGLAND AND WALES, 1966

Conurbation centre	All occupations	Office occupations	% of total	Males	Females
Greater London	1305940	775260	59·4	424680	350580
South East Lancashire	139740	67410	48·2	33050	34360
Merseyside	138550	57860	41·8	29500	28360
West Midland	108570	50000	46·1	22180	27820
Tyneside	76650	30200	39·4	14390	15810

Note: There is no central area delimited for the West Yorkshire conurbation and it is therefore excluded from the table.

Source: General Register Office, *Sample Census 1966, England and Wales, Economic Activity Tables, County Leaflets* (London: Her Majesty's Stationery Office, 1968), Table 2.

Source: Daniels, P.W. (1975) Op. Cit., p.96

TABLE 4.4

Type of Job	Proportion of Office Jobs Located in Australian Capital Cities									
	NSW		VIC		QLD		S.A.		W.A.	
	1966	1971	1966	1971	1966	1971	1966	1971	1966	1971
Professional	76	79	87	88	65	64	88	87	83	81
Admin/Managerial	71	71	77	79	50	51	76	77	72	75
Clerical	78	78	85	85	65	65	86	85	84	84
Sales	68	72	81	81	61	60	84	83	80	84
Communications	66	68	72	74	49	52	71	72	69	73
TOTAL	75	76	83	84	60	61	83	83	80	81

Source: Alexander, I. (1979) Op. Cit., p.29

As illustrated in Figures 4.3 and 4.4 the spatial distribution of office jobs in Sydney and Melbourne presents a highly centralized picture. In comparison to the United States and Great Britain, Australia has a greater proportion of office workers per national population, namely 13.42 office workers per 100 population[1]. Sydney and Melbourne would produce a much higher index than the average index for Australia. Tables 4.8 and 4.9 below indicate that Sydney and Melbourne office industry are highly export oriented. In general Sydney appears to be the financial centre with very high quotients in investment, finance and insurance, and Melbourne the industrial centre leading Sydney in transport and production but not in building. Armstrong's method of gauging the export orientation of office activities would also appear applicable to Australia. These patterns can also be explained in terms of economic advantage and settlement history in Australia. Urban development in Australia

1. Sources: Alexander, I. (1979) Op. Cit., p. 5 (percentage of total workforce engaged in office type jobs in 1970) and Australian Bureau of Statistics (1971 population - Australia 12, 728, 461 persons).

FIGURE 4.2

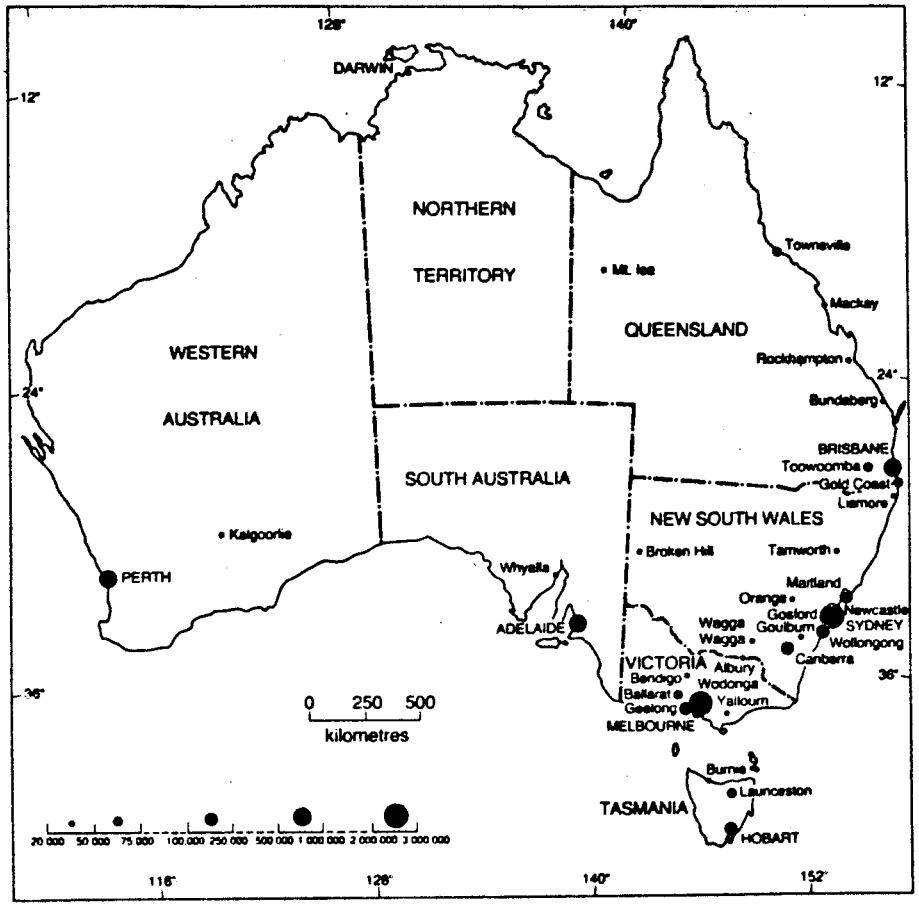

Fig. 4.1 Major urban centres, Australia 1971

Source: Alexander, I. (1979) Op. Cit., p.44

FIGURE 4.3

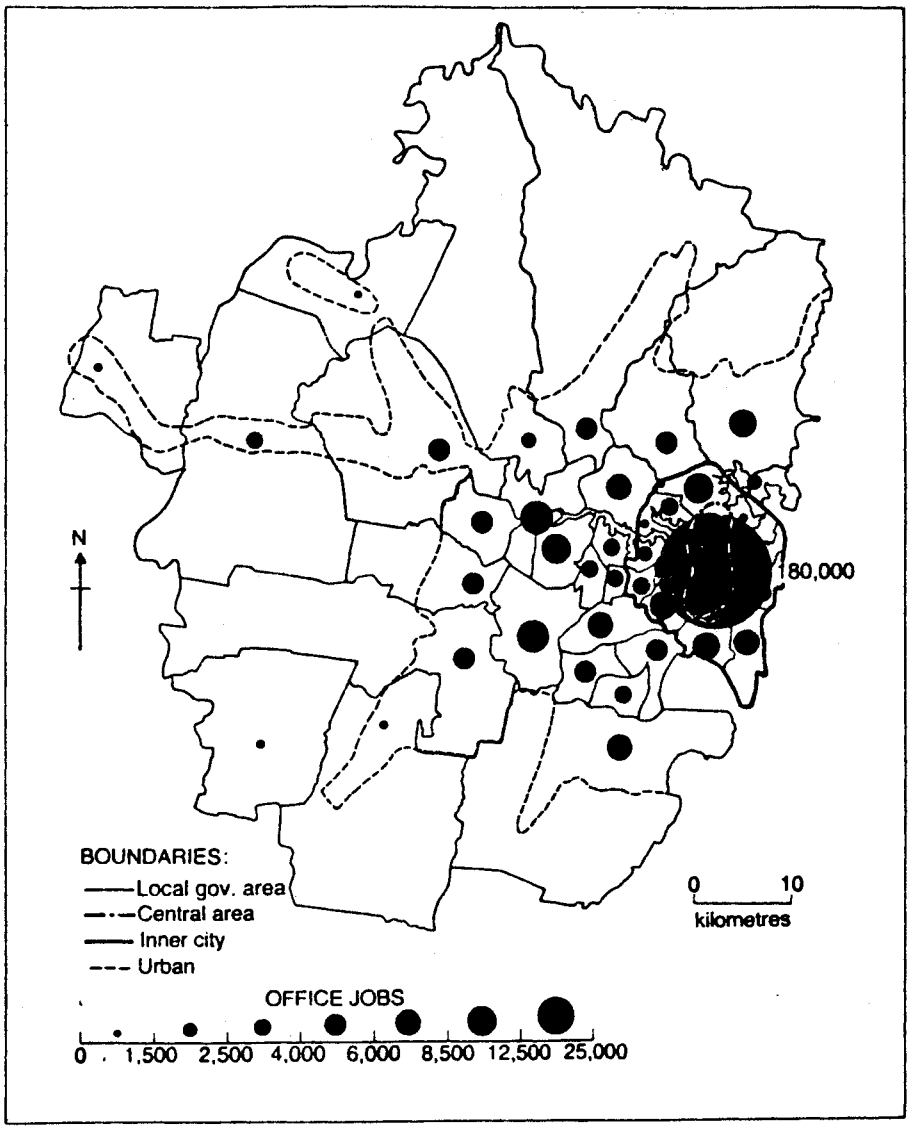

Fig. 3.2 Distribution of office jobs in Sydney, 1971

Source: Alexander, I. (1979) Op. Cit., p.36

FIGURE 4.4

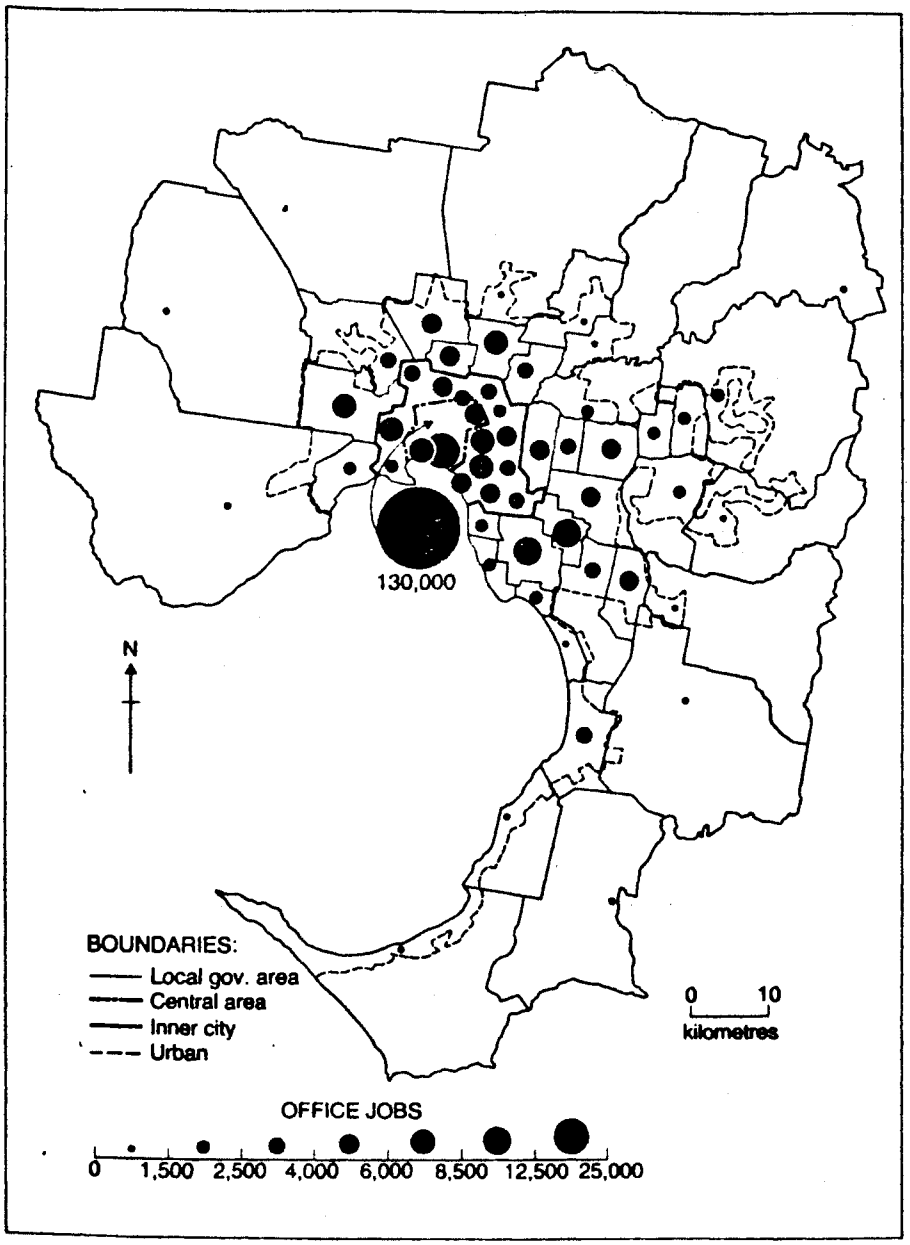

Fig. 3.3 Distribution of office jobs in Melbourne, 1971

Source: Alexander, I. (1979) Op. Cit., p.37

occurred with an economy oriented towards external trade. The initial concentration at key coastal focal points which provided rapid and efficient communication gave these selected centres a large advantage.

Regional Distribution of Office Floorspace - Great Britain, United States and Australia

Urban areas not only possess concentrations of office employment but can also be shown to have the largest proportion of office floorspace. A number of studies have been carried out to determine whether an analytical relationship is able to be developed between office space and urbanized area size.

In the United States, Horwood and Boyce[1] examine the relationship between office space and urbanized area population for 60 cities (see Appendices 11(a) and 11(b)) over a 10 year period from 1946 - 1956. A direct and exponential relationship was found, that is, as cities become larger, office space also increases but at a more rapid per capita rate as illustrated in Figures 4.5(a)-(c). As population increased by one unit, office space increased by at least two units for both 1946 and 1956. There was found to be a significant cluster of points along the least square lines, with correlation coefficients (r) of 0.90 and 0.89 for 1946 and 1956 respectively ('r' values are illustrated on Figure 4.5(d)). Office space in the central business district increased slightly from 1946 to 1956 and appeared to grow more rapidly in larger cities than smaller cities.

It is pointed out that in the preceding analysis Horwood and Boyce, due to data difficulties, compared the 1946 and 1956 office space with 1950 population data. Application of a population correction based on past population trends caused the 1946 and 1956

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1. Horwood, E. and Boyce, R. (1959) Studies of the Central Business District and Urban Freeway Development, University of Washington Press, Seattle, pp 46-57

lines in Figure 4.5(c) to almost change places for much adjusted population office space declined between 1946 and 1956 rather than increased as previously shown. The reduction of office space per capita ranged from 20 per cent in areas of 100,000 to about 9 per cent in areas of about 3 million people. In 1956 a central business district in an urbanized area of 3 million people would be expected to have 9 per cent less office space than one in an area of the same size in 1946. This means that whilst most urbanized areas actually gained in central business district office floorspace despite the fact that the per capita office space for a city of any particular size in 1946 was higher than for a similar one in 1956. Thus per capita office space increases with urbanized area population but at a decreasing rate. For example, in 1956 an urbanized area of 1 million people may add office space at a rate of 3 ft^2 per capita whereas a city of 2 million may add just below 5 ft^2 per capita.

These observations are useful not only in that they indicate the likely business infrastructure of different city sizes but point to important likely impact trends on the supply of office space per capita as the city ages. Without a macro overview of the latter regional or national dynamic trends in the supply of office space per capita, researchers incorrectly perceive that on the micro scale (urban or intra-urban level) decentralization of office based activities to be occurring when in reality the change could be universal and related to changes in the structure of the economy as opposed to an increase in attractiveness of an alternative location.

An analysis by Armstrong carried out in respect of the period 1960 - 1970 for the whole of the United States reinforces the findings of Horwood and Boyce. Figure 4.6 shows that both the larger SMSA's over 1 million people possessed larger proportions of office occupations per capita than smaller SMSA's of 250,000 to 1 million people. It has also been shown that a relationship exists between SMSA office employment and central business district office floorspace and that the higher the office workers/population ratio

FIGURE 4.5(a)

URBANIZED AREA POPULATION, 1950, VS. REPORTED OFFICE SPACE, 1946

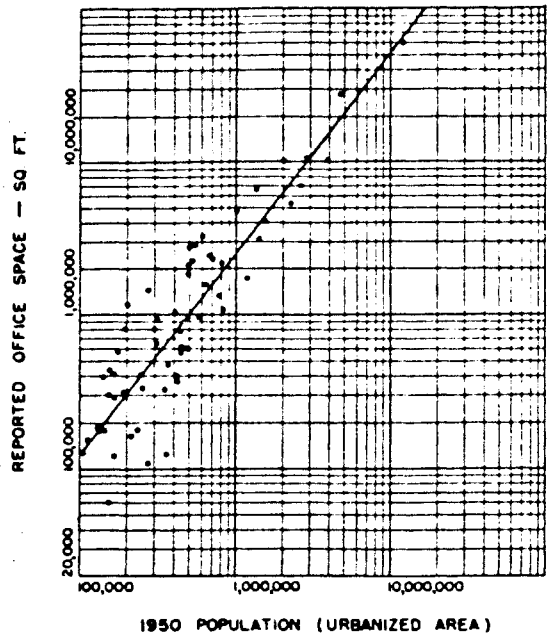


FIGURE 4.5(b)

URBANIZED AREA POPULATION, 1950, VS. REPORTED OFFICE SPACE, 1956

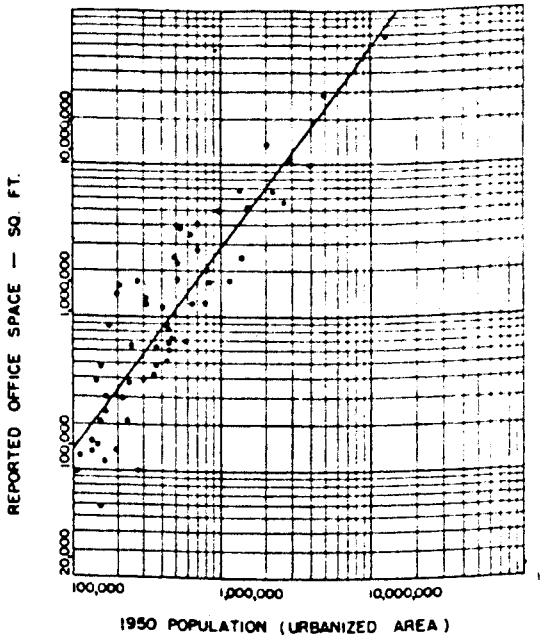


FIGURE 4.5(c)

URBANIZED AREA POPULATION, 1950 VS. CBD OFFICE SPACE

1946 — 1956 COMPARISON

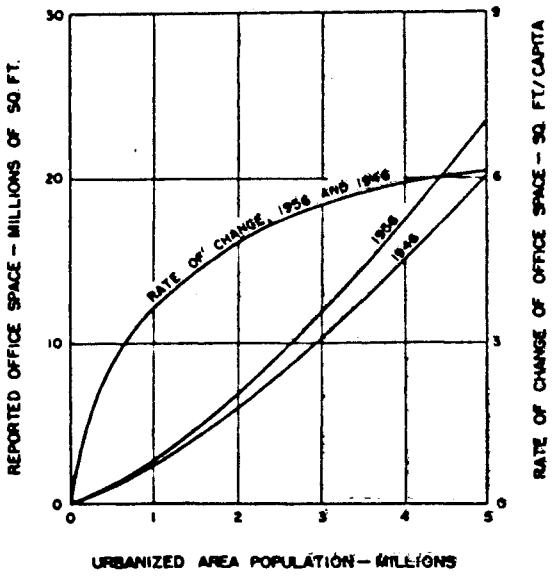
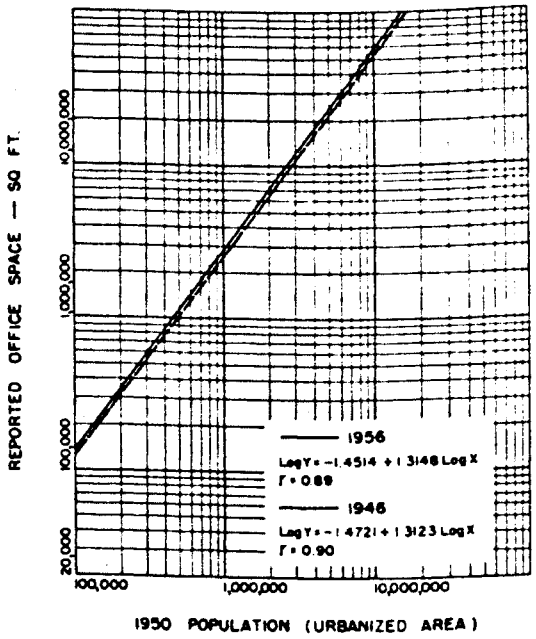


FIGURE 4.5(d)

URBANIZED AREA POPULATION, 1950, VS. REPORTED OFFICE SPACE

1946 — 1956 COMPARISON



Source: Horwood, E. and Boyce, R. (1959) Op. Cit., p.52

FIGURE 4.6

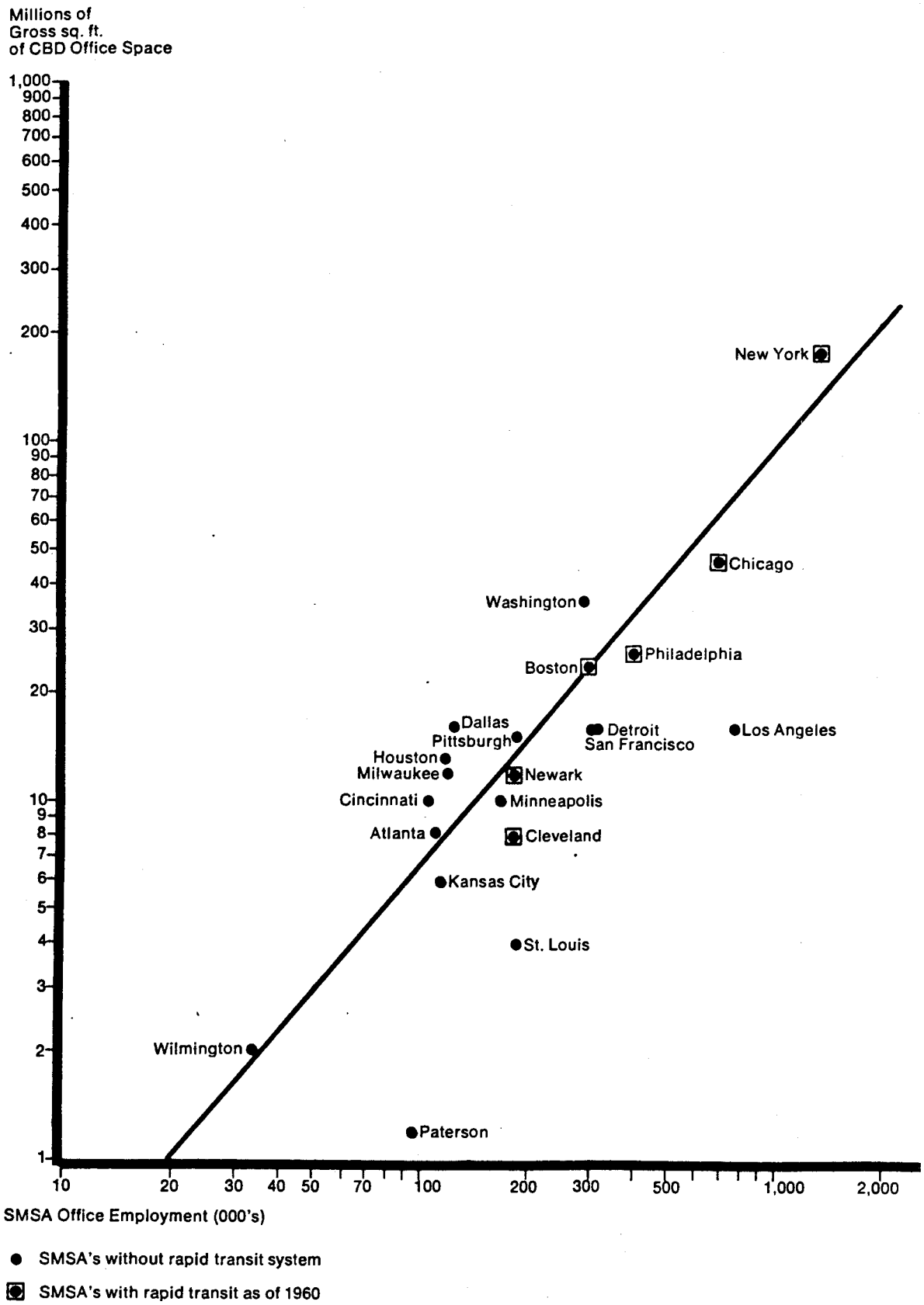


Figure 2.5 Metropolitan office employment and CBD office floor space in 1960

Source: Armstrong, R.B. (1972) Op. Cit., p.51

the higher is the proportion of office workers concentrated in the central business district[1]. (See Table 4.5 and Figure 4.7).

A similar exponential relationship has been demonstrated for British cities with more than 500,000 ft^2 of total commercial office floorspace[2]. (Westminster and the City of London were excluded as they produced extreme deviations from the least squares line). In Figure 4.8 the least squares line illustrates that as population increases, the supply of office floorspace also increases. Using the equation derived by Daniels

$$\text{Log } Y = 2.0475 + 0.7819 \text{ Log } X$$

where Y = Floorspace and,

X = Population

'r' value = 0.65

a city of 100,000 population might be expected to have about 852,000 ft^2 total office space and a city of 1 million population about 2,900,000 ft^2 total office space. A low r^2 value of 42 per cent as achieved in the above equation could not be relied upon, however, for prediction purposes. Several cities namely Manchester, Liverpool and Birmingham were found to have considerably more office floorspace than anticipated - Manchester had 4 to 5 times more office space whilst Liverpool and Birmingham had three times more space. Other cities also located in the North West Region had much less office space than was expected due to the dominance of Manchester and Liverpool.

Daniels has also found that there is a positive relationship between the total number of workers with workplaces in a city centre and the proportion of office occupations[3]. The equation of

$$Y = 20.43 + 11.22 \text{ Log } X$$

where Y = % of office occupations and

X = total number of employees working in each centre

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1. Armstrong, R.B. (1972) Op. Cit., pp 49-51
2. Daniels, P.W. (1975) Op. Cit., p.103
3. Daniels, P.W. (1975) Op. Cit., p.105

TABLE 4.5

Total Office Employment in Selected SMSAs and Estimated Intraregional Distribution

	Office employ. in thousands, 1960*				% office employ. in downtown	Est. gross priv. and pub. office space in downtown (× 1 million sq ft)	
	SMSA	Central city	Suburban ring	Downtown		1960	1970
New York SMSA	1,334	1,113	221	840	63%	179	247
Los Angeles SMSA	703	376	327	100	14	16	33
Chicago SMSA	688	488	200	275	40	47	63
Philadelphia SMSA	397	240	157	120	30	26	34
Detroit SMSA	316	183	133	80	25	16	23
San Francisco SMSA	306	175	131	100	33	16	26
Boston SMSA	297	142	155	120	40	24	34
Pittsburgh SMSA	188	79	108	70	37	15	22
St. Louis SMSA	188	110	78	35	19	4	8
Washington SMSA	288	199	89	180	63	36	54
Cleveland SMSA	183	126	57	50	27	8	11
Newark SMSA	178	85	93	50	28	12	14
Minn.-St. Paul SMSA	168	124	44	65	39	10	12
Houston SMSA	118	100	18	80	68	13	22
Milwaukee SMSA	120	90	30	60	50	12	14
Paterson SMSA	97	24	72	5	5	1	1
Dallas SMSA	124	93	31	80	65	16	22
Cincinnati SMSA	106	71	35	45	42	10	12
Kansas City SMSA	113	76	37	30	27	6	9
Atlanta SMSA	111	77	34	45	41	8	17
Wilmington SMSA	34	17	17	10	29	2	3
Total SMSAs	6,055	3,990	2,065	2,440	40	477	681

Sources: Employment estimates constructed by Regional Plan Association from data in U.S. Census, *Census of Population: 1960 Detailed Characteristics*, and *Journey to Work*. Floor space estimates from a survey of respective city planning agencies and, when not locally available, constructed by Regional Plan Association.

Notes: Detail may not add to totals because of rounding. The data on downtown office employment are estimates rounded to the nearest five thousand and apply to major central business districts only.

* Office employment located at office, factory, store, institution, and other sites. Does not include sales workers in offices except for downtown estimates.

Source: Armstrong, R.B. (1972) Op. Cit., p.49

FIGURE 4.7

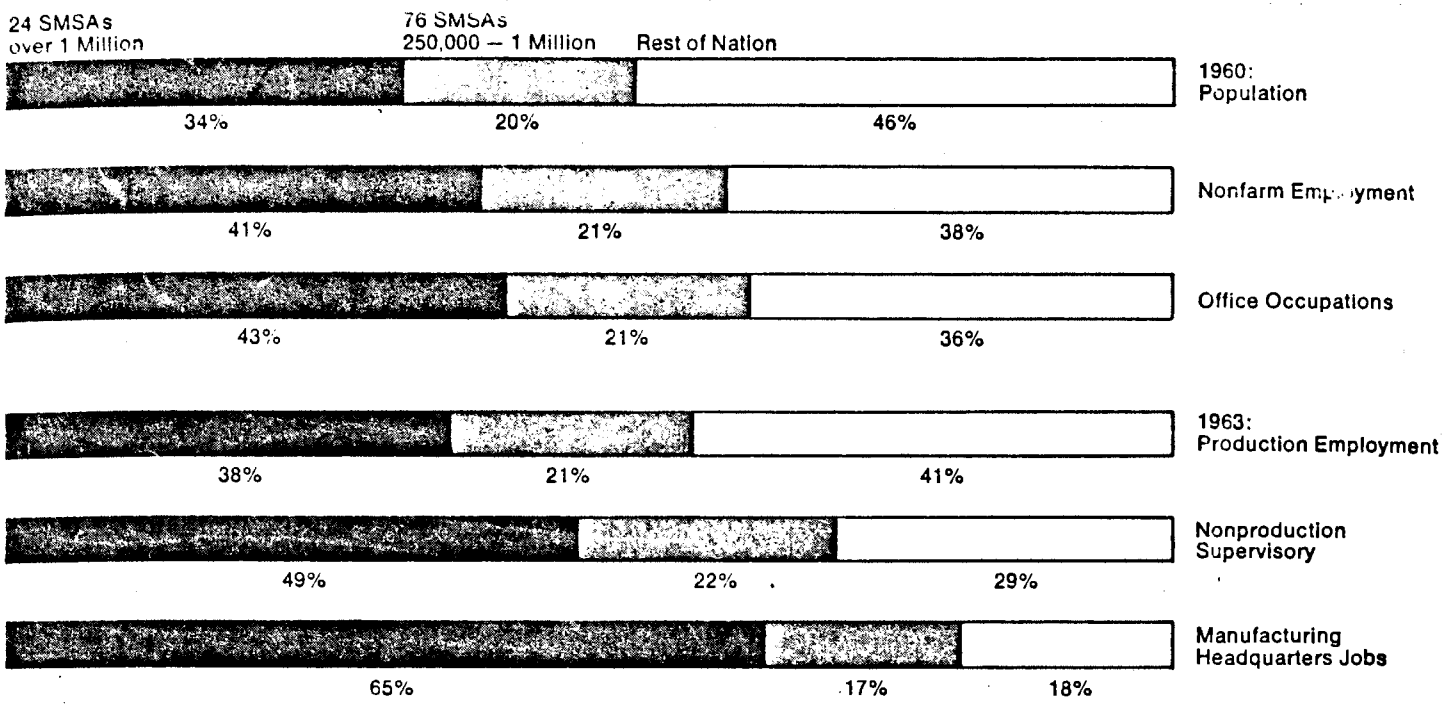

Figure 1.5 Distribution of selected activities by size of metropolitan area, 1960 and 1963

Source: Armstrong, R.B. (1972) Op. Cit., p.19

had an 'r' value of 0.43 which revealed that there was considerable variability in office occupation levels relative to total occupations. By comparison provincial county boroughs with similar working size were not as well endowed in office occupations as their counterparts in the South East.

As regional office space data is not recorded by the Australian Bureau of Statistics the relationship between cities size and population was not able to be explored. Australian floorspace data is available on a limited basis only where special studies have been commissioned.

The Spatial Hierarchy of Headquarters and Asset Control

In so far as the multi-locational organizations control large shares of advanced economies, they are by far the most important propagators of flows of goods, services, economic information and capital. Hence they are the most predominant source of interdependencies within a nations system of cities and the most important generators of inter-urban growth transmission[1]. If the location, function and relative size of headquarters and other component units can be identified, it should be possible to make some observations on inter-urban growth transmission and flows of multiplier effects caused by inter-organizational relationships. From this point it would become possible to make further observations about growth transmission channels associated with a particular urban area.

This analysis aims to identify regional processes of office activities, and that it is not the intention of the author to debate the merit of decentralized or centralized spatial patterns. Westaway[2] suggests that the most efficient way to organize large

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1. Pred, A. (1976) Op. Cit., p.154

2. Westaway, J. (1974) Op. Cit., p.157

FIGURE 4.8

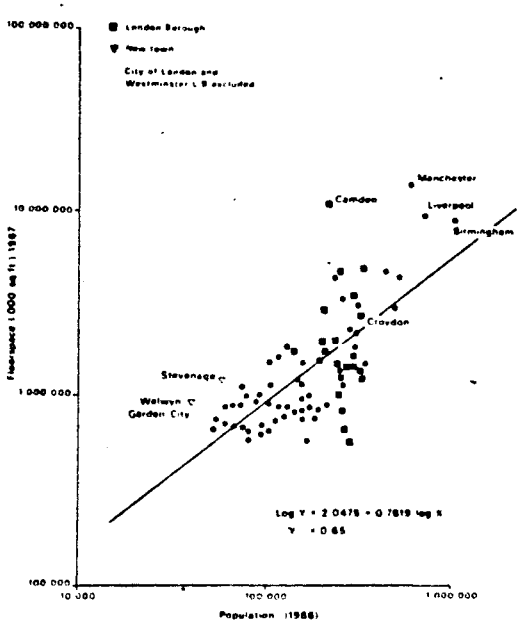

Fig. 24 Relationship Between City Population and Total Office Floorspace, England and Wales – 1966 (Data: General Register Office, *Sample Census 1966, England and Wales*, 1968 and as for Fig. 23)

Source: Daniels, P.W. (1975) Op. Cit., p.103

corporations by centralization may be best for the national economy, however there could be social consequences of unemployment and lack of opportunity implicit in such a policy. Prior to regional public policy being carried out by the government should it consider conflict to exist between economic efficiency and equity goals some insight into the basis for uneven spatial distribution of offices must be gained.

The Spatial Distribution of Control Activities

In the United States it would appear that as national economies grow there is a trend towards a more evenly distributed or less concentrated distribution of corporate control reflected in the spatial pattern of headquarters offices. A number of recent studies demonstrate this trend. Throughout the period 1956 - 1971 the proportion of assets, sales and revenues controlled by giant corporations continued to grow[1]. The relative concentration of the fifty largest corporations of industrials, retailers, transportation companies, life insurance, banking and utilities were analyzed by Semple according to sales, revenues or assets as was most appropriate in each case. Financial data collected for the top fifty corporations in each of the six corporate classes associated with the subregion where the headquarters were located are presented in Figures 4.9(a)-(f).

This spatial arrangement of financial data revealed that generally the economy has matured and expanded; at the national level, the concentration of the largest headquarters becoming more dispersed. This is the case at the regional level but is only partially true at the subregional level. On the whole, large goods and service headquarters are geographically more concentrated by sales and revenues than financial institutions are by assets but both groups are becoming more dispersed on a national basis, however whilst there is a tendency towards national dispersal the concentration of

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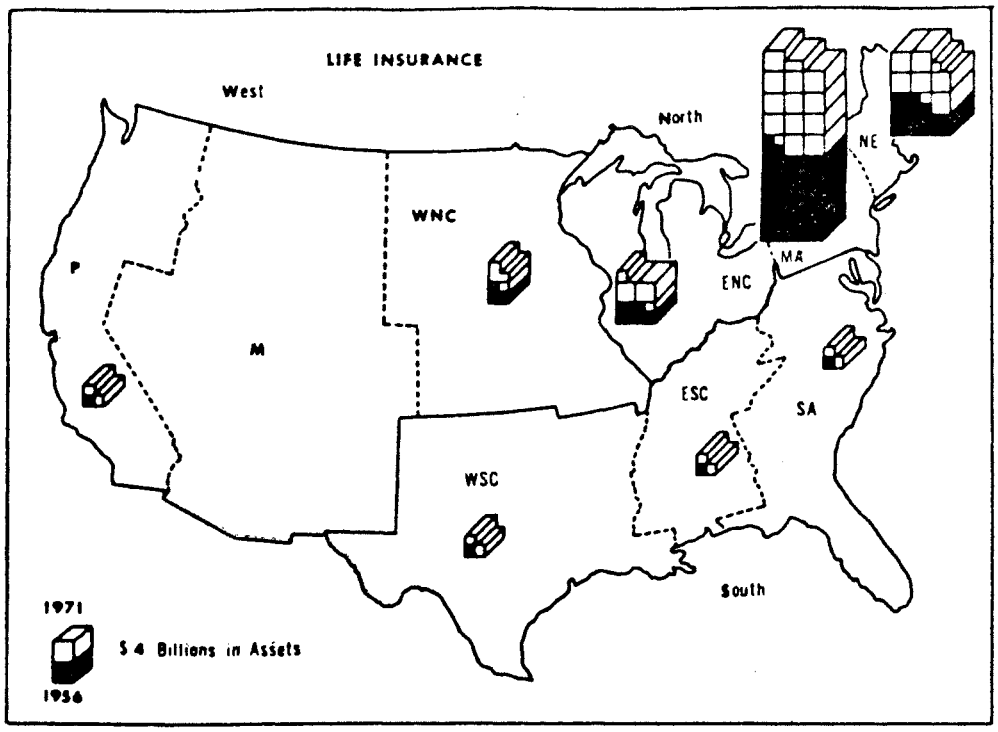
1. Semple, R. Keith (1973) "Recent Trends in the Spatial Concentration of Corporate Headquarters" in Economic Geography, Vol. 49, pp 309-318

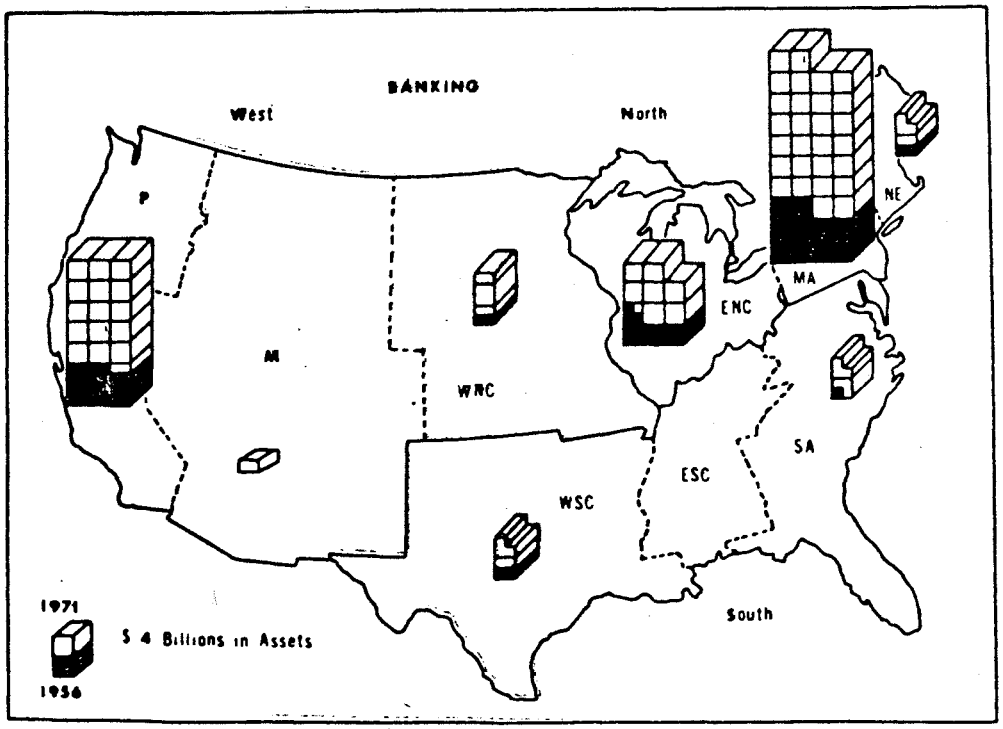
FIGURE 4.9(a)



Assets of the headquarters of the top 50 corporations in life insurance.

Source: Semple, R.K. (1973) Op. Cit., p.313

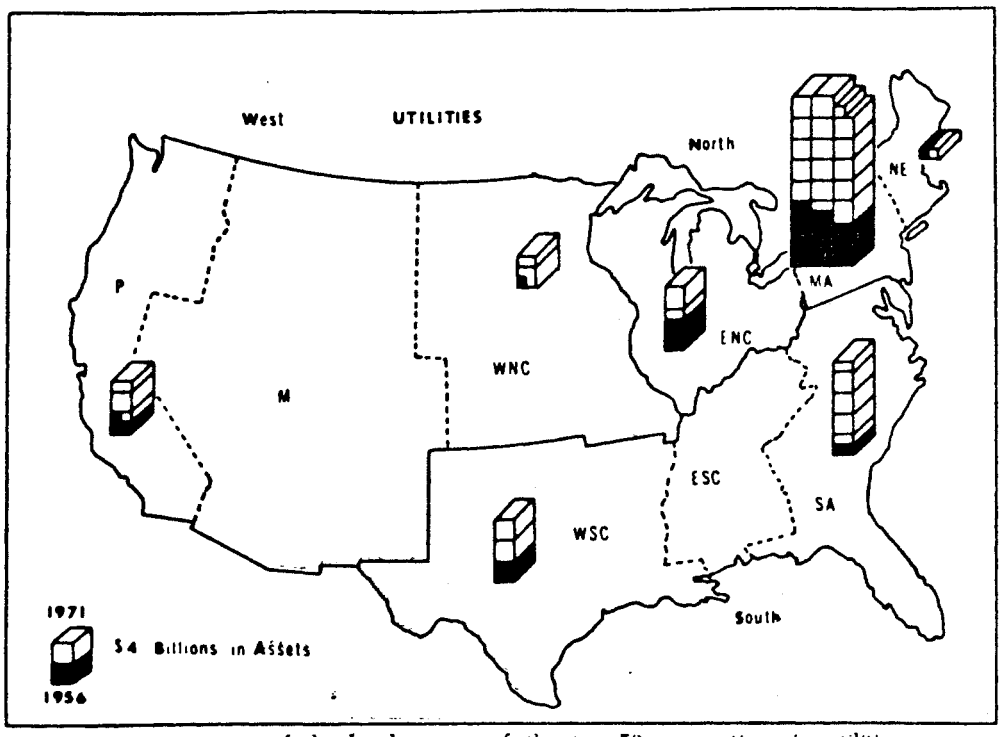
FIGURE 4.9(b)



Assets of the headquarters of the top 50 corporations in banking.

Source: Semple, R.K. (1973) Op. Cit., p.313

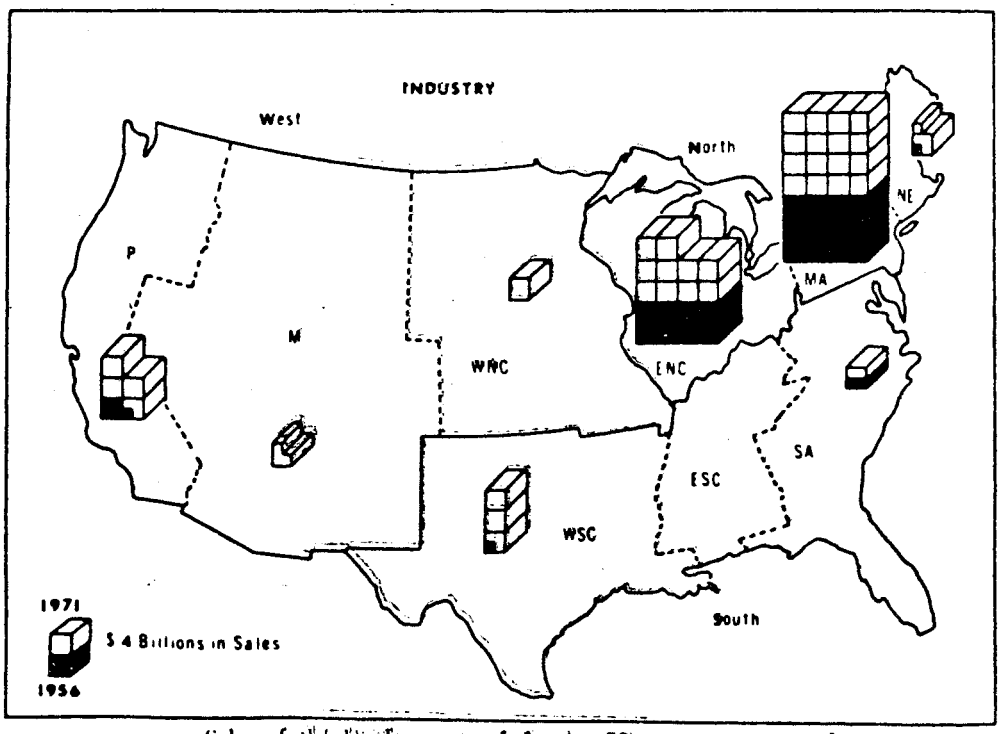
FIGURE 4.9(c)



Assets of the headquarters of the top 50 corporations in utilities.

Source: Semple, R.K. (1973) Op. Cit., p.314

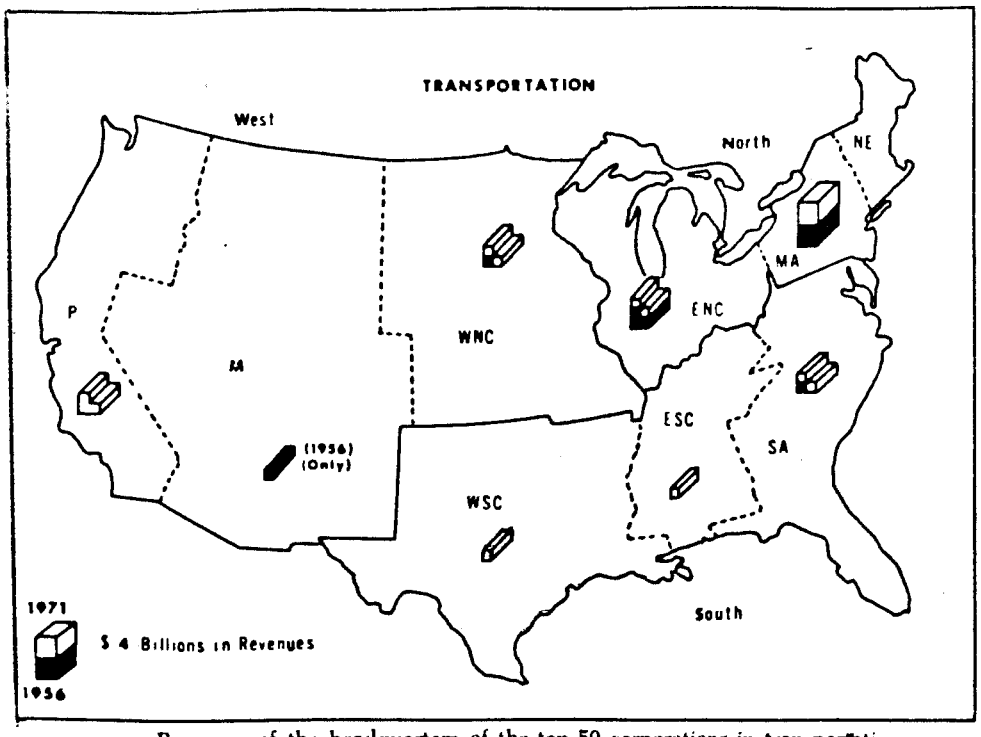
FIGURE 4.9(d)



Sales of the headquarters of the top 50 corporations in industry.

Source: Semple, R.K. (1973) Op. Cit., p.314

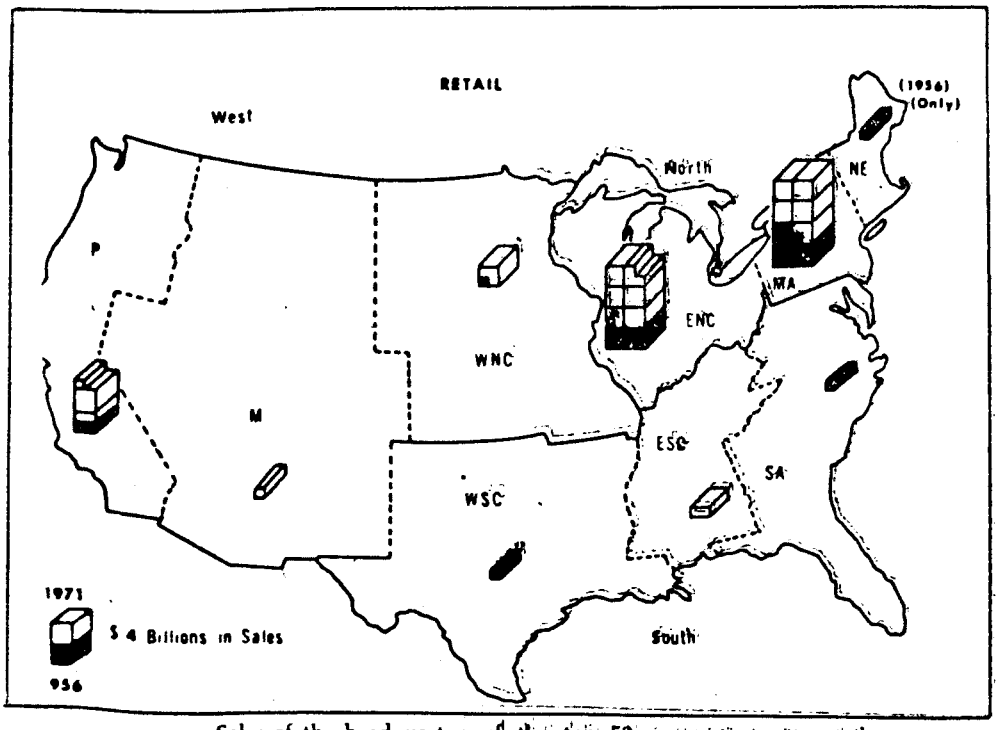
FIGURE 4.9(e)



Revenues of the headquarters of the top 50 corporations in transportation.

Source: Semple, R.K. (1973) Op. Cit., p.315

FIGURE 4.9(f)



Sales of the headquarters of the top 50 corporations in retail.

Source: Semple, R.K. (1973) Op. Cit., p.315

goods and service and financial groups are still occurring in the major North, South and West regions. In these regions, subregional concentration is higher for the financial group than for the goods and service group, and whereas goods and services at the local level are becoming more dispersed, the opposite is the case for the financial group[1].

Whilst in all classes the trend from 1956 to 1971 was to greater corporate dispersion among major regions of the country within major regions the dispersion between the subregions was greatest for life insurance in both 1956 and 1971. The most concentrated corporate structure in both periods was utilities and concentration in 1971 had increased from the 1956 level. Retailing and transportation classes of corporation also achieved higher levels of concentration at the subregional level despite the overall trend of dispersal.

The examination of data pertaining to the location of head offices in Great Britain reveals that the concentration of head offices are overwhelmingly in London. No less than 532 of the top 1000 companies (ranked by total turnover) have their head office located in London[2], whilst more than 300 of these are located in Central London[3]. The concentration of head office functions in London is reinforced by the fact that the larger the firm is the greater the probability that it will have its headquarters in Central London - firms with London headquarters account for over 78 per cent of the turnover of the 1000 largest firms whilst they represent only 53 per cent of their number.

As Table 4.6 shows 86 of the 100 largest firms have their

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1. Ibid.
2. Westaway, J. (1974) Op. Cit., p.71
3. Evan, A. (1973) "The Location of the Headquarters of Industrial Companies" in Urban Studies, Vol. 10, pp 387-395

headquarters in London whilst only 32 of the 100 smallest firms follow this pattern.

TABLE 4.6

FIRM SIZE AND DEGREE OF CONCENTRATION IN LONDON 1971/72

Rank of Firms By Turnover	No. with Head Offices in London	Cumulative No. in London	Cumulative % in London
1 - 100	86	86	86
101 - 200	70	156	78
201 - 300	62	218	73
301 - 400	59	277	69
401 - 500	50	327	65
501 - 600	48	375	62
601 - 700	42	417	60
701 - 800	39	456	57
801 - 900	44	500	56
901 -1000	32	532	53

Source: Westaway, J. (1974) Op. Cit., p.71

A comparison of the location of the headquarters of the 500 largest companies in the largest United States and major British cities reveals that New York, whilst dominant, has a far smaller proportion of headquarters of the major companies than London has (Table 4.7). The reasons for this greater dispersal in the United States could perhaps be explained by the greater geographical area of the country together with the greater wealth of the population. This means that a firm operating economically in Britain as a national company may experience the same economies of scale at the regional level in the United States.

TABLE 4.7

Percentage of the 500 largest British Industrial Companies with Headquarters in the major British cities by turnover, 1971		Percentage of the 500 largest United States Industrial Companies with Headquarters in the largest United States cities	
Conurbation	% of companies	City	% of companies
Greater London	62.2	New York City	32.6
West Midlands	5.0	Chicago	10.2
S.E. Lancashire	1.6	Pittsburgh	4.2
West Yorkshire	2.6	Los Angeles	3.2
Clydeside	2.6	Philadelphia	3.2
Sheffield	1.6	Cleveland	3.0
Merseyside	1.4	San Francisco	2.8
Tyneside	1.2	Detroit	2.6
Bristol	0.4	St Louis	2.4
Leicester	0.2	Boston	2.4
Edinburgh	0.8		
Located Elsewhere	20.4	Located Elsewhere	33.4

Source: Evan, A. (1973) Op. Cit., p.359

If the locational pattern of office headquarters in Britain is examined over time the results reveal that the most notable change between 1969 and 1971 occurred in London which gained a further 30 of the top 500 headquarters[1]. On the other hand losses were experienced by the large cities apart from London, for example, Manchester lost 7, Birmingham 6, and both Leeds and Sheffield lost 2 headquarter offices during the latter period. Westaway explains this increased concentration of headquarters by two factors. Firms within London but outside the largest 500 may have increased their turnover

1. Westaway, J. (1974) Op. Cit., p.70

by growth or merge to such an extent that they become one of the 500 largest firms by 1971. The other factor is that as firms outside London grow they may find the need to move headquarters to London, for larger or growing firms with national or regional sales may find their optimal location in the national metropolis where a pool of outside specialists and outside sources of information simplify the communication process. Goodwin[1] has shown that in the United States, the larger the metropolitan area in which the headquarters offices are located the greater is the number of states in which companies had branch plants. The decline in geographical extent of control occurs as cities further down in the hierarchy are considered.

Location patterns of different types of headquarters: Central London dominates the location pattern of headquarters offices of Britain's top 500 manufacturing companies (engaged primarily in trade and industry). 57 per cent of the headquarters are located in London and administer 77 per cent of the total turnover of the top 500 manufacturing companies. Since 1955 this concentration of headquarters in London has increased[2]. As Figure 4.10 shows other British cities are only minor centres for the location headquarters of industrial firms[3]. Ranked in order of total number of headquarters are Glasgow (10), Birmingham (9), Liverpool and Sheffield (8 each), Manchester (7), Leeds (5) Brentford (Hounslow L.B.) (5), Bradford and Slough (4 each).

The location of industrial headquarters outside of London coincide with those major cities with above average floorspace per

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1. Goodwin, William (1965) "The Management Center in the United States" in The Geographical Review, Vol. 55, pp 1-16

2. Morgan, W.T. (1962) "The Geographical Concentration of Big Business in Great Britain" in Town and Country Planning, Vol. 30, pp 122-124

3. Daniels, P.W. (1975) Op. Cit., p.107

FIGURE 4.10

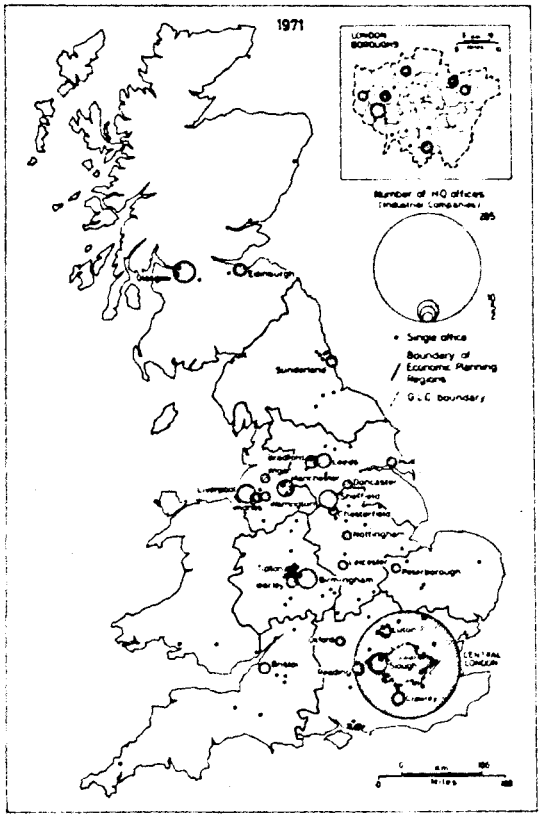

Fig. 26 Location of Headquarters Offices of the Top 500 Manufacturing Companies, Great Britain - 1971–1972 (Data: *The Times 1000 Leading Companies in Britain and Overseas 1971–72*, 1972)

Source: Daniels, P.W. (1975) Op. Cit., p.106

capita discussed in the preceding part of this chapter. Westaway's[1] observation that between 1969-1970 and 1970-1971 four major provincial office centres Manchester, Birmingham, Leeds and Sheffield, lost 17 head offices between them does not imply that centralization has occurred. Most of those losses made by the provincial centres ranging in population from approximately 1.1 million to 2.8 million were dispersed evenly among smaller centres which had populations ranging from about 200,000 to 300,000 and located mainly in the Midlands, North West, South East. As most of the large cities and London experienced losses in administrative functions (as opposed to managerial and professional and those in the Midlands, North West and South East gained) it appears reasonable to assume that the relative losses experienced by large cities and the gains experienced by surrounding towns are related. Gains in professional and managerial functions were experienced mainly in the South East and to a lesser extent in the Midlands. It would appear that control functions with their high degree of external contact activity are tending to centralize in the region in which information needs are best met. Administrative functions which would have few external face-to-face contacts (as this level of management is concerned primarily with the functioning of the firm) in so far as special information requirements are concerned, hence they tend to be less constrained in a locational sense and tend to show signs of decentralization from large city regions.

As regards the headquarters of companies engaged in service industries (banking, insurance, finance and agriculture are excluded as they operate primarily overseas), London is particularly important as it controlled 71.5 per cent of service company assets and possessed about 50 per cent of company headquarters[2]. On a national basis London and the South East have disproportionate concentration in central services, divisional head offices and research and development units[3].

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1. Westaway, J. (1974) Op. Cit., p.60
2. Morgan, W.T. (1962) Op. Cit., p.122
3. Parsons, G.F. (1972) "The giant manufacturing Corporations and balanced regional growth in Britain" in Area, Vol. 4, pp 99-103

Of the top 50 life insurance companies 68 per cent had their headquarters in Central London - most of the companies with headquarters offices located outside London were the life and non life insurance[1]. Financial office headquarters were widely distributed amongst individual locations despite the fact that 76 per cent were located in the City of London. The headquarters of nationalized industries controlled from London, are the most concentrated although this is not the same type of centralization exhibited by the location of offices of private companies[2]. Other published data was unavailable to permit the location patterns of different headquarter patterns to be analyzed temporally.

The State capitals are the leaders in management in Australia in that they have well above average proportions of workers in the administrative executive and management together with above average proportions of professional and technical workers[3]. The distribution of headquarters control as indicated by the location of control over assets is strongly concentrated in Sydney and Melbourne which share the leadership function in the Australian economy[4]. The concentration tendency was greatest in relation to administrative and managerial jobs in all States and in relation to professional jobs in NSW and Victoria[5]. The minimum proportion of assets controlled by them is oil exploration and their maximum is life insurance. Although Sydney has greater all round strength (Melbourne is lacking in investment and building) both cities appear to be complementary in their share of different assets.

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1. Daniels, P.W. (1975) Op. Cit., p.108

2. Evan, A. (1973) Op. Cit., p.392

3. Australian Bureau of Statistics

4. Johnston, R.J. (1966) "The Australian Scene - Commercial Leadership in Australia" in The Australian Geographer, Vol. 10, pp 49-52

5. Alexander, I. (1979) Op. Cit., p.29

(Table 4.8). Sydney specializes in financial headquarters (investment, finance, insurance) whilst Melbourne has a higher proportion of industrial headquarters in all categories of transport and production except food and building. The greatest concentration of mining headquarters occurs in Brisbane (Table 4.9).

The geographical extent of control of each centre may be ascertained by examining the total distribution of factories by each State and the location of the cities which control these factories. Table 4.10 shows that Victoria is the State whose own factories are controlled to the greatest degree by its own capital, NSW ranks second closely following Melbourne's degree of dominance. No other State is dominated by its own capital. Headquarters activity in Melbourne and Sydney are thus highly export oriented in comparison to those in the other State capitals or commercial centres.

The national capital, ACT, has failed to attract many nationally oriented headquarters. Of the top 100 companies registered at the Sydney Stock Exchange, only one had a head office in Canberra whilst 90 per cent were based in Sydney and Melbourne[1]. Only the regional offices of insurance companies and sales offices of manufacturing companies are evidenced in the ACT.

It can be seen that regional and indeed national inequalities exist in the distribution of headquarters activity and the control of assets in Australia. The heavy concentration of insurance, finance and manufacturing on a national basis is similar to the British situation. Whilst regional concentrations in these areas of business exist in the United States, the overall national trend is one of gradual equalization whilst the reverse is occurring in Australia.

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1. Alexander, I. (1979) Op. Cit., p.89

TABLE 4.8

PROPORTION OF TOTAL ASSETS CONTROLLED: LOCATION QUOTIENTS

	Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Other
Trading	2.40	2.03	.44	1.37	.37	.45	.04
Investment	3.92	.78	.12	.37			.03
Finance	2.68	2.23	.15	.39	.15	.27	.01
Life Insurance	2.86	2.13	.29				
Non-Life Insurance	2.61	1.81	1.68	.16	.45		
Entertainment	3.18	1.54	.29	.21	.45		.03
Building	3.45	.74	2.30				.03
Transport	1.60	3.04	.24	1.37	.07		.04
Oil Exploration	2.65	1.33	1.13	.34	2.97		
Production	1.70	2.91	.49	.52	.25	.36	.10

Source: As Table 1. The production, trading, and investment categories include all companies with shareholders' funds of £1m. plus and those making a tax-paid profit of £100,000 a year (for most companies this refers to the 1963 financial year). Production covers manufacturing, mining and other primary industries. The finance category includes all banks, investment banks, hire-purchase firms, short-term money lenders, factors and permanent building societies with assets over £5m. and profits over £100,000 p.a. The entertainment category covers television, radio, hotels, motels, theatres and bowling centres (assets and profits as for production) and building covers real estate developers as well as contractors.

Source: Johnston, R.J. (1966) Op. Cit., p.50

TABLE 4.9

TOTAL ASSETS CONTROLLED IN PRODUCTION CATEGORIES: LOCATION QUOTIENTS

	Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Other
Agriculture	1.40	3.12					.32
Mining	1.54	1.79	5.09	.05	.38		.08
Cement, etc.	1.71	2.98		.39	.55		.13
Fuel Chemicals	2.23	2.68		.23	.32		.03
Engineering	1.42	3.41	.29	.36	.72		.10
Vehicles	.72	4.06		1.36			.08
Clothing Textiles	1.15	3.48		.98		.91	.14
Food	2.48	1.16	.81	.46	.60	1.73	.15
Wood Products	.68	3.49	.68	.30	.42		.33
Others	2.12	2.48	.32	1.20	.30	.36	.01

Source: As Table 1.

Source: Johnston, R.J. (1966) Op. Cit., p.5

TABLE 4.10

THE EXTENT OF CONTROL: NUMBER OF ESTABLISHMENTS (FACTORIES)

State	N.S.W.	Victoria	Queensland	S.A.	W.A.	Tasmania	Other
A. Percentage of factories in each State controlled from each City							
Sydney	69.9	20.1	32.0	30.8	25.2	12.7	41.5
Melbourne	24.9	74.8	43.4	38.0	39.3	55.2	50.0
Brisbane	1.2	.4	15.8	.5	1.3		2.8
Adelaide	.7	3.0	1.3	28.4	2.6		4.7
Perth					29.0		9
Hobart						6.9	
Other	3.3	1.7	7.5	2.4	2.6	25.3	
B. Percentage of factories controlled by each City in each State							
Sydney	65.6	13.1	6.8	5.9	3.6	1.0	4.1
Melbourne	22.6	47.0	8.9	7.1	5.5	4.3	4.8
Brisbane	21.4	5.3	63.2	1.8	3.5		5.3
Adelaide	7.1	21.2	3.0	59.6	4.1		5.1
Perth					97.9		2.1
Hobart						100.0	

Source: As Table 1. The factories in the other category are mainly in the Northern Territory (13), Australian Capital Territory (9), New Zealand (51), the United Kingdom (12), Italy (6), and New Guinea (5).

Source: Johnston, R.J. (1966) Op. Cit., p.51

Spatial Complexity of Non Local Control

At a regional or national level many linkage patterns are complex in the sense that they do not conform to a gravity model perspective. For example, in the United States the most important job control linkages of the Phoenix SMSA are with the Chicago metropolitan complex rather than with the more comparably sized and physically proximate Los Angeles metropolitan complex[1]. (Figure 4.11). Another of many such situations is the intra-organization interdependencies between San Francisco-Oakland San Jose and the Eastern Tennessee centres of Knoxville and Kingsport-Bristol. These are of greater importance than metropolitan complexes such as Detroit, Cincinnati and Indianapolis which lie at similar distances from Northern California but have much larger populations (Figure 4.12).

Also illustrated in the latter figure is an additional complexity of the inter-metropolitan pattern of inter-organization growth transmission reflected by the number of centres at which linkages radiating from individual centres such as the San Francisco-Oakland-San Jose complex. Multi locational business organizations in this centre control units in 234 other United States and Canadian metropolitan centres.

The occurrence of non local job control may be observed in other developed countries. An Australian example in the peripheral State of Tasmania where a large proportion of manufacturing, transport/storage, and finance activity is controlled from mainland locations such as Victoria and NSW. See Table 4.11 below.

Quante's[2] studies relating to New York explain this trend in terms of national population redistribution towards new and growing

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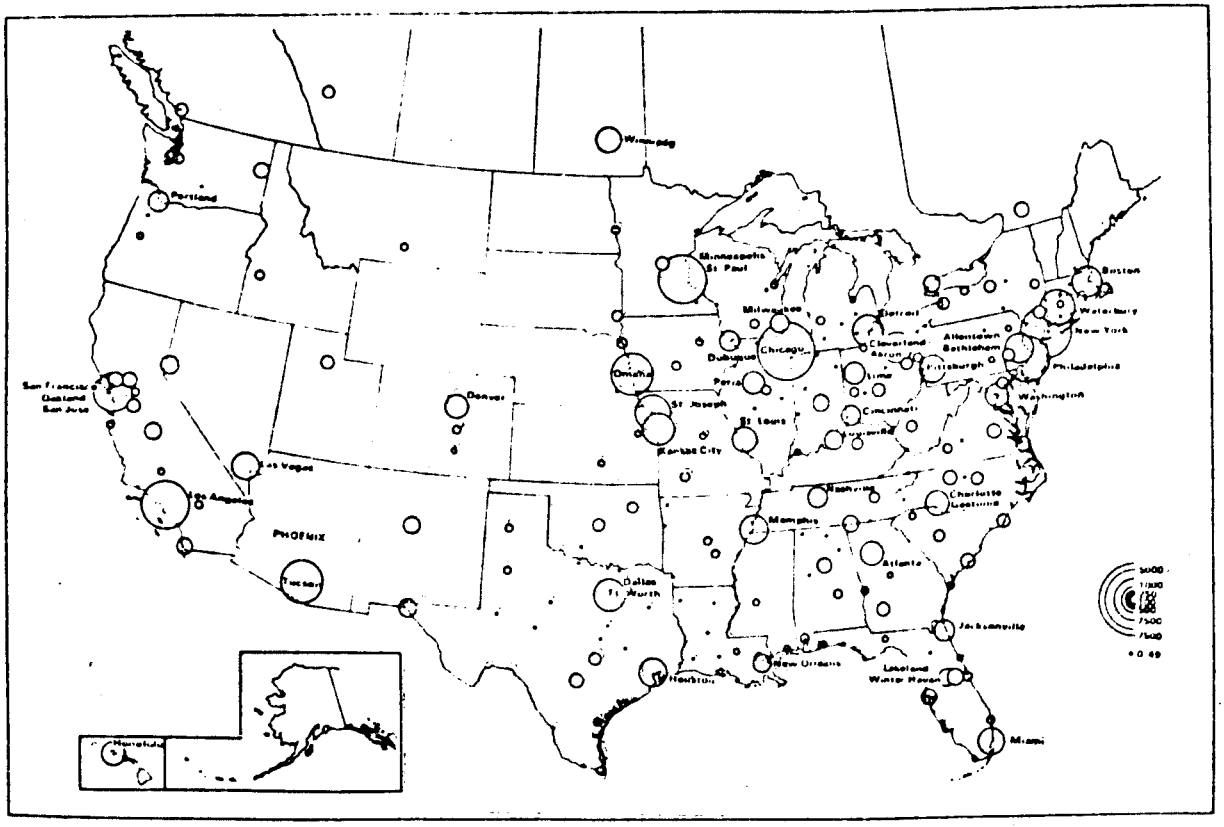
1. Pred, A. (1976) Op. Cit., p.161

2. Quante, W. (1976) The Exodus of Corporate Headquarters from New York. Special studies in U.S. social, economic and political issues, Preager, N.Y., p.35

FIGURE 4.11



U.S. and Canadian metropolitan complexes with jobs controlled by multilocational business organisations headquartered in the Phoenix SMSA.

Source: Pred, A. (1976) Op. Cit., p.163

FIGURE 4.12

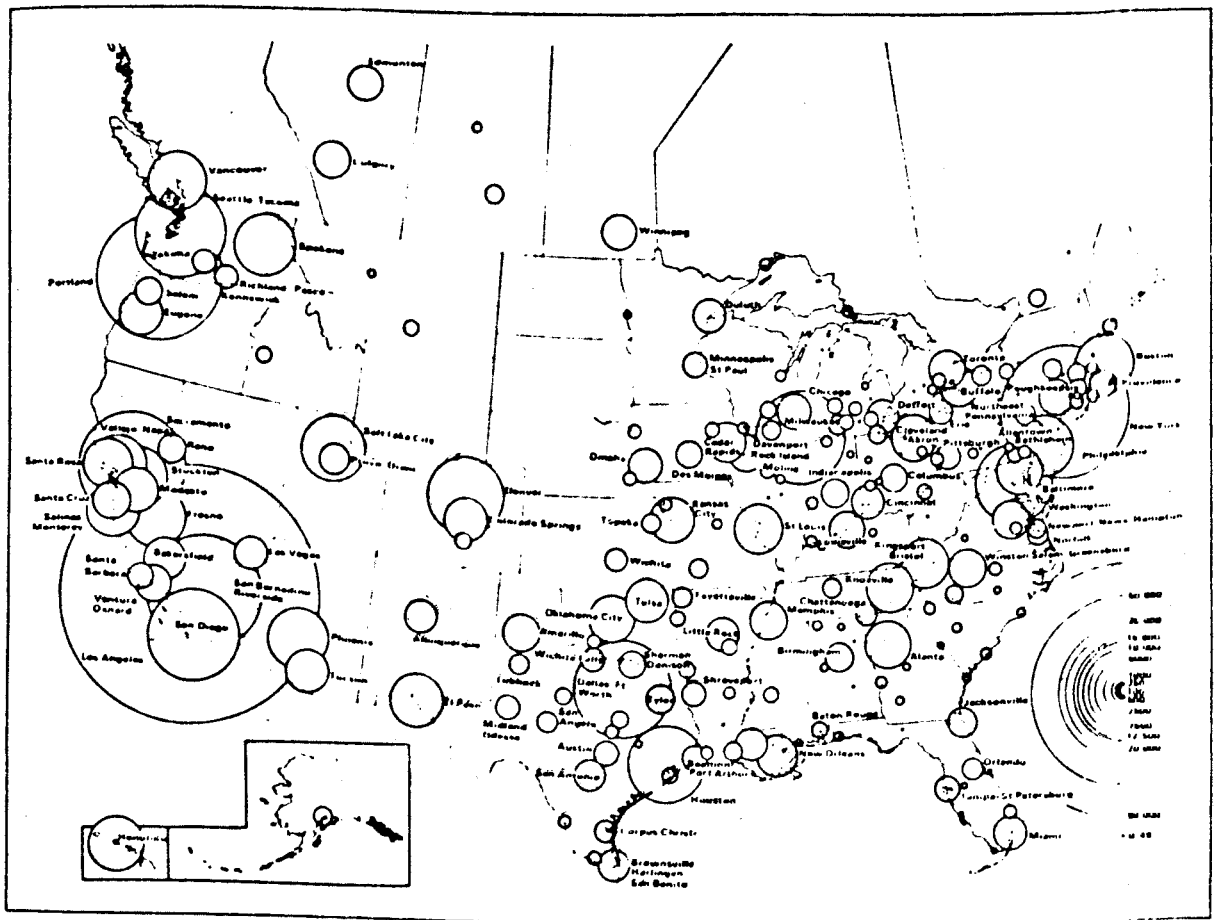


Fig. 1. U.S. and Canadian metropolitan complexes with jobs controlled by multilocational business organisations headquartered in the San Francisco–Oakland–San Jose metropolitan complex, 1974–75. (Here, as in Figs. 2–9, circles are proportional to the number of jobs. Unavoidably, there were some dissimilarities in the quality of data provided by the surveyed organisations. In some instances it was necessary to make place-by-place employment estimates based on such criteria as output, sales, and production capacity. Consequently, there is a margin of error of 100 or more for some of the larger employment totals shown in Figs. 1–9 and Table 4.)

Source: Pred, A. (1976) Op. Cit., p.161

centres of the South and West. Not only are headquarters being offered increasingly attractive locations but headquarters can be expected to be reasonably sensitive to large shifts in population.

TABLE 4.11

NON LOCAL JOB CONTROL IN TASMANIA, 1975

Industry	Control by State - % of Tasmanian Employment				
	TAS	VIC	NSW	OTHER STATES	TOTAL NON LOCAL
Mining	13	25	62		87
Manufacturing	44	45	10	1	56
Transport/ Storage and Communication	47	49	3	1	53
Finance	52	19	28	1	48
Wholesale/ Retail	78	14	8	1	22
Construction	82	16	2		18
Entertainment	88	NA	NA	NA	12
Community Service	94	NA	NA	NA	6
All Industry	68	22	9	1	32

The non local growth impact of large scale investment in a growth centre will not necessarily be mostly or totally concentrated in the 'hinterland' of the centre[1]. It is significant that non local multiplier effect leakages can frequently involve head office metropolitan complexes situated at considerable distances. Thus having regard to this evidence it would seem that the Christallerian central place theory is incompatible with the transmission of the regional pattern of growth of office based activities. There is no evidence that growth is transmitted solely via hierarchical diffusion from cities of a given size to less populous nearby centres.

1. Pred, A. (1976) Op. Cit., pp 164, 166

SUMMARY OF FINDINGS AT THE MACRO SCALE

National and Regional Growth and Control Patterns

The number of office jobs in regions appear to be a function of population and the state of economic activity. Whilst this appears to be the case in spatial terms, the reverse is actually the case when the economic multiplier concept is employed. Little or no office employment in Britain appeared in regions with undergoing structural change and experiencing declines in their manufacturing base and economically active population out migration. Middle size cities have been declining absolutely in terms of administrative office job whilst the very largest centres have increased their share of higher order employment at a slightly reduced rate relative to the overall trend. Not only does a relationship between population of a centre and number of office jobs emerge but one between population and level of office employment. Largest centres experience unequalled gains in managerial/executive office jobs and have over-concentrations of the more routine clerical and administrative jobs than their share. It would appear also that centres having populations of 1 to 3 million are likely to lose administrative jobs to smaller centres of several hundred thousand population whilst centres in that range are receptive to increases in higher order management jobs.

A further relationship between population and office activity has been established. The larger the ratio of office jobs per 100 workers in an area, the more export oriented the office activities seem to be those areas with greater than 15.2 office jobs per 100 population have proved in a number of case studies involving several nations, to have office activities which are highly export oriented. A further effect is that concentrations of successful export office activities tend to stimulate more rapid and growth of an extensive range of office activities and exhibit large concentrations of office functions in the downtown or central business district area.

Empirical evidence from the United States and Great Britain has suggested that a direct and exponential relationship exists between city size (measured in terms of population) and the amount of office floorspace, that as cities increase in size office space increases at a more rapid per capita rate. It also seems likely that over a period of time as cities grow the rate of increase of office space per capita may not be as great as it was say ten years ago although absolute increases will still occur. Simple projections of existing office space trends in line with population expansion could lead to excessive overestimations of future office space. These findings have implications for smaller centres of approximately 100,000 population for on a temporal basis the rate of increase of office space decreases at a greater rate than larger centres of several million population. A further finding as far as population and floorspace are concerned is that generally the greater the ratio of office workers/population, the greater is the proportion of office workers concentrated in the downtown or central business district and similarly the larger the proportion of workers in a city centre, the larger is the proportion of office occupations.

On a national and regional basis the spatial behaviour of the location of headquarters offices in the United States differs substantially from those patterns occurring in Great Britain and Australia. In the United States the concentration of the largest headquarters is becoming more dispersed at the national and regional level whilst the opposite is the case in Great Britain and Australia.

At the subregional level there are however some similarities in the spatial behaviour of headquarters location in the three countries. New York and London are both nationally dominant in terms of their share of the location of the headquarters of large companies but New York has a far smaller proportion of headquarters than London. London still appears to be gaining headquarters whilst its provincial centres are losing headquarters to the smaller nearby centres of populations in the vicinity of several thousand. The concentration of industrial type headquarters in London has increased and it appears

likely that this trend will continue in respect of London and the South East as far as higher level headquarters are concerned. Employment shifts indicate that whilst larger centres such as London and the provincial centres are losing administrative or lower level functions most gains in managerial and professional functions continue to be made in London and the South East.

As far as insurance activities were concerned there is heavy concentration of headquarters in London - most of the company headquarters located outside of London were the life and non life insurance. A greater proportion of the financial office head quarters were located in London but those headquarters outside of London were more widely dispersed. The service assets were over-represented in London but to a lesser extent the other types of headquarters. Ranked in order of concentration in London are the manufacturing, finance (insurance), life and non life insurance, and service industry headquarters. In general concentrations of industrial and insurance headquarters were high in the United States as in Great Britain and services tended to be concentrated but to a lesser degree.

Australia's performance closely followed Britains in that a tendency towards national dispersal of office headquarters was not marked but concentration was divided between Melbourne and Sydney. Melbourne had a greater proportion of industrial headquarters whilst Sydney led in financial headquarters. Both cities were over-represented in all the other types of headquarters.

Headquarters locational behaviour can be explained partly in terms of shifts in population increases and the sensitivity of certain types of consumer oriented firms to these shifts. Another factor which is relevant is the geographical size of a country, the distribution of resources and the subsequent scale of economy. Whilst inadequate scales of economy are found in the main in national capitals in Great Britain and Australia, the same companies may find that in an area with geographical characteristics such as in the United States, economies

of scale could be achieved at the regional level.

It is likely that economies of scale do not only include access to services but to higher levels of information as revealed by the locational tendencies of different levels of management. The degree of concentration of the control functions of managerial and professional is becoming more marked in the largest cities whilst operating or productive functions requiring little external contact opportunity are best represented in less prosperous regions. The latter situation was observed to occur because multiplier effects are directed back to large cities in which headquarters are situated rather than being spread around the hinterland of the production area.

An added complexity in the spatial behaviour of headquarters is that the regional distribution of centres over which control is exercised does not conform to the gravity model concept or Christaller's central place theory. Neither size nor locational proximity govern the location of control linkages. Perhaps the location of headquarters in relation to control linkages is related to the industrial function, the level of management and the perceived need for contact opportunities.

Having established that disparities exist in the national and regional distribution of office activities, especially the higher level functions and having identified related trends, the need for a particular line of investigation seems to flow from this chapter. What are the characteristics of the spatial patterns of office activities at the micro (urban) level and do they resemble the macro patterns identified in this chapter. These concerns are examined in the following chapter.

THE EFFECT OF MICRO ECONOMIC CONSIDERATIONS ON THE LOCATION OF OFFICE ACTIVITIES

This section attempts to offer an explanation of the spatial patterns of offices firstly by identifying the general circumstances which determine an office firms location. Such an approach deals more with the locational choice of the individual decision making unit as opposed to a general pattern of location created by the total office industry. Within the context of the administrative activity outlined in the preceding chapter it is intended to ascertain the importance of economic principles as an influence or restriction on office activities at specific locations in space by developing a method by which profit may be calculated for each location. Both cost and revenue factors would need to be identified and measured to allow spatial profitability to be calculated.

As considerable work has been done on developing theory for the location of industry it is proposed to analyse the location of office activities within the context of industrial location theory to develop a theoretical framework relevant to office location. To date the neoclassical economic theories of industrial location have dominated research in the field of industrial location (Weber, 1909; Hotelling, 1929; Losch, 1954; Isard, 1956; Greenhut, 1956). In general these theories assume that each firm will be optimally located with reference to markets labour, raw materials and other firms and that each firm behaves rationally so as to optimize its circumstances[1]. Suboptimal behaviour is incorporated in the concept of the retention of the spatial margin to profitability which is discussed in an ensuing section of this chapter.

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1. Smith, D.M. (1971) Industrial Location - An Economic Geographical Analysis, pub. by J. Wiley & Son N.Y.

Difficulties Inherent in Analysing Office Location Within the Context of Industrial Location Theory

At this point in time no research relating to the location of office activities within the context of industrial location theory has been undertaken. Since the words information and interaction are key words in the study of office location, it could be postulated that whereas industrial location models are sensitive to transport costs of raw materials and products, an office location model might be sensitive to the cost of communications which are more difficult to measure than transport costs as costs such as communication 'damage' may be relevant in addition to the actual transmission costs.

If areal variations in each of the costs of office firms and areal variations in demand/revenue (which are termed cost and revenue surfaces respectively) are examined in relation to specific locations for office activities, it can be seen that the communications factor is inextricably bound up between the demand and cost components. It would appear that as the ability to communicate or process information could vary with location thus affecting the volume of sales or revenue obtainable, communication could be introduced as a demand factor provided the customer bears the costs. From a cost point of view spatial variations in the cost of communications, whether such costs be measured in terms of transportation, telecommunications or lost contact opportunities could act as a restraint upon the margin within which some administrative activities are free to locate in if the costs are absorbed by the firm. The problem which faces the researcher is how to determine the proportion of communication costs which are absorbed by the organization and the proportion which is passed on to the consumer. The resolution of this problem is critical in that the traditional economic model cannot be applied to offices to assist in the development of an office location until this problem is rationalized.

Without an extensive examination of individual firm's

policies, the nature and extent of control and other factors such as those dealt with in the preceding chapter relating to administrative systems, the necessary data would not be available to operationalize a model of office location incorporating all cost and demand factors. Such a profit surface could be derived only by overlaying the cost and revenue surfaces. Where cost is less than revenue and the difference between cost and revenue was minimized the maximum profit would be derived.

There are a number of difficulties involved in the calculation of a profit surface. In order to calculate cost it is necessary to know the price at which goods are to be sold as price influences sales. The firm size is related to the cost at which a firm can operate and to the price at which it can sell. However the price for which goods are to be sold cannot be calculated unless total sales (revenue) are known. In order to calculate a cost structure it is necessary to know revenue and sales because economies of scale determine cost which determines price. If price is not known, sales or revenue cannot be calculated, therefore costs are not known which means size is not known. These difficulties would be of particular relevance to direct service types of office activities.

A further difficulty is the intangibility of office activity and the identification of office functions. The possibility exists that office activities may be suboptimally located and operate with more success than would manufacturing plants. It has been claimed that office location is less sensitive to costs (which are absorbed by the firm) than most economic activities as no process exists to measure the improvement in quality of executive decision making in a given location against the costs of operating at that location[1]. If office activities do locate suboptimally then this flexibility may be perpetuated by the ability of organizations to modify their

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1. Hoover, E.M. and Vernon, A. (1959) Anatomy of a Metropolis, Cambridge, Mass., Harvard Uni Press, p.97

operations in response to changing circumstances. This would be a much more difficult achievement for many industrial plants since machinery and production units are far more costly to modify, locate or replace than are office 'machinery' such as computers, microcopiers, word processing typewriters. Given this difficulty of identification and the lack of sensitivity to costs it appears that there is no accounting process which can completely evaluate the costs and potential revenue of a particular location. The office activity 'production' process is concerned with the processing of the abstract commodity of information whereas industrial activity deals with more concrete materials and products which are more easily costed in monetary terms. Thus if it is difficult for administrative organizations to identify the costs and revenue associated with office locations it may be preferable to adjust to existing locations i.e. relocate.

As industrial offices must be located in distinctive agglomerations from which they can control other units or be attached to production units the concept of intermediate locations between plants and concentrations of office activity which balance attractions of plant interactions and interactions with other firms may be inappropriate. This idea has been demonstrated by Pred who found that local jobs are controlled by multilocational business organizations, the headquarters of which are in remote metropolitan complexes on the other side of the United States[1]. To what extent the locational problems for service sector offices are similar to the kind experienced by manufacturing industry office is a problem which has yet to be researched. There may be an analogy between insurance companies, building societies and banks and between manufacturing offices in that the former have a network of branches to monitor and control and the problem is where to locate the headquarters or regional middle market offices in relation to branches. Market access may constitute a prime consideration for regionally or locally oriented service firms while headquarters may require access to established information networks and services.

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1. Pred, A. (1977) City Systems in Advanced Economies, Lond., pub. by Hutchinson

This distinctive division of function does not exist in industry nor does the hierarchical structure referred to above. The hierarchical division of office activities could be dealt with under the heading of scale. It has been shown that in some instances costs of administrative overheads decline relative to increasing size of enterprises[1] thus economies of scale may be relevant to office activity. It would follow that firms at the lower end of the hierarchy would be more sensitive to location costs than those at the other end of the spectrum with head offices in addition to regional and local branches. In the latter case costs of office location involved could be small in relation to the total turnover of such companies[2].

In the ensuing section of this chapter the cost structure of office activities is examined to enable cost surfaces to be identified.

As a starting point the factors of production applicable to industrial activities are outlined and their relevance to office activities discussed to facilitate the construction of an appropriate cost structure.

Factors of Production and Cost Structure

The conventional factors of production are referred to as land, labour, capital and enterprise. These apply to office activities but are of varying importance in the 'manufacturing' process of such activities. Due to the vertical nature of office blocks, office activities are not as land intensive as say an industrial manufacturing plant nor are office activities as capital intensive as manufacturing plants which require large amounts of floorspace and

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1. Daniels, P.W. (1979) "Perspectives on Office Location Research" in Spatial Patterns of Office Growth and Location, Ed. by Daniels, P.W. Pub. by John Wiley & Sons, Chichester, p.5

2. Ibid

heavy investment in machinery. As in the case of industrial activities it is now easier to substitute between the labour and capital factors of production. Previously this was not the case as the introduction of office equipment such as typewriters, duplicating machinery, punched card systems gave use to new numbers of office occupations, the result being an increased demand for office workers. It is doubtful that this is now the case with the development of technology such as electronic data processing systems, computer software and word processing machines. The reduced rate of increase of office workers in the Sydney Region[1] and the increasing usage of new technology in offices[2] indicate the potential for increased substituion of some types of office labour for capital. In some activities however, it is likely that capital cannot be readily substituted due to the nature of the task involved. The types of office activities that are unlikely to be reduced in labour content are non routine managerial and professional/technical occupations.

The relative importance of the various factors may be clarified by an illustration of the cost structure of a firm that is, the required quantity of the various inputs needed to produce a given output by using a common unit of monetary measurement.

Cost Structure and the Identification of Cost Surfaces

In the neoclassical approach to industrial location theory the concept of a cost surface which depends upon scale and revenue and is subject to areal variations is an important determinant of profit and the margins to profitability*. In order to derive the total cost surface it is necessary to identify the areal variations

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1. Urban Transport Study Group of N.S.W., 1976 Journey to Work Draft form: Information Paper No. 1, Jan 1980

2. Commissioner of Enquiry into Technological Change in Aust., (1980) "Technological Change in Australia" in Report of Commission of Enquiry into Technological Change in Australia

* The scale of operations influences the cost at which a firm can generate and subsequently the price which in turn influences sales (revenue)

of each item of expenditure which constitutes the total cost. In the case of some industrial activities the cost of one or several inputs may be so important as to effectively determine position of locations advantage, for example the cost of the input of electricity in aluminium smelters. This would result in locational choice being explained without constructing the total cost surface or introducing other factors such as demand[1].

The relevance of the variable cost model referred to by Smith[2] as part of a total approach to determining the optimum location for office activities is tested by examining the cost structures of office activities in the Sydney Region, N.S.W. and comparing any resultant areal variations. Traditionally the following cost surfaces applied to industrial location theory are:

building cost surfaces, material cost surfaces, source of power, labour cost surfaces, taxation surfaces, capital costs, transportation and communication costs,

which are all met by the entrepreneur.

As demonstrated below rental costs (reflected in land and building costs) and labour costs are the most relevant to office location theory. Due to difficulties associated with the allocation of transportation costs to the consumer and the firm, the importance of such costs were unable to be assessed.

Given the fact that urban development in Australia is unevenly distributed for reasons discussed in the section dealing with spatial patterns of office location, it is not proposed to make cost comparisons on an inter-regional basis. As office development is not significantly represented in other regions and due to data restrictions the Sydney Region, N.S.W. is used as a

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1. Smith, D.M. Op. Cit., p.279

2. Ibid

basis for intra-regional cost comparisons.

Building and Land Cost Surfaces. As most office based firms are tenants in established office blocks, the land cost component is relevant to office costs only in so far as it affects rental level. To determine whether land costs significantly affect office rental, it is necessary to show land costs as a proportion of the total cost of an office development. The following data illustrates how land costs/m^2 are becoming a minor part of the total office development cost and the ultimate rental cost as construction costs/m^2 have risen so sharply.

In the case of the central business district land values have nearly doubled between the period 1968 and 1980 although 1973 levels have now only been achieved following the 1974 economic recession[1]. While land values have remained at the 1973 level building costs for the same period 1973 - 1980 have nearly doubled for office development up to and over 50 storeys. Because land costs per m^2 have reached the $2000 level (1980) and building costs are between $500 and $600/$m^2$ depending on number of storeys, land costs are still the prime influences on rental levels in the central business district but building costs are increasing at a faster rate than the land component. In Parramatta land costs are in the vicinity of $800/$m^2$ [2]. Other major suburban centres would have similar land values as building costs do not vary spatially and rental costs vary only marginally. Thus in the major suburban centres building costs/m^2 constitute nearly half of the cost of office development costs.

It can be seen from the above results that although land costs vary with location, the land component is becoming less significant as building costs increase. The building cost surface can be expected to generally reflect the overall pattern of labour

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1. Dept. of Valuer General of NSW - Valuation Section provided above information.

2.

and material costs. Although the cost of building would be subject to local site area variations, the cost of non-residential building in different localities does not vary significantly in the Sydney Region as labour costs are not spatially variable due to wage awards. Building costs are relatively uniformerly priced in the Sydney Region but may be expected to vary in country locations[1]. The major variations occur on an individual site basis depending upon factors such as foundation material, slope and access to the site.

A further point relevant to land cost considerations is that offices generally represent the 'highest and best' use of land and may outbid other land uses. Thus the restriction of competition from other land uses does not apply to office activities.

Rental Cost Surfaces: Rent represents approximately 8 per cent of an office firm's total expenditure[2]. See Table 4.12 below. Rental levels may vary according to the age and condition of a building, the services offered within the building and with the supply of office space available. As illustrated in Table 4.13 opposite rental values are spatially variable however the level of rent does not vary significantly between the major suburban centres. The rental differential between the central business district and the suburbs was significant during the first half of the 1970's but the oversupply of office space which reached the market after 1973 was a significant factor in reducing the price differential between the city and suburbs. In 1979 the market for prime new office space began to show signs of recovery in the city at the expense of older harder to let office space, thus widening the gap between city and suburban office rental levels. As construction costs continue to rise in relation to commercial land prices it is likely that price differentials between suburban locations will be reduced given that

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1. Cordells Building Cost Book, Op. Cit., 1978-79

2. Annual Expenditure Statement of: NSW Dept of Environment and Planning, Housing Loans Insurance Corporation, Central Mapping Authority, Sinclair Knight & Partners, Valuer General of NSW

demand for city office space does not outstrip supply.

TABLE 4.12

COST STRUCTURE OF OFFICE FIRMS/ESTABLISHMENTS

Firm/Establishments	Salaries as % of total Expenditure	Materials	Rent as % of total Expenditure
Dept of Planning and Environment	77	2-3%	8
Housing Loans Insurance Corporation	54	-	7
Central Mapping Authority	59	4%	8
Sinclair Knight & Partners	59	-	12
Valuer General of N.S.W.	89	2%	2 (not representative due to large salary expenditure which is not all relevant to head office)

Source: Annual Expenditure Statements of Various Firms/Establishments

Material Cost Surfaces: Although the materials necessary for the industrial process constitute a large portion of total expenditure of industries, the cost of materials employed in the processing of information in the office is insignificant relative to other costs. Materials used in offices are in the main stationery, recording tapes, writing and drawing implements and the like, which are all spatially consistent. The expenditure-income statements contained in Appendix no. 12 illustrates this point. Given that such materials were required to be transported to the place of production (the office) the cost of haulage would be low due to the durability, non bulky and light weight characteristics of the 'materials'.

1. N.S.W. Valuer General Annual Reports 1978-79

TABLE 4.13

RENTAL VALUE $ PER M^2 P.A.

YEAR	CBD (PRIME)	SECOND-ARY	NTH SYDNEY	BONDI JN	BURWOOD	CHATS-WOOD	PARRA-MATTA
1973	110	60	60			50	
1974	75				60		
1975	100	75			48		
1976	80	50	45	59	45	67	67
1977	80	50	45	60	54	60	67
1978	80	50	50	60	54	60	67
1979	90	50	50	60	54	60	67

Source: Valuer General of N.S.W. - Annual Reports.
(Rentals are indicative of modern air conditioned office space).
Jones, Lang & Wootton Pty Ltd

Sources of Power: Electricity which today is the most important power source for industries and office activities exhibits negligible variations in cost in the Sydney Region and in the remainder of New South Wales since it can be transmitted from one location to another at a relatively low cost. Electricity costs for large industrial activities such as aluminium smelters may be relevant where special concessions may be negotiated with different states. In Britain and other small countries electricity transmission through a national grid makes this power source ubiguitous thus rending the cost of electricity irrelevant as an influence on location[1].

Labour: Labour constitutes a high component of total costs not only in the industrial plant but in most office activities. As

1. Smith, D.M., Ibid., p.43

the preceding Table No. 4.12 indicates salaries of offices may vary from 50-80% of total expenditure. The Expenditure Revenue Statement at Appendix 12 demonstrates the significance of labour costs in relation to total cost structure discussed so far.

Wages do not vary over space thus whilst they constitute an important input cost they are not an areally significant variable in the office location process due to the standardized award wages which have been achieved by unions. While Government regulation of labour costs may vary little on a geographical basis, the availability of labour could constitute a spatially variable cost factor to the office firm. Thus in order to minimize costs an entrepreneur would need to consider the following:

a. the location of suitable supplies of labour,
b. the distance or time that employees are prepared to travel to work with additional renumeration,
c. the cost of inducing staff beyond certain distances,
d. the mobility of labour according to job level and other socioeconomic factors
e. the likely competition for labour due to the presence of other firms.

Perusal of relevant journey to work data such as origin and destination of journey to work by occupation and industry would indicate to a firm the likelihood of obtaining the required labour. In addition to incoming offices securing their supply of workers from neighbouring places, the occasion may arise where relocating firms may wish to induce qualified people to move with the firm to a new location.

In both instances it is necessary to estimate the likely distance that staff will travel to work or the costs of such travel that staff are prepared to accept. As Yannopoulos[1] found, the

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1. Yannopoulos, George (1973) The Local Impact of Decentralized Offices, L.O.B. Research Paper No. 7, Lond., pp 40-45

percentage of workforce transfers will be substantially lower where moves occur over longer distances making commuting difficult or infeasible. Availability of staff must also be viewed within a time framework as not all employees moving with a firm will stay with it subsequently. Those who move house will probably stay for a longer period but some of the commuters may choose to take a job nearer to their place of residence at a future date[1]. Work carried out by Friedly[2] relating to staff moves with firms relocating from London indicated that after a firm had moved a distance of 20 miles total staff losses increased sharply. Generally moves of up to 10 miles were acceptable to most staff levels (Figure 4.13 illustrates this).

In measuring accessibility of labour to the office firm, Yannopoulos[3] found that accessibility does not simply mean shorter travelling time but primarily less expenditure on travel. His work relating to Hemel Hemstead and Reading in England showed that despite a shorter average journey for commuters to Hemel Hemstead, commuters paid almost 30 per cent more for this journey to work than the more distant journey to Reading. A much larger proportion of commuters moved with the firm to Reading than to the other town. Most firms would be unlikely to contemplate a move without first having ascertained that their key staff would move. As demonstrated by Yannopoulos[4] relocating offices are often unwilling to offer financial inducements to encourage workers of routine occupations such as clerical to move house and job when they can easily be replaced from the local labour market. To date no data is available to enable the calculation of the financial inducements required to attract key staff over increasing distances. As a theoretical basis for the cost surface referred to previously it is assumed that all employees will relocate for a price. However a migrating executive or manager may

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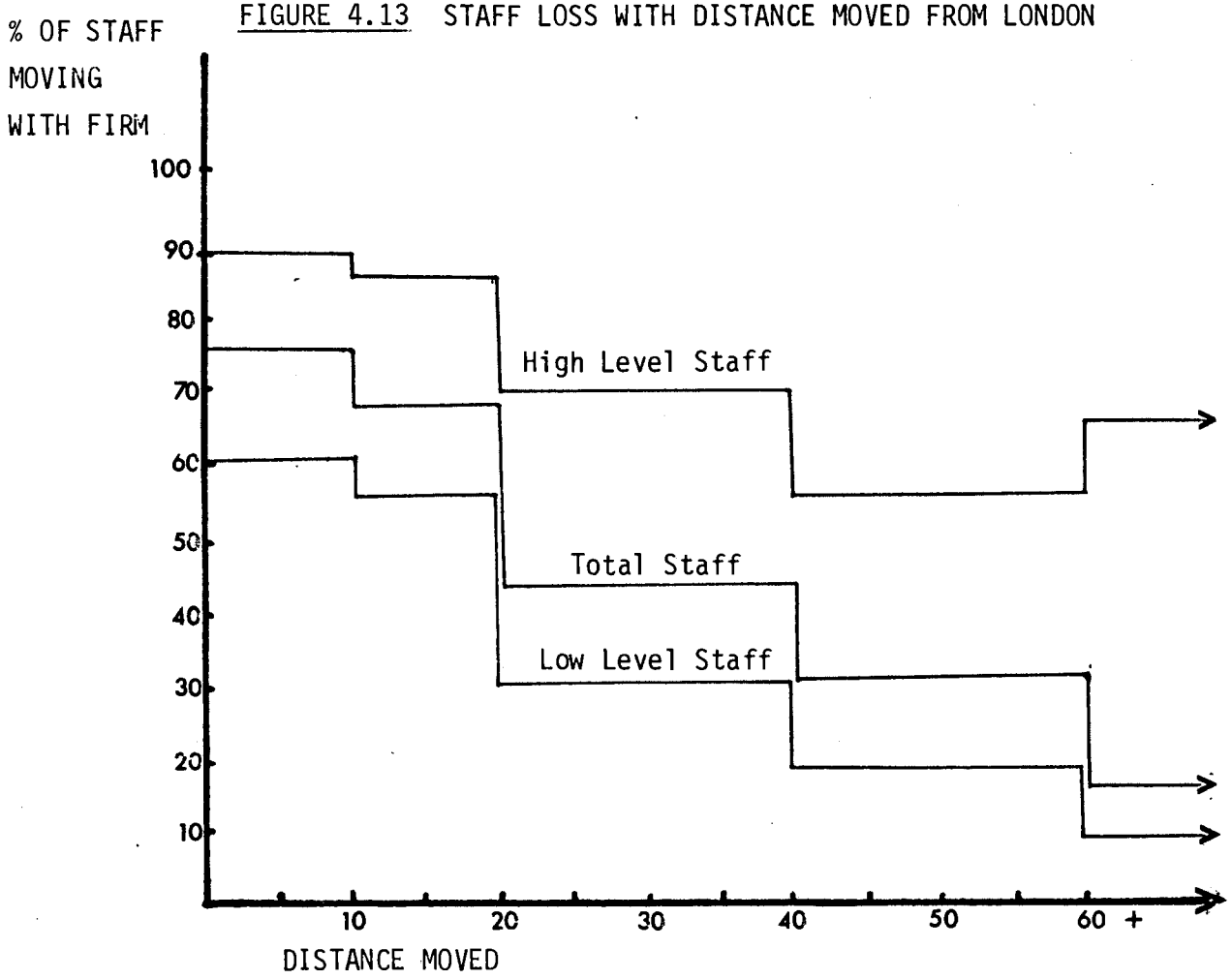
1. Ibid, pp 42-46

2. Friedly, P. (1974) National Policy Responses to Urban Growth, Saxon House/Lexington House, Westmead/Lexington, p.53

3. Yannopoulos, G. Op. Cit., pp 40-44

4. Ibid, p.45

FIGURE 4.13 STAFF LOSS WITH DISTANCE MOVED FROM LONDON



Source: Friedly, P. National Policy Responses to Urban Growth, Saxon House/ Lexington House, Westmead/Lexington, 1974, p.53

face considerable risks associated with the problems of adapting to a new location and if he fails to settle there may be difficulties in readjusting[1]. In view of this, recognition must be given to the fact that monetary differentials are not the sole explanation of whether managers migrate or not. However, since satisfaction cannot be easily measured, if at all, a salary maximizing approach would be more operational but would lose generality in its applicability.

In assessing the likely mobility of labour a firm would need to take into account socioeconomic factors such as proportion of car owning households, number of cars owned by each household and the number of cars owned by each household and the proportion of clerical to other employees. This has been borne out by work carried out by Daniels who examined transport changes generated by decentralized offices[2]. Significant mobility difference was found to exist between male and female office employees. In the Standard Telephones and Cables move from North Woolwich to Basilden where 85 per cent of the male staff moved as against 10 per cent of women employees similar findings were made by Manning[3].

The mobility of labour is also related to job level as demonstrated in Figure 4.13 which relates to work carried out by Friedly[4]. This figure suggests that high level staff appear to be less mobile than low level office staff and large proportions of high level staff (70 per cent) tend to remain with firms for relocation distances up to 40 miles. For the same relocation distance only 30 per cent of the low level employees chose to remain with the firms. Surveys of Government office staff in Melbourne scheduled for a move

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1. Richardson, H.W. (1972) Regional Economics, World Uni., Lond., pp 318-319

2. Daniels, P.W. (1972) "Transport Changes Generated by Decentralized Offices" in Regional Studies Vol. 6, Pergamon Press, pp 273-289

3. Manning, I. (1978) A Place to Work, Allen & Unwin, Sydney

4. Friedly, P. Op. Cit., p.53

from the central area of Melbourne to the suburbs suggested that 14 to 40 per cent of clerical staff were likely to resign or seek a transfer if relocation occurred[1]. Only 2 to 13 per cent of higher level staff were likely to resign. Yannopoulos[2] found that the retention ratios of employees moving with firms reflected not only a commitment of the more senior staff in the firm but also company requirement for trained key personnel. In the move related to the Post Office Savings Certificate division from London to Durham, Hammond[3] observed that the higher grades had a lower refusal rate than the lower grades which also points to the immobility of high level labour.

In addition to identifying the location of a suitable supply of labour, the entrepreneur of an office firm would need to consider the likely competition for labour due to the presence of other firms. In making a locational decision a firm has to take into account the existence of other firms in the industry, their locations and their possible responses to actions taken by the incoming firm, the level of competition for different occupational groups and the length of service of the employees of competitors. In relation to the cost or availability of labour no work has to date been carried out to enable the identification of the main factors in locational interdependence that influence whether firms tend to agglomerate or disperse. Yannopoulos[4] found that incoming offices compete very strongly with existing offices in the local labour market for a

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1. Public Service Board (Aust) (1974) "Report on the Survey of Melbourne Australian Public Service Staff in Connection with Dispersal from Inner City Melbourne", Office of Public Service Board, Aust. in Alexander, I. (1980) Office Location and Public Policy, Longman Group, p.53

2. Yannopoulos, G. Op. Cit., p.45

3. Hammond, E. "London to Durham: A Study of the Transfer of the Post Office Savings Division, Durham", Rowntree Research Unit in Bateman, M. and Burtenshaw, D. "The Social Effects of Office Decentralization" in Spatial Patterns of Office Location, Ed. Daniels, P.W. (1979) Wiley & Sons, pp 325-373

4. Yannopoulos, G. Op. Cit., p.49

limited number of occupational groups particularly for professional and secretarial staff; local firms estimated wage increases of 10 and 50 per cent as a result of competition. This situation may not arise in larger urban areas where there are larger labour supplies than in Hemel Hemstead and Reading. Following a case study of a move made by a major office organization and its staff, it has been suggested that a correlation might exist between length of service with a firm and the likelihood of accepting relocation[1]. A period of two years seemed to represent a reasonable cut off period after which the employee became increasingly dependent on the firm.

Given the mobility of the more skilled office labour and the general availability of the more routine levels of office labour it would seem that labour expressed in terms of availability does not constitute a significant spatially variable cost to the firm provided that the office is located within 10 miles of the skilled labour. In fact, distances of up to 20 miles can be withstood without significant skilled staff problems occurring in large urban areas. In small decentralized locations firms may need to induce key staff to relocate and may have to compete with other firms for secretarial and professional labour due to the limited size of the resident workforce. In these circumstances labour costs could influence the firms location.

Capital: The term capital includes both the fixed capital and the financial capital. As most office activities tend to rent premises from large investment firms, and overall the operating costs of an office firms are not capital intensive for reasons outlined earlier in this chapter, the fixed capital of such firms is not a relevant consideration. As financial capital or investment funds are today tied to a national or international market

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1. Sidwell, E. "London to Bristol: The Experience of a Major Office Organization and its Staff" in Spatial Patterns of Growth and Location, Ed. Daniels, P.W. (1979) John Wiley & Sons, Chichester, p.353

it is doubtful that sufficient variations in the cost of such would exist at various locations within the Sydney Region or indeed within Australia to influence the locational choice of an office firm. According to Smith[1] rates of interest on industrial capital do not appear to vary much in advanced industrial nations; the same would apply to the requirements of office firms.

One factor which might appropriately be considered under the heading of 'capital' is the availability of the financial capital for investment firms which provide rental premises for office activities. An interview with several leading property developers[2] has shown that the availability of financial capital varies according to the location of the investment. Cheaper rates of return are required for office building investments in the Sydney Central Business District than for investments in the suburbs due to the perceived gilt edged securities of investment in land and buildings in the Central Business District. Due to the high appreciation rate of the I.C.V.* of office buildings in Sydney's Central Business District large suppliers of office space have constructed many speculative office buildings in anticipation of reaping large capital gains. Thus as discussed in Chapter One there is a tendency for supply of office space to precede demand.

As the available supply of office premises is governed in spatial terms by fixed and financial capital consideration the location of offices activities must be influenced by capital in an indirect sense only. Thus capital restrictions on suppliers of office space could constitute an external restrictive influence on office location. It is clear however, that as far as the availability of capital for office activities is concerned a cost surface is generally non existent.

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1. Smith, David M. (1971) p.38

2. Ascertained from Mr Peter J. Thompson of Hooker Projects Pty Ltd and Jones, Lang and Wootton Pty Ltd

* Improved Capital Value

Transportation and Communication Costs: As transport charges affect what an industry has to pay for its materials or input and in some cases the cost of marketing the finished output, the effect of this cost on the location of office activities is considered below.

The transportation requirement for industrially related inputs and outputs depends very frequently upon the type of materials or products being in the case of the office industry the type of material used in the 'manufacturing' process and ultimately being produced is information. The cost structure of most office based firms, as discussed in the preceding section is unlikely to be influenced by relatively minor courier, telephone, stationery or postage costs (see Cost Expenditure Statements at Appendix 12) which illustrate the proportional importance of these to other costs. Perhaps the major considerations are communication damage or lost contacts. Thus the ability to communicate effectively would appear to be more relevant than the transportation costs.

At this point it is relevant to raise the problem associated with the measurement of costs which are absorbed by the office firm and those which are paid for by customers upon receipt of the finished product. Both the intangible nature of office activities and the lack of an adequate accounting system to deal with communication or contact costs are difficulties which need to be overcome. As communication costs measured in terms of lost opportunities to carry out essential functions and to increase business contacts directly affects the revenue of control functions, it is proposed to view this aspect of communication costs as a revenue factor rather than a cost to be absorbed by the firm. In the previous chapter and the preceding part of this chapter the importance of a contact enriched environment to the efficient functioning of higher level office functions is emphasized. In the case of head-quarter activities price is not a consideration in determining office locational requirements as the need for a contact enriched environment appears to take precedence. Given that price is not relevant, revenue

is maximized by increasing potential sales contacts not by the firm's absorbtion of communication costs such as lost opportunities. In the case of the more locally oriented service activities, price may be a relevant consideration but transport costs would have little influence on price in a localized situation. The construction of appropriate cost and revenue surfaces are discussed below.

Cost Surfaces

As has been demonstrated there are a number of difficulties associated with the measurement of costs associated with office activity. Firstly offices could be located suboptimally due to difficulties associated with the measurement of quality of executive decision making at different locations. This could indicate that office activities are insensitive to cost and are sufficiently flexible to adjust to changing circumstances. The intangible nature of office activity together with the fact that communications (or transportation) costs are unable to be readily separated into cost or revenue factors further hinder the development of an office location theory, unless it is assumed that contact opportunities influence sales regardless of price and constitute a revenue factor.

Case studies showed that the largest cost components of office activities were wages and salaries followed by rent costs which amounted to about 60-80% and 8% of total expenditure respectively. Transportation costs could not be measured accurately for the reasons outlined above.

An examination of costs associated with office activities showed that building construction costs, materials, power, labour and capital were not spatially variable. Due to the mobility of higher level office staff and the general availability of routine levels of staff, labour costs did not vary significantly over space in large urban areas. In decentralized locations with limited supplies of labour the importance of labour costs increases. Rental costs were significantly higher in the Central Business District

than in the suburbs and rental levels at suburban locations varied slightly. The importance of rent could vary according to the age and size of the firm. Whilst the cost of capital for use by office activities did not vary spatially the cost of development capital for the supply of office space varied according to the location of the proposed office building and the perceived risks associated with the development. Transportation costs and the spatial variation of such costs were not analysed in the above manner due to difficulties relating to the allocation of costs to the consumer as opposed to the office activity but were assumed to be revenue factors in so far as they related to contact requirements.

Revenue Surfaces

Industrial location theory holds that demand or volume of sales will vary from place to place according to the nature of the product, the number, type and distribution of customers[1]. Whilst several procedures have been developed to permit the identification of total revenue surfaces for industrial activities, no empirically derived revenue surface has been developed. At this stage, the incorporation of the demand factor in the sense of areal variations in the volume of sales and total revenue is still a problem to be overcome in the development of operational industrial location models.

Areal variation in demand only produce variations in total revenue (R) in those cases where plant location affects the volume of sales (S) and price (P) or

$$R = f\ (S,\ P)$$

Customer demand (q) is influenced by shipping costs to customer (t) and price (p), thus

$$q = f\ (p + t)$$ where it is absorbed by customer. Price may be influenced by the geographical pricing policy, the competitive situation and the cost of production.

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1. Smith, David M. (1971) Op. Cit., p.5

While demand factors may not affect office activities in the same way as they would affect industrial activities, this concept of industrial location theory provides a basic approach for the identification of total revenue surfaces for office activities. As demonstrated in the preceding chapter dealing with environmental structure, the success of an office firm attempting to carry out essential activities is dependent upon the opportunities and restrictions operating in the environment. For control functions revenue is more dependent upon sales (or contacts made) than price. Customer demand for office activities does not depend upon price or shipping costs to customers but upon the contact opportunities available to the firm. Thus as revenue and customer demand appear to be equal it could be assumed that costs to the customer are not the critical determinants of office location. As offices deal with abstract commodities such as information, ideas or knowledge, information search, storage and retrieval and exchange and generation of ideas, the success of an office activity depends in the first instance on the opportunities for and restrictions on communications. The construction of a revenue surface involves far more than the construction of a cost surface as spatial variations in revenue are more intangible phenomenon being subject to the complexities of contact opportunities (the demand factor) and to competition and interdependence amongst firms as described in the previous chapter.

The competitive situation is likely to affect demand for the product of lower status or office activities aimed at a local distribution of customers. These types of local office activities such as accountants, solicitors, town planners and which are of the service industry category generally require a location close to potential custom, as they respond to demands of nearby firms or the surrounding population. In the case of higher status office activities such as head offices, the presence of head offices of competitors in a highly agglomerated central business district may be desirable in order to allow the development of a highly developed infrastructure capable of sustaining a rich environment of information. Non local offices are not in direct contact with consumers but often create demand for the product of the firm while local market oriented offices which

are not 'subsidized' by other components of the firm must conform to certain economic expectations.

Although customer demand as it relates to industry can be influenced by shipping costs to the customer and price, the degree to which such factors would influence an office activity would depend upon the status of the activity and the type of market involved. In the case of locally oriented offices with a small return both price and transportation costs could be relevant but only if contact requirements have been met. Offices serving local market areas need to minimize travelling time in order to attract and retain customers. The level of price in so far as it reflects delivery costs to the customer or customers costs is relevant except in those circumstances where the level of abstraction of the product does not allow a price comparison to be made by the customer. It is possible that demand in relation to higher status office activities may not be influenced by either physical proximity to the consumer or by price. Activities such as industrial head offices may require access to a widespread market through advertising to specialized services and to information facilities available in central business areas. Both industrial and non industrial head offices exist for the purposes of maximizing profits accruing to the total firm. The office component need not be self-supporting or cost efficient. In some instances it may be necessary to locate in a high cost location and even at some distance from the source of demand for the firm's product. The need to keep contact with market behaviour and to maintain a stock of ideas and innovations would be vital to the total revenue of all the components of the firm. It appears that the price of the product or services of the other components of the firm are not relevant to the operation of higher status office activities.

Whilst characteristics such as consumer preferences, income and expenditure patterns may encourage centralized locations for industrial head offices dealing with consumer oriented products in

order that efficient marketing of industrial products might be facilitated, the marketing of durable goods for utilization by other industries may not require the same level of accessibility to the market through information media or through contact with innovative sources. Thus 'plant location' may not affect the level of sales of all industrial head office activities to the same degree according to the type of market being catered for.

Although the location of office activities could affect the volume of sales and in some cases price as is the case in industrial location theory the type of total revenue surface which would be produced would also vary according to status of the office activity, the type of market, the type of office activity and the level of abstraction of the type of product. It would seem that the derivation of revenue surfaces for office activities would constitute a far more complex task than the derivation of such surfaces relevant to industrial activities.

Derivation of Profit Surfaces

The construction of the profit surface is achieved by calculating a spatially variable revenue surface and by subtracting from this surface the derived cost surface. In industrial location theory it maintained that the profit surface is an even more nebulous concept than that of the revenue surface[1]. As the cost surface for office activities is not generally as variable as it is for industrial activities, the difficulties in deriving a profit surface for office activities stems mainly from the complexities of measuring the revenue surface. Costs do not have a major impact on profits at high level office activities nor do they exhibit as marked spatial variations as industrial activities.

As in the case of industrial location theory the concept of

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1. Smith, David M. (1971) Ibid, p.259

the third surface representing total profits is important as it allows the incorporation of suboptimal behaviour within a theoretical framework. An additional point which emerged from the above analysis is that scale of production at any point does not determine cost, revenue or profit surfaces as economies and diseconomies of scale which are so relevant to industrial production theory are not relevant due to the nature of office functions which are concerned primarily with the search, storage and retrieval of information, the exchange of knowledge and generation of ideas and due to different capital investment costs.

SUMMARY OF FINDINGS AT THE MICRO-SCALE

This chapter has contributed to the overall aim of the thesis by identifying the economic principles which in various ways influence the implementation of activities and contacts within and between firms. The economic principles with which this chapter is concerned are the economic forces which determine the organization of office activities within the region and the nation and determinants of the location of the individual firm. This approach allows the connection to be made between what is happening at the micro level to the individual office activity, with the aggregate performance of the regions as a whole.

The Aggregate Behaviour of Office Activities

At the regional and national level spatial inequalities in terms of the distribution of office activities were found to exist in Britain, Australia and the United States. In the latter country, regional disparities were not found to be as marked probably due to the existence of greater regional scales of economy in the United States. Generally office activities tended to concentrate in the areas already well endowed with economic activity. Where office activities tended to be concentrated, employment in the office industry was relatively more important in the overall regional employment structure. The major cities do not necessarily receive a share of growth of high level office activities proportional to their size in the urban hierarchy. These patterns of distribution may be explained by the size of urban centres within the nation or region, the spatial complexities of non local control of office activities, the degree to which centres in a region or nation are export oriented and variations in the national and regional spatial requirements of control activities by type industry.

The Size of Urban Centres as an Influence on Locational Requirements of Office Activities

Empirical evidence from the United States and Great Britain

has suggested that a direct and exponential relationship (r = 0.65) exists between city size (measured in terms of population) and the amount of office floorspace, that as cities increase in size office space increases at a more rapid per capita rate. It also seems likely that over a period of time as cities grow the rate of increase of office space per capita may decrease although absolute increases still occur. Thus simple projections of existing office space trends in line with population expansion could lead to excessive overestimations of future office space. These findings have implications for provision of public transport and other public infrastructure requirements. In terms of public centres policy it may be necessary to consider the diversion of resources from one centre to another to achieve more rapid growth in office employment opportunities. The most rapid rate of increase in office space occurs in urbanized areas of up to 500,000 population. A further decline in the rate of increase in office activities occurs from this point up to the 3 million population level after which the gradient begins to level out.

The larger the size of an urban centre the greater is the proportion of office occupations per capita although centres do not necessarily gain high level office activities in proportion to the centres position in the urban hierarchy. The logistic equation relating to centre size and proportion of office activity also confirms that simple projection methods are unsatisfactory in this regard. However the low correlation coefficient achieved for this relationship (r = 0.43) suggests that other variables in addition to centre size must influence office activity location at the regional and national level.

Those centres with larger populations and with more than 15 per cent of the workforce in office work generally exhibit signs of expanding economic activity while areas with less than 15 per cent office workforce tend to have a more limited economic base which do not exhibit growth. The locational preference of higher level office activities for larger centres may be explained by

regional variations in access to specialized information, the principle means through which differentials in rates of economic growth and chance occur.

Regional and national patterns of office location suggest that city size also has a bearing on the potential for decentralization of routine office activities to other locations within the city regions - the larger cities such as London, Manchester, Liverpool, Glasgow, Leeds, Sheffield, Sydney and New York which have populations of approximately 725,000 upwards. This would suggest that office activities need to relocate from urban centres to pursue the market when urban centres reach a population of approximately 725,000 or greater. Of relevance to the public policy maker is the fact that quarterly employment opportunities are unlikely to be enticed from central areas to suburban centres in small to middle sized cities with less than approximately 725,000 population.

The larger the size of a firm (measured by extent of assets), the greater the likelihood of the firm being located in a large capital city and the greater is the complexity of control associated with the firm. Thus as the assets of firms increase so does the need to simplify the communication process with pools of outside specialists and information. The larger the metropolitan area and the size of headquarters the greater is the number of states in which the firm has branch offices which have more routine communication requirements and which do not contribute to the rapid growth of high level activities responsible for spontaneous growth in regions. These findings have implications for the future distribution of high level office activities and uneven regional development. This concept is further examined in the ensuing section dealing with spatial complexities of non local control.

Spatial Complexities of Non Local Control of Office Activities and Uneven Growth

At the regional and national level many linkage patterns are complex and do not conform to gravity model perspective due to the

occurrence of non local job control. Thus now local growth impact of large scale investment in a growth centre will not necessarily be concentrated in the hinterland of the centre. Non local multiplier effect leakages can frequently involve head offices in metropolitan complexes which are located at considerable distances. On this basis it would seem that christallerian central place theory is not compatible with the transmission of national and regional patterns of growth of offices.

Due to demands of expanding production and advanced technology the consolidation of many small enterprises into national enterprises has occurred thus increasing the occurrence of non local control. Divergent levels of management and the horizontal division of management into specialist department divisions have arisen in response to new business demand.

As more headquarter functions move to large urban centres the demand for a wider variety of services is increased while the differential between the growth of urban centres in the region or nation increases. This process of circular cumulative causation continues to cause uneven regional and national patterns of office activity location in order to fulfil the objectives of the non local control activities. In so far as multi locational organizations control large shares of advanced economies they are significant propagators of flows of goods, services, economic information and capital. These types of control activities are the most predominant source of interdependencies within a nation's system of cities and the most important generators of interurban growth transmission.

Export Orientation of National and Regional Urban Centres

The export success of an area partly explains the distribution of office activities. In the United States, office employment is concentrated into 22 metropolitan areas in excess of 1 million population. These national office centres have greater numbers of office jobs per capita than the national average of 12.2

office jobs per 100 population while the metropolitan areas of greater than one million population have an average of 15.2 office jobs per 100 population. Of these centres an even greater average number of office jobs per 100 population exist. This conclusion also applies to Great Britain which has a national basis of 10.3 office jobs per 100 population; within Britain the export oriented south-east economic planning region has 14.1 jobs per 100 population. Similarly in Australia the national average of 13.42 office workers per 100 population is exceeded in Sydney and Melbourne which are highly export oriented. Thus the export success of an area and the resultant import of capital acts as a major stimulus to regional economic growth and to related service employment. In most prosperous and larger areas the diversification of services begins catering for adjacent urban areas, the surrounding region and perhaps the nation.

National capitals are often important parts in each state. Given that foreign trade does not grow as rapidly as gross national product it is likely that ports will become less important location factors for office activities. At present some office activities have become increasingly concentrated into capital cities while others have demonstrated decentralization preferences. These differences are examined below in the light of the industry of the office activity.

Variations in Regional and National Distributions of Control Activities by Industry of Office Activity

In the United States the concentration of headquarters at the national and regional level has become more dispersed while this is only partly true at the subregional level. On a national basis London has a great concentration of control activities. In Australia most of the control activities are located at Sydney and Melbourne. In the United States the control activities are more evenly distributed than is the case in Britain and Australia. This is perhaps due in part to the fact that national resources are more evenly distributed, that regional scales of economy exist and that

foreign trade in the States may not have been growing as rapidly as gross national product in which case the importance of selective locations such as ports would not have increased at the expense of other centres. An examination of the nationally regional patterns of office activities by industry was undertaken to determine whether the industrial classification of an office activity also constituted a variable in office locational requirements. The following conclusions were reached.

In the United States the large goods and service headquarters, the financial groups, utilities, retail and transportation office activities exhibit more concentrated patterns of regional distribution than do other industrial groups of office activities. Perhaps these types of activities are able to operate most successfully at the regional scale of economy. At the subregional level the large goods and service headquarters are more highly concentrated while some of the financial groups exhibit lower levels of concentration. The latter pattern of distribution reflects intra-regional contact requirements. The former pattern of distribution is related to both geographical and organizational considerations which accounts for inter-regional variations in office activities. Such variations may be linked with the more fundamental processes of regional economic development particularly relating to inter-regional flows of information.

On a national basis London and the south-east region have great concentrations of central services, divisional head offices, research and development units, nationalized industries and now life insurance. Headquarter control is strongly represented in both Sydney and Melbourne. The latter city has a higher proportion of industrial office activity while Sydney exhibits concentrations of financial headquarters such as investment finance and insurance. The Australian capital cities exhibit highly centralized national, regional and subregional patterns of office activity.

At the regional and national level it seems that the industrial category of office activity does not constitute a

detriment of office location. However as discussed in the preceding chapter the industrial classification does influence the locational requirements of office activities due to the employment characteristics of some industries. Basically the concentration of economic power into a fewer large organizations has lead to the geographical concentration of higher level employment opportunities into a few regions well endowed in terms of economic activities, services and communications. Not only is the development of corporate hierarchy in the regions as a whole related to patterns of control activities but to the distribution of resources, the export possibilities and the existing size of urban centres throughout the nation and region. The attractiveness of large cities to office activities may be gauged by the contact possibilities with the remainder of the country and with other organizations that are located in the city itself.

The Micro Economic Considerations Relevant to Office Location

In order to connect office activity patterns in the regions as a whole with what is happening at the micro level to individual organizations the following approach was adopted to deal with the locational choice of the individual decision making unit. The difficulties inherent in the task of deriving profit surfaces were given the recognition and the basic structure of industrial location theory was used as a means of developing an appropriate method of examining office locational requirements. Following the production of cost structures of office activities, the possible means of producing cost, revenue and profit surfaces were examined. The main findings are as detailed below.

Cost Surfaces

Cost surfaces could be derived primarily from rental variations which occurred as a result of variations in the price of commercial land. Building costs which also comprise a component of rental charges do not vary within the highly developed regions such as Sydney region. Rental costs varied significantly between

the central business district and the suburbs but little difference in rental charges existed between the major suburban centres. Rent which constitutes about 8 per cent of an office firm's cost structure would constitute a greater influence on the smaller firm's locational requirements while large control functions would not be affected to the same degree. Variations in rental values must be related back to accessibility levels and the availability of communication facilities and to supply and demand factors. Subject to economic fluctuations and variations in supply of available office space, demands for central business district office space have been greater than for suburban office space.

Although labour costs constitute a significant proportion of the cost structure of office activities (approximately 60 per cent), there was no evidence available to suggest that these costs were spatially variable. Considerable survey work would be necessary to determine whether such variations existed. Given that wages varied spatially, even to a small degree, labour costs could constitute a significant cost variation for offices with larger salary overheads. In the absence of the above survey data the assumption that wages did not vary significantly over space is due to award agreements. However, survey data does suggest that most levels of labour are mobile up to 10 miles increase in journey to work while higher levels of office workers are more mobile and will accept a further increase of 10 miles in their journey to work. While lower level workers are able to be readily substituted by local labour when a firm relocates within an urban area, it may be necessary to offer inducements to key personnel where journey to work is increased by more than 10 miles or in times of high economic demand when a shortage of certain types of highly skilled labour exists.

Revenue Surfaces

At this stage the incorporation of the demand factor in the sense of areal variations in the volume of sales and revenue is still a problem to be overcome in the development of operational industrial location models. Although the construction of a revenue

surface proved to be more difficult than the cost surface the intangible nature of demand factors such as contact opportunities, competition and interdependence among firms did not permit the construction of a revenue surface, however the following conclusions were derived.

Contact opportunities comprised the major revenue factor which exhibited marked spatial variations. As office activities deal in abstract commodities such as information, ideas and knowledge (that is, search, storage and retrieval of information, exchanges of knowledge and generation of ideas) the success of an office activity is dependent upon the opportunities for and restrictions on communications in the environmental structure. The concept of environmental structure and its importance was discussed in the preceding chapter.

The level of office activity has a bearing on revenue considerations. Both industrial and non industrial head offices exist to maximize profits accruing to the total firm. Thus the office component of the organization need not be self supporting or cost efficient in itself. The need to keep contact with market behaviour and to maintain a stock of ideas and innovations is vital to the total revenue of the firm. Non local office activities often create demand for the product of the firm although not in direct contact with customers.

Whether price influences demand depends upon the status of the office activity and the level of abstraction of the goods or services. Price is not relevant to high level functions but does have some relevance for the locally oriented service activities. In some instances price comparison may not be possible due to the abstract nature of goods or services being offered.

Competition is likely to affect the demand for a product of a lower level or service type office activity aimed at a local distribution of customers, for example, solicitors, architects or engineering services. In the case of higher status office

activities which usually occupy different locations, the presence of competitors' headquarters in a highly agglomerated central business district may be desirable as it allows the development of a contact enriched environment.

In the case of control functions and high level office activities, revenue surfaces are more dependent on sales or contact opportunities than prices or shipping costs to the consumer (that is costs payable by the consumer). In the case of locally oriented office activities offering routine services which are not highly specialized price may constitute a consideration if local competition exists. Shipping costs to consumer would be of little importance due to the nature of office activity products.

Profit Surfaces

Construction of the profit surface is achieved by calculating the spatially variable revenue surface and by subtracting from this the derived cost surface. As the cost surface is generally not as variable as for industrial activities, the difficulties involved in deriving the profit surface stem mainly from the complexities involved in measuring the revenue surface.

In the case of higher level office activities such as headquarters of national corporations, costs do not have as major an impact on profits nor do they exhibit as marked spatial variations as industrial activities. Costs such as rent can affect the locational choice of local service type office activities which are generally smaller firms.

Scale of production does not determine cost, revenue or profit surfaces as economies and diseconomies of scale which are so relevant to industrial production theory do not apply to office activities due to the nature of such activities and the relatively small fixed capital investments involved.

Due to the limited role of the cost surface especially in relation to high level office activities, revenue is more important in determining locational profit surfaces of all office activities at the micro economic level. In all instances revenue is a function of sales (or contact opportunities) while transport costs of the product are negligible and output is not relevant. Price is relevant only in the case of locally oriented services where competition exists.

Chapter 5 Conclusions

Chapter 5 - Conclusions

INTRODUCTION

This chapter contains the conclusions of the thesis. It is proposed to assess the extent to which the overall aims have been achieved, to interrelate the restrictions and opportunities which influence office activity location, to explain the importance of the theoretical framework to public policy and to develop guidelines to direct the efforts of policymakers concerned with the regulation of office activity location. Finally it is intended to provide relevant directions for further research in order to assist in the formulation of a complete office activity location theory.

Despite the intangible nature of office functions and costs the preceding chapters have been organized so as to enable a conceptual framework for office activities to be produced. Rather than pursuing one strand of office location in detail an integrated approach was adopted to enable the variables determining office location to be assessed together.

ACHIEVING THE OVERALL AIMS

The overall aims of this thesis as stated in Chapter One were as follows. It was proposed to attempt the development of a theoretical framework to identify those influences and restrictions which confront a firm undertaking essential activities which are dependent upon conditions within the firm and the environment. It was then proposed to illustrate the interrelationships which exist between the various categories of

influences and restrictions. Also it was intended that the theoretical framework would provide useful guidelines for public policy makers and relevant directions for future research into the office activity location problem.

For the most part, the enunciated aims have been achieved as a rudimentary theoretical framework was able to be deduced for office activity location. The five categories of influences and restrictions on office location which were advanced were shown to be relevant. However due to time and data limitations it was not possible to test in detail the relevance of these categories relating to the environmental perception of individuals and other 'rules' such as finance and supply of office space restrictions or town planning controls. It was demonstrated that the categories of administrative systems, environmental structure and economic principles had a direct bearing on the location of office activities when viewed as both independent and interrelated variables. In the case of the latter three categories, the firm's locational requirements were the prime considerations.

The administrative structure provided the basis for classifying a firm's critical functions; spatial considerations were introduced through the concept of environmental structure. The category of economic considerations demonstrated how economic rationalization carried out at the micro-level was also applicable at the regional and national level. In both circumstances accessibility to information constituted the basis for the location patterns. The environmental perception of individuals dealt with the situation where optimal economic rational behaviour was unlikely to occur. Other 'rules' did not directly influence the choice of office location but had to be accounted for as this category did restrict the ultimate location choice.

THE INTERRELATIONSHIPS BETWEEN THE CATEGORIES OF INFLUENCES AND RESTRICTIONS

The five categories of influences and restrictions on office activities namely, administrative systems, environmental perception of individuals, environmental structure, economic principles and other 'rules' all interact to determine the location of office activities. The first four categories are concerned with communication; the last category constitutes an external constraint on the office location decision.

As office activities are concerned primarily with information flows, the category of administrative systems (or intraorganizational factors) is an important component of the proposed theoretical framework. This category provides an understanding of how organizations function in time and space and provides a consistent basis upon which to represent reality. Basically the types of tasks being performed by an organization are divided into three levels of complexity and are related to contact requirements which in turn can be related to spatial requirements.

Intraorganizational requirements are directly related to the environmental structure which may be viewed as the total range of external contact opportunities available to the firm. Critical to the administrative functions of the firm is the fact that the range of opportunities will vary according to the size, constitution and distribution of the structure of the environment. For example, only central business districts are able to fulfil the extensive communication requirements of head office functions of a large firm's administrative system. Other administrative considerations such as type of department, industrial sub-sector, job level, type and geographical extent of market influence the location of an office activity within the environmental structure.

The chapter relating to economic considerations demonstrated that the profit surface of the individual firm is primarily dependent upon the revenue surface. As the latter surface is a function of

potential contact opportunities, the importance of the environmental structure to the efficient functioning of office activities is reinforced. At the national and regional level of economic analysis, it was found that the concentration of economic power into fewer large organizations tends to lead to the geographical concentration of higher level employment opportunities into several economically prosperous regions already well endowed with services and communications. As the headquarter functions move to large urban centres, the differential between the growth of urban centres in the region or national increases in order to fulfil the objectives of the non local control activities. On this basis a connection is able to be made between what is happening at the micro level to the individual firm with the aggregate performance of the regions as a whole. The objective of all office activities is to maximize contact potential. Such an objective continues to promote uneven and complex distributions of economic activity at both the urban and regional level and ultimately at the national level.

The category of influences and restrictions entitled environmental perception of individuals is an important part of the framework as it is necessary to bridge the gap between individualistic decision models and social location patterns. Environmental images explain the individuals' attitudes towards and knowledge of different abstract and concrete phenomena within the firm and its environment. Such images whilst subjective reflect the objective possibilities within and outside the firm and are of importance for scanning the possibilities for coupling individuals to each other where activities require individuals to receive, deliver or exchange information with other individuals within the firm or the environment. Economic factors probably establish a broad region within which a location will be considered; the personal factors would operate at a secondary level in the decision makers process.

Other 'rules' constitutes factors which are not directly related to the location decision of office activities but which may ultimately affect location. Factors such as the activities of property developers, vested interests, complex financial influences town planning and

statutory controls may be all relevant influences and restrictions. However supply of office space by property developers and financiers would appear to constitute the major external influence on the location of office activities.

GUIDELINES FOR PUBLIC POLICYMAKERS

Although it is not possible to claim that planning practices were able to be developed to cater for the needs of urban policymakers, a number of useful planning guidelines emerged from the preceding analysis. These guidelines pertain to functional differences which exist between office activities. In order to effect urban policies the public policymaker must comprehend:-

> The functional business environments in central areas; the limitations of decentralization strategies; how the geographic extent and type of market relate to functional business environments and decentralization potential; how regional and national economic growth characteristics may affect urban strategies; those factors which influence the profitability of the individual firm; the effect of other influences external to the firm and the need to institute office activity data systems.

The Existence of Different Types of Office Activities

In the first instance, the urban policymaker must be aware of the existence of different types of office activities which have varying critical functions. An examination of administrative or intraorganizational factors is the most appropriate means of classifying office activities. It is important that the relevance of inter office units of communication to office activity location requirements be recognized. Generally contact requirements vary according to job status, type of department, status of office activity (for example, head office, branch) and by industrial sectors. Broad industrial sectors must be analysed at sub-sector level to provide meaningful information regarding functional requirements.

Functional Business Environments in Central Areas

An understanding of the basis for the functional business environments which exist in the central business districts of larger cities is essential. Without such knowledge urban policies directed at influencing the location of office activities within the central area itself and within the overall urban area may not achieve the desired effects. Within the functional business environment, the existence of which depends upon the prime office activities, clearly identifiable networks of prime and non prime office activities operate within and between different industrial sectors. The types of different networks which exist depend upon the media employed in communication tasks.

Within the central business districts of large cities the existence of a functional business environment relies upon the presence of prime users of the area and their generation of high level service functions. Some of these activities may operate independently of the money market but some firms require connections with that market as well as the market for their own product. Headquarters of industrial and specialized professional service activities together with central banking functions, the Stock Exchanges, securities industries, brokers, discount and foreign market exchanges and insurance activities such as underwriting and premium investment constitute the prime users of the central business district. The benefits of this environment also extend to the other non prime users of the area.

The presence of financial office activities features strongly in the central business districts of large cities. As in the case of the manufacturing headquarters, the financial firms not only exhibit strong patterns of concentration in the central areas but control most of the country's financial assets associated with that sector. Some business centres tend to specialize in financial activities while others share their specialization between finance and manufacturing. Banking in the central business districts of cities is concerned mainly with the corporate accounts and with the provision of nationwide services; the

financial corporations are also concerned with national markets. Functional business districts appear to have a highly concentrated financial centre composed of insurance (nationally and internationally oriented), central banking, the securities industry closely centred around the Stock Exchange. Other financial activities such as financial corporations exist in the central business district but do not seem to be related to this closely integrated network.

As indicated by the spatial organization of the financial community in the central business districts of large cities there exists a structured market internal to the members of the financial community. This community is composed, in the main, of central banking functions, investment or merchant bankers, brokers, the Stock Exchange, the underwriting and premium investment functions of insurance companies, discount exchanges and foreign market exchanges. The relationship between these functions is essential to the operation of the money market functions of the city and the nation. Banks derive external economies from proximity to each other in small districts for cheque clearances, funds and securities transfers, exchange of information and for counsel and advice. Investment bankers need to be near large banks. Corporation offices and investors require proximity to each other as co-operation is necessary for the underwriting of financial risks and related details. Brokers require locations accessible to clients, near large banking facilities, near each other and the Stock Exchange to make deliveries and clear transactions within strict time limits. Insurance activities need to be near each other for underwriting purposes as large insurance contracts are often under time pressures and in their premium investment role, insurance companies require access to specialized information and advice and to the recipients of such investment funds. Merchant banks have also to satisfy the latter requirements. Discount and foreign market exchanges are strong cohesive forces for financial institutions involved in overseas transactions.

Most of the headquarters of the nation's top industrial and mining firms located in the central business districts of the major cities tend to control a disproportionate share of the nation's economic activity.

The type of industrial sector represented varies according to the export market or the economic base of the city. In some smaller city centres headquarters are rarely represented whereas in cities of equivalent population in other locations small numbers of headquarters do exist. These firms which have a dispersed national or internal market and are involved in complex financial operations require a central location to allow contact with the market and to permit conferences between its executives and the large commercial and investment banks.

On the basis of these findings, the urban policymaker would be able to determine which business components need to be represented before a viable commercial centre can be established in a growth area. Also it is clear that there are office activities which urban scale decentralization policies are unlikely to affect due to the locational requirements of such firms. Some doubt is cast upon the feasibility of urban strategies which advocate policy measures to limit the growth of central business districts given that it is unlikely that some of the prime functions could be duplicated in other locations.

Factors Relevant to Decentralization Policies

A number of findings of direct relevance to urban decentralization strategies emerged from this study. Although initially it would be necessary to justify a decentralization policy on social, economic and environmental grounds, the following conclusions based upon contact requirements of firms and their decentralization potential are applicable to urban policy. Generally those components of office activities with routine, low level contact functions and which serve local markets appear on contact grounds, to be suitable for decentralization. These activities tend to have a low intensity of external contacts and weak network connections.

In the case of large firms, partial decentralization of some departments may be possible. Those departments with below average orientation (or high level contacts) contacts include sales, production,

property, insurance, information services, client relations, financial, buying, accounts, export, transport and distribution and company records. There is no clear distinction in the ranking between the broad sectoral classifications for example, the services, finance and manufacturing sectors. Within the industrial sub sectors some ranking is possible. In the finance sector, banking has above average numbers of orientation contacts and insurance and other finance fall into the below average category. Professional services differ from business services in that the former usually have a higher proportion of orientation contacts.

The office industries which have decentralized their operations most are the insurance, finance and banking service industries and professional and scientific services. The policymaker should note that the insurance industry will continue to decentralize its operations considerably as most of the underwriting of new business and settlement of claims are done in branch offices or in the field throughout the country. The premium investment and international business will continue to be handled in the central business district. There are many routine functions in the former types of office activity which makes them suitable for relocation or location in non central areas. It is those office activities related to the financial and manufacturing sectors which offer the greatest potential in employment redistribution due to their high clerical labour content.

The success of a decentralization policy depends as much on existing occupational structure of new locations as upon their connections to the national communications systems. A policy of office dispersal to growth centres would be more likely to succeed if it was part of a co-ordinated effort to upgrade the quality of local contact requirements in a selected number of proposed development areas serving populations of at least 150,000. Such a policy could be effected through investment decisions or dispersal of large sections of government employment to provide the required growth impetus.

Cities with populations of 750,000 and upwards tend to experience decentralization of office activity from the city centre to the suburbs. Of relevance to the policymaker is the fact that decentralization policies may not be desirable in smaller cities given that access to the market is best achieved from central areas until such time as increased dispersal of population warrants the existence of more branch offices.

The Relationship of Market Area Characteristics to Functional Business Environments and Decentralization Possibilities

Both the geographical extent and market type can affect the locational requirements of an office activity. Those head office functions of large firms which are located in central business areas serve national and international markets. Planning strategies must recognize that those functions often involve complex decision making and thus require access to high levels of information pertaining to the market and to competitors. Access to highly specialized legal, accounting and advertising services is essential. Within the central business district it is those firms involved in non durable, consumer oriented markets that require the most centralized and information enriched locations.

Whether the firm is operating at the branch or local level, accessibility to the market is a functional requirement. Those centres serving populations of 150,000 or more are likely to have branch or regional offices but few headquarter activities. Thus these centres will tend to grow at a faster pace than locally oriented centres but will not develop the high level contact environment exhibited in the central business areas. Local market office activities tend to serve populations of less than 50,000. These types of office activities include utilities or population oriented firms such as business and personnel services. Firms in the development and building business and related professional firms such as surveyors, architects and engineers also constitute local market office activities.

These findings demonstrate the types and levels of employment opportunities that office location policies will be able to generate in major suburban and local centres and suggest the growth patterns which will emerge without planning intervention.

How Regional and National Economic Growth Characteristics Influence Urban Strategies

Of particular relevance to growth centre strategies is an understanding of regional and national economic growth transmission patterns. These complex patterns are related to both geographical and organizational considerations and may be linked with the more fundamental processes of regional economic development particularly inter-regional flows of information.

In relation to city size and likely office employment or floorspace, it was found that major cities do not receive a share of higher level office activities in proportion to the cities' size in the urban hierarchy. It is likely that office activities will tend to concentrate in the areas already well endowed with economic activity. The existence of a logistic equation relating to centre size and proportion of office activity confirms that simple projection methods are unsatisfactory in this regard.

Simple projections of existing office space trends in line with population expansion for a particular city must also be avoided. Over a period of time the rate of increase of office space per capita appears to increase only until a population level of 3 to 4 million is reached and then markedly decline (absolute increases still occur). Thus gross overestimations of future requirements could result from simple projection methods.

The proportion of the population employed in office activity appears to serve as an indicator of the level of economic activity. Those

centres with over 15 per cent of the population employed in office work generally exhibit signs of expanding economic activity; centres with less than this figure do not exhibit growth characteristics.

Due to demands of expanding production and advanced technology, the consolidation of many small enterprises into national enterprises has occurred thus increasing the occurrence of non local control. As the size of the firm increases the greater is the probability that the firm will be located in a large capital city and the greater is the complexity of control associated with the firm. Hence the need for maximum information accessibility becomes paramount. This situation has particular implications in relation to the occurrence of uneven regional development. The spatial complexities of non local control of office activities and uneven growth are such that at the regional and national level many linkage patterns are complex and do not conform to the gravity model perspective.

The policymaker must understand that new local growth impact of large scale investment in a growth centre will not necessarily be concentrated in the hinterland of the centre but rather non local multiplier effect leakages may involve head offices in metropolitan complexes which are located at considerable distances. Branch offices which have more routine communication requirements will not contribute to the rapid growth of high level office activities responsible for spontaneous growth in regions. Multi-locational organizations are the most predominant source of interdependencies within a nation and the most important generators of interurban growth transmissions. This is due to the fact that they control large shares of advanced economies and are significant propagators of flows of goods, services, economic information and capital.

Considerations Relating to the Profitability of the Individual Firm

The profit surface of the individual office activity is primarily determined by the revenue surface. In the case of smaller firms the cost

surface may however play a locational role. Cost surfaces can be derived primarily from rental variations. Rent comprises about 8 per cent of the cost structure rental and may influence the locational choice of a small firm. As regards the head office functions which exist to maximize profits accruing to the total firm it is unlikely that this component would need to be self supporting or cost efficient. Further research is required in relation to variations in labour cost and the resultant impact on the profit surface of smaller firms.

Contact opportunities (or potential sales) comprise the major revenue factor which varies greatly over space. Price may be relevant for smaller, locally oriented service activities which are directly competing with other firms but is not relevant to higher level office activities which have a different function. Transportation or shipping costs (for which the firm is responsible) are not relevant to any particular level of office activity due to the nature of office activities.

It may be seen that urban policies aimed at increasing costs to influence the location of office activities would have little effect upon higher level activities. On the other hand smaller office activities may be extinguished if contact opportunities do not exist elsewhere.

External Influences on Office Activity Location Choice

Perhaps the most significant external influences on the location of office activities are the activities of property development companies and property development financiers. As the majority of office buildings are erected on a speculative basis by property developers and the majority of office buildings are occupied by tenants rather than owners, supply of office space often leads demand. The influence of property development companies on the location of office space is strongly linked with the availability of sources of development finance which include merchant banks, insurance companies, superannuation funds and other financial institutions of both local and overseas origin.

Not only is it necessary for the public policymaker to liaise extensively with property developers and financiers but information pertaining to property ownership and options on land should be collected to enable the extent of vested interests and potential political pressures on office location to be assessed.

DIRECTIONS FOR FUTURE RESEARCH

As the achievements of this thesis relate only to the formulation of a theoretical framework, further research is required for the development of a complete theory for the location of office activities. Because a comprehensive office location theory is unlikely to emerge until the interactions between all of the components are able to be comprehended, future research must adopt an integrated approach. Little will be gained by the pursuit of single strands of office activity location.

As regards the overall theoretical framework proposed, further work remains to be carried out in relation to the environmental perception of individuals and other 'rules' such as statutory and supply restrictions. In particular it appears necessary to devise means of predicting decisions and the resulting partial equilibrium patterns rather than conditions for optimality.

Given that office activity location is heavily oriented towards communication considerations, much more research needs to be carried out on contact requirements. This would necessitate extensive communication audits of interactions between office based firms and the environment. These information flows would then have to be mapped to demonstrate the spatial implications. Research is also required to determine whether information flows as opposed to the formal structure of the firm defines the way in which the firm eventually operates and how the organization is able to adapt to changes in the environment by selecting new contacts. This may involve an examination of particular sets of administrative functions in a range of locational situations.

Further classification of contact functions may contribute to a better understanding of office location problems. Contacts should not only be further classified but weighted to allow quantification techniques to be introduced. This type of approach would allow a more precise definition of office activity requirements which would enable a closer

representation of reality. In this way office location theory could be made more relevant to the urban policymaking process.

Finally, the researcher must be reminded of the need to continually monitor technological advances and structural changes in the economy to ensure that the suggested approach to office activity location remains relevant.

DATA SYSTEM REQUIREMENTS

As demonstrated in Chapter One the urban policymaker does not have access to a comprehensive data system. This situation has probably arisen out of the lack of understanding of the nature of office activities. Both the researcher's and policymaker's task would be greatly facilitated if centralized data systems could be established by the public sector for general use.

A revision of some aspects of Census data collection methods may prove useful. Statistics relating to commercial centres (as opposed to local government areas), a more precise definition of office based workers and the collation of floor space data for various office activities are required for research purposes.

Public policymakers responsible for commissioning office activity location studies should ensure that a comprehensive approach is taken and that comparable methods are employed in relation to such studies. Where possible the results of study work should be circulated to relevant research bodies to ensure that such data is generally available to promote further advances in the field of office activity location.

SUMMARY OF CONCLUSIONS

By adopting an integrated approach to assess the variables determining office activity location, it is possible to develop a theoretical framework to identify those influences and restrictions which confront a firm undertaking essential activities. These activities are dependent upon conditions within the firm and the environment. The influences and restrictions which affect office activity location may be categorized as administrative systems, environmental structure, macro and micro economic considerations, environmental perception of individuals and 'other rules'. With the exception of the latter category, these influences and restrictions are all concerned with communication and interact to determine the locational choice of the firm. The category of 'other rules' constitutes an external constraint on the office activity location decision.

Arising out of this research, there are a number of guidelines relevant to the public policymaker. In the first instance, it must be recognized that different types of office activities exist and that the critical functions of the firm are relevant to locational requirements. More specifically, the composition of functional business environments in central business areas and the decentralisation potential of the various types of office activities must be comprehended. An understanding of the relationship of market area characteristics to functional business environments and decentralisation possibilities is required as the geographical extent and type of market may influence the location of office activities. Urban strategies can be limited in their effectiveness by regional and economic growth characteristics. On this basis, the impact of complex factors such as non local control and non linear growth patterns must be taken into account. Also relevant to the formulation of urban policy are the individual firm's profits and the external influences on office activity location.

The establishment of more adequate data systems would facilitate further research efforts directed at office activity location. In this

regard it may be necessary for government departments concerned with office activities and with data collection to liaise more extensively. Furthermore studies dealing with office activity location need to be carried out on a consistent basis to allow appropriate comparisons to be made and to permit a more extensive data base to be compiled.

Future research should regularly assess the relevance of the suggested framework in the light of technological advances and structural changes in the economy. Finally, it is emphasised that the most appropriate direction for further research is the development of a fully integrated approach whereby the variables determining office activity location may be addressed together.

Appendix

APPENDIX 1

(a) Classification of Occupations is obtainable in the following format on a collector's district basis

	Major Groups
0.	Professional, technical and related workers
1.	Administrative, executive and managerial workers
2.	Clerical workers
3.	Sales workers
4.	Farmers, fishermen, hunters and timber getters and related workers
5.	Miners, quarrymen and related workers
6.	Workers in transport and communications
7.	Tradesmen, production process workers and labourers N.E.C.
8.	Service, sport and recreation workers
9.	Members of armed services
10.	Occupation inadequately described or not stated

(b) The Australian Standard Industrial Classification is available in the following format on a collector's district basis:-

	Division
1.	Agriculture, forestry, fishing and hunting
2.	Mining
3.	Manufacturing
4.	Electric and gas and water
5.	Construction
6.	Wholesale and retail trade
7.	Transport and storage
8.	Communication
9.	Finance, insurance, real estate and business services
10.	Public administration and defence
11.	Community services
12.	Entertainment, recreation, restaurant, hotels and personal services

APPENDIX 2

Category	Class
	Food
	Chemicals
	Metal
	Engineering
	Other Metals
	Textiles
	Clothing
	Bricks
	Timber
	Paper
	Printing
Manufacturing: Total	
	Construction
	Public Utilities
	Railways
	Road Passenger
	Road Haulage
	Sea Transport
	Ports
	Air
	Misc. Transport
	Distribution
Physical Services:Total	
	Insurance
	Banking
	Finance
	Property
Finance:Total	
	Accountancy
	Education
	Legal
	Medicine
	Religion
	Other Professional
Professional: Total	
	Misc. Services
	Other Services
	Associations
	Advertising
	Typing
	Business Services
Miscellaneous: Total	
All categories: Total	

Source: Facey, M.V. & Smith, G.B. Op. Cit., p.28

APPENDIX 3

THE TYPES OF OFFICE

Manufacturing offices	Food
	Chemicals
	Metals
	Engineering
	Other Metals
	Textiles
	Clothing
	Bricks etc
	Timber
	Paper
	Printing
Physical Services offices	Construction
	Gas etc
	Railways
	Road transport
	Road haulage
	Sea transport
	Ports
	Airtransport
	Misc. transport
	Distribution
Finance offices	Insurance
	Banking
	Finance
	Property
Professional offices	Accountancy
	Educational
	Legal
	Medical
	Religious
	Professional
Miscellaneous Service offices	Misc.
	Services
	Assocations
	Advertising
	Typing
	Employment

Source: Croft, M.J. Op. Cit., (Ex. Appendix)

APPENDIX 4

MEETING RECORD

1 How long did the meeting last?

1 ☐ 2-10 minutes
2 ☐ 10-30 minutes
3 ☐ 30-60 minutes
4 ☐ 1-2 hours
5 ☐ more than 2 hours

2 Was the meeting arranged in advance?

1 ☐ Not pre-arranged at all
2 ☐ Arranged on the same day
3 ☐ Arranged the day before
4 ☐ Arranged 2-7 days in advance
5 ☐ Arranged more than 1 week in advance

3 Who initiated the meeting?

1 ☐ Myself/another person in my firm
2 ☐ Any person outside the firm or any other organization

4 How many people, apart from you, were at the meeting?

1 ☐ One other person
2 ☐ 2-4 people
3 ☐ 5-10 people
4 ☐ over 10 people

IF there was only one other person at the meeting:-

5 What is the work address of that person?

.....

.....

6 What is the nature of business of his firm?

.....

.....

IF there was more than one other person at the meeting, please complete the details overleaf

7 How often on average do you have a meeting with this person or particular set of people?

1 ☐ Daily
2 ☐ About once a week
3 ☐ About once a month
4 ☐ Occasionally
5 ☐ First contact

8 What was the main purpose of the meeting?

1 ☐ To give an order or instruction
2 ☐ To receive an order or instruction
3 ☐ To give advice
4 ☐ To receive advice
5 ☐ For bargaining
6 ☐ To give information
7 ☐ To receive information
8 ☐ To exchange information
9 ☐ For general discussion
10 ☐ Other (please specify) .....

.....

9 What was the range of subject matter discussed?

1 ☐ One specific subject
2 ☐ Several specific subjects
3 ☐ A wide range of general subjects

10 Was the meeting concerned with the purchase or sale of goods or services?

1 ☐ Directly concerned with purchases or sales
2 ☐ Indirectly concerned with purchases or sales
3 ☐ Not at all concerned with purchases or sales

IF the meeting took place outside your place of work:-

11 What is the address of the meeting place?

.....

.....

12 What was your principal method of transport from your office or previous meeting place?

1 ☐ Walk
2 ☐ Bus
3 ☐ Private car
4 ☐ Taxi
5 ☐ Underground
6 ☐ Train
7 ☐ Plane

13 How long did this journey take?

1 ☐ Less than 10 minutes
2 ☐ 10-30 minutes
3 ☐ 30-60 minutes
4 ☐ 1-2 hours
5 ☐ More than 2 hours

An example of a meeting record sheet.

Source: Goddard, J.B. (1973) Op. Cit., p.156

APPENDIX 5

Coding of Establishments from OSRP Registrations

			SIC
01	PRIMARY INDUSTRY		
	010	*Agriculture, forestry and fishing*	
		0100 Agriculture, forestry and fishing	001-003
	011	*Mining and quarrying*	
		0110 Coal mining	101
		0111 All other mining and quarrying	102, 103, 109
02	FOOD, DRINK AND TOBACCO		
	020	*Food*	
		0200 Cereal products	211, 213
		0201 Bacon curing, meat products	214
		0202 Fish and fish products	214
		0203 Dairy products	215
		0204 Sugar and confectionery	216, 217
		0205 Fruit and vegetables	218
		0206 Any other food industries	219, 229
	021	*Brewing and other drink industries*	
		0210 Brewing and other drink industries	231, 239
	022	*Tobacco*	
		0220 Tobacco	
03	CHEMICALS AND ALLIED INDUSTRIES		
	030	*Fuel and Oil*	
		0300 Fuel and oil	261-263
	031	*Chemicals*	
		0310 Chemicals, dyes, explosives	271, 273
		0311 Pharmaceuticals and toilet preparations	272
		0312 Paint and printing ink	274
		0313 Vegetable and animal oils, soap, detergents	275
		0314 Synthetic resins, plastics, polishes and adhesives	276, 277
04	METALS AND OTHER METAL GOODS		
	040	*Metal manufactures*	
		0400 Iron and steel, steel tubes, iron castings	311-313
		0401 Other metal manufactures	321, 322
	041	*Metal goods*	
		0410 Metal goods	391-395
		0411 Jewellery, etc.	396
		0412 All other metal industries	399

Source: Goddard, J.B. (1973) Op. Cit., pp 217-223

APPENDIX 5

05	ENGINEERING		
	050	*Heavy machinery* (other than electrical)	
		0500 Industrial machinery	331-337
		0501 Other machinery	339
	051	*Precision engineering*	
		0510 Office machinery	
		0511 Scientific, surgical and photographic instruments, watches and clocks	351, 352
	052	*Mechanical engineering and industrial plant*	
		0520 Industrial plant and steelworks	341
		0521 All other mechanical engineering	342, 349
	053	*Electrical engineering and electrical goods*	
		0530 Electrical machinery	361
		0531 Telegraph, telephone apparatus, cables and wires	362, 363
		0532 Radio and electric apparatus and domestic electrical goods	364, 365
		0533 Other electrical goods	369
	054	*Shipbuilding and marine engineering*	
		0540 Shipbuilding and marine engineering	370
	055	*Vehicles*	
		0550 Vehicles	381-389
06	TEXTILES, LEATHER AND CLOTHING		
	060	*Textiles*	
		0600 Textile manufacture	411-419
		0601 Made up textiles	421-429
	061	*Leather, leather goods and fur*	
		0610 Leather, leather goods	431, 432
		0611 Fur	433
	062	*Clothing and footwear*	
		0620 Men's tailoring and outerwear	441
		0621 Women's tailoring and outerwear	443
		0622 Dresses, lingerie	445
		0623 Other clothing	441, 444, 446
		0624 Footwear	450
07	OTHER MANUFACTURING		
	070	*Bricks, pottery, glass, cement*	
		0700 Bricks, pottery, glass, cement	461-469
	071	*Timber and furniture*	
		0710 Timber and domestic furniture	470, 472, 473, 475, 479
		0711 Shop and office fitting	474
	072	*Miscellaneous manufacturing industries*	
		0720 Miscellaneous manufacturing	491-499
08	PAPER, PRINTING AND PUBLISHING		
	080	*Paper and paper products*	
		0800 Paper and board and cardboard products	481, 482
		0801 Other paper products	483
	081	*Printing and Publishing*	
		0810 Publishing of daily and weekly newspapers	486
		0811 Publishing of periodicals and journals	486
		0812 Book publishing	487
		0813 Printing, engraving, lithographic work	487

APPENDIX 5

09	CONSTRUCTION		
	090	*General construction and contracting*	
		0900 General building contractors	500
		0901 Highway construction and repair	500
		0902 Heavy structural and civil engineering	500
	091	*Specialist contracting*	
		0910 Plumbing, heating, air conditioning	500
		0911 Electrical contracting	500
		0912 Masonry, stonework, tiling, etc..	500
		0913 Concrete	500
		0914 Other specialist contracting including plant hire	500
10	GAS, ELECTRICITY AND WATER		
	100	*Gas, electricity and water*	
		1000 Gas electricity and water	601-603
11	TRANSPORT AND COMMUNICATIONS		
	110	*Transport*	
		1100 Railways	701
		1101 Road passenger transport	702
		1102 Road haulage	703
		1103 Sea transport	704
		1105 Air transport	706
	111	*Postal services and telecommunications*	
		1110 Postal services and telecommunications	707
	112	*Transport services*	
		1120 Shipping and forwarding, freight broking, etc.	709 (1)
		1121 Travel agents	709 (1)
		1122 Other transport services	709 (1)
			709 (3)
	113	*Storage associated with transport*	
		1130 Storage associated with transport including bonded warehouses	709 (2)
12	WHOLESALE DISTRIBUTION		
	120	*Food wholesaling*	
		1200 Grocery and provisions	810 (1)
		1201 Meat and meat products	810 (2)
		1203 Fresh fruit and vegetables	810 (2)
		1204 Dairy produce	810 (2)
		1205 Other food products	810 (2)
	121	*Clothing and footwear wholesaling*	
		1210 Clothing and footwear wholesaling	810 (4)
	122	*Paper, stationery and books wholesaling*	
		1220 Paper, stationery and books wholesaling	810 (5)
	123	*Machinery and equipment wholesaling*	
		1230 Electrical goods	810 (7)
		1231 Hardware, plumbing and heating equipment	810 (7)
		1232 Office machinery and equipment – supplies and service	810 (7)
		1233 Other commercial and professional machinery and equipment	810 (7)
	124	*Drugs, chemicals and other non-food goods wholesaling*	
		1240 Drugs, chemicals and allied products	810 (7)
		1241 Other non-food goods wholesaling	810 (7)
	125	*General wholesale merchants*	
		1250 General wholesale merchants	810 (8)

APPENDIX 5

13	RETAIL DISTRIBUTION		
	130	*Food shops*	
		1300 Grocery and provisions shops	820 (3)
		1302 Other food shops	820 (3)
	131	*Confectionery, tobacco and newspapers*	
		1310 Confectionery, tobacco and newspapers	820 (3)
	132	*Clothing and footwear shops*	
		1320 Footwear	820 [illegible]
		1321 Men's and boys' outerwear	820 [illegible]
		1322 Other men's wear shops	820 [illegible]
		1323 Women's outerwear	8[illegible]
		1324 Other women's wear, drapery and general clothing shops	820 (4)
	133	*Furniture and furnishing shops*	
		1330 Household furniture	820 (5)
		1331 Soft furnishings	820 (5)
		1332 Floor covering	820 (5)
		1333 Antiques and second-hand furniture	820 (5)
		1334 Art dealers and galleries	820 (5)
	134	*Electrical and cycle shops and ironmongers*	
		1340 Radio and electrical including hire	820 (5)
		1341 Cycles and perambulators	820 (5)
		1342 Ironmongery and hardware	820 (5)
	135	*Booksellers and stationers*	
		1350 Booksellers and stationers	820 (6)
	136	*Chemists and photographic goods shops*	
		1361 Chemists	820 (6)
		1362 Photographic goods shops	820 (6)
	137	*Jewellery, sports and leather goods shops*	
		1370 Jewellery, watch and clock shops	820 (6)
		1371 Sports goods	820 (6)
		1372 Leather goods	820 (6)
		1373 Toy shops	820 (6)
		1374 Fancy goods and gifts	820 (6)
	138	*Other non-food goods shops*	
		1380 Other non-food goods shops	820 (6)
	139	*Department and variety goods stores*	
		1390 Department and variety goods stores	820 (6)
14	COMMODITY DEALING		
	140	*Export and import merchants*	
		1400 Export and import merchants	832
	141	*Commodity brokers, merchants and dealers*	
		1410 Grain merchants	832
		1411 Metal brokers and dealers	832
		1412 Tea and coffee merchants	832
		1413 General produce merchants	832
		1414 Plantation house commodity dealers	832
		1415 Wool and fur dealers	832
		1416 Diamond merchants	832
		1417 Timber merchants	832
		1418 Miscellaneous commodity brokers	832
15	INSURANCE		
	150	*Insurance companies*	
		1500 Life insurance companies	860 (1)
		1501 Fire, marine and other casualty insurance	860 (1)

APPENDIX 5

	151	*Other insurance*	
		1502 Life and casualty insurance combined	860 (1)
		1510 Insurance brokers	860 (1)
		1511 Underwriters and underwriters' agents	860 (1)
		1512 Other insurance – re-insurance, insurance adjusting, etc.	860 (1)
16	BANKING		
	160	*Central banking*	
		1600 London clearing banks – Head offices	860 (2)
		1601 London clearing banks – other special departments	860 (2)
		1602 Merchants banks	860 (2)
		1603 Bill discounting and foreign exchange	860 (2)
	161	*Other banking*	
		1610 Other banks	860 (2)
		1611 London clearing banks – branches	860 (2)
17	OTHER FINANCE		
	170	*Stockbroking and jobbing*	
		1700 Stockbroking and jobbing	860 (3)
	171	*Other Finance*	
		1710 Building societies	860 (3)
		1711 Investment and credit banks	860 (3)
		1712 Other finance	860 (3)
	172	*Property*	
		1720 Property owning and developing companies	860 (4)
		1721 Estate agents, surveyors and valuers	860 (4)
18	PROFESSIONAL AND SCIENTIFIC SERVICES		
	180	*Accounting, auditing and bookkeeping*	
		1800 Accounting, auditing and bookkeeping	871
	181	*Legal services*	
		1810 Legal services	873
	182	*Consulting engineers*	
		1820 Consulting engineers	879 (1)
	183	*Architects*	
		1830 Architects	879 (1)
	184	*Management, production, marketing and costing consultants*	
		1840 Management, consultants	879 (1)
		1841 Production and costing consultants	879 (1)
		1842 Marketing consultants and market research	879 (1)
	185	*Other specialist consultants*	
		1850 Other specialist consultants	879 (1)
	186	*Educational services*	
		1860 Educational services – including language and secretarial schools	872
	187	*Medical services*	
		1870 Medical services	874
	188	*Non-profit educational and scientific research institutes and agencies*	
		1880 Non-profit educational and scientific research institutes and agencies	879
19	BUSINESS SERVICES		
	190	*Advertising and public relations*	
		1900 Advertising agencies	899 (6)
		1901 Advertising services	899 (6)
		1902 Public relations consultants	899 (6)

APPENDIX 5

	191	*Office services*	
		1910 Typewriting and duplicating, photocopying	899 (6)
		1911 Direct mail advertising circular services	899 (6)
		1912 Translating services	899 (6)
		1913 Calculating services	899 (6)
		1914 Electronic data processing services	899 (6)
		1915 Employment agencies	899 (6)
		1916 General services to buildings	899 (6)
		1917 Security services	899 (6)
	192	*Drawing and photographic services*	
		1920 Drawing services, drawing office	899 (6)
		1921 Commercial photographic services	899 (2)
	193	*Miscellaneous business services*	
		1930 News agencies and press services	988 (6)
		1931 Equipment rental and leasing services	899 (6)
		1932 Other business services	899 (6)
20	SOCIETIES AND ASSOCIATIONS		
	200	*Employers' and trade associations*	
		2000 Employers' and trade associations	899 (6)
	201	*Professional membership organisations*	
		2010 Professional membership associations	899 (6)
	202	*Trade unions and labour organisations*	
		2020 Trade unions and labour organisations	
	203	*Religious organisations*	
		2030 Religious organisations	875
	204	*Charitable organisations*	
		2040 Charitable organisations	899 (6)
	205	*Political organisations*	
		2050 Political organisations	899 (6)
	206	*Other societies, associations*	
		2060 Other societies, associations	899 (6)
21	PERSONAL SERVICES		
	210	*Launderies, dry cleaning, shoe repair*	
		2100 Laundries, dry cleaning, shoe repair	885, 886, 888
	211	*Hairdressing, barbers and beauty shops*	
		2110 Hairdressing, barbers and beauty shops	889
	212	*Garages, car distributors, car hire*	
		2120 Garages, car distributors, car hire	887
	213	*Other personal services*	
		2130 Other personal services	899 (1) (9
22	ENTERTAINMENT		
	220	*Cinemas*	
		2200 Cinemas	881 (1)
		2201 Film producers	881 (1)
		2202 Film distributors	881 (1)
		2203 Other cinema services	881 (1)
	221	*Theatres*	
		2210 Theatres	881 (2)
		2211 Theatre ticket agencies	881 (2)
		2212 Theatrical production and services	881 (2)

APPENDIX 5

	222	*Other entertainment*	
		2220 Bands, orchestras and other entertainment	881 (2)
		2221 Television and radio	881 (2)
	223	*Sport, betting and other recreation*	
		2230 Sport and other recreation	882
		2231 Betting shops and casinos	883
		2232 Clubs	883
	224	*Hotels*	
		2240 Hotels	884
	225	*Cafes and restaurants*	
		2250 Cafes and restaurants	885
23	MISCELLANEOUS OFFICES		
	230	*Head offices of enterprises interested in more than one activity*	
		2300 Head offices of enterprises interested in more than one activity	899 (8)
	231	*Head offices of enterprises operating abroad*	
		2310 Head offices of enterprises operating abroad	899 (7)

APPENDIX 6

Connectivity of Business Sectors to the Contact Network

Sector	Telephone Contacts			Meetings	
	Concentration index	Communality	Connectivity index (C^6)	Concentration index	Communality
Highly connected					
Fuel and oil	0·45 (1)	0·85 (1)	306 (2)	0·56 (1)	0·78 (1)
Metals and metal goods	0·55 (2)	0·73 (2)	344 (1)	0·64 (2)	0·53 (3)
Mechanical engineering and machinery	0·52 (2)	0·90 (1)	365 (1)	0·67 (2)	0·64 (2)
Paper, printing and publishing	0·43 (1)	0·72 (3)	298 (2)	0·44 (1)	0·79 (1)
General construction	0·40 (1)	0·85 (1)	622 (1)	0·63 (2)	0·64 (2)
Retailing	0·46 (1)	0·76 (2)	319 (1)	0·76 (3)	0·61 (2)
Banking	0·46 (1)	0·75 (2)	160 (3)	0·52 (1)	0·78 (1)
Legal services	0·44 (1)	0·85 (1)	140 (3)	0·60 (2)	0·83 (1)
Consulting engineers	0·51 (2)	0·73 (2)	546 (2)	0·59 (1)	0·75 (2)
Other specialist consultancy	0·48 (2)	0·67 (3)	288 (2)	0·49 (1)	0·81 (1)
Advertising and public relations	0·57 (3)	0·57 (3)	271 (2)	0·50 (1)	0·83 (1)
Office services	0·34 (1)	0·74 (2)	119 (3)	0·55 (1)	0·81 (1)
Societies and associations	0·40 (1)	0·74 (2)	195 (2)	0·63 (2)	0·80 (1)
Central and local government	0·39 (1)	0·86 (1)	160 (3)	0·52 (1)	0·60 (3)
Moderately connected					
Food, drink and tobacco	0·65 (4)	0·69 (3)	206 (2)	0·61 (2)	0·62 (2)
Chemicals	0·57 (3)	0·81 (2)	507 (1)	0·64 (2)	0·59 (3)
Precision engineering	0·47 (2)	0·12 (4)	139 (3)	0·70 (2)	0·17 (4)
Electrical engineering	0·60 (3)	0·84 (1)	51 (4)	0·69 (3)	0·78 (1)
Bricks, pottery, glass and cement	0·57 (3)	0·54 (3)	405 (1)	0·75 (3)	0·16 (4)
Other manufacturing	0·55 (3)	0·31 (4)	417 (1)	0·57 (1)	0·29 (4)
Specialist contracting	0·57 (3)	0·71 (3)	410 (1)	0·79 (4)	0·40 (3)
Transport and communications	0·61 (3)	0·90 (1)	119 (4)	0·79 (4)	0·52 (3)
Transport services	0·60 (3)	0·72 (2)	203 (2)	0·81 (4)	0·09 (4)
Other specialist wholesaling	0·43 (1)	0·57 (3)	306 (2)	0·79 (4)	0·71 (2)
Stockbroking and jobbing	0·64 (4)	0·85 (1)	47 (4)	0·75 (4)	0·84 (4)
Other finance	0·54 (1)	0·48 (1)	222 (4)	0·56 (4)	0·75 (2)
Architects	0·54 (2)	0·82 (2)	345 (1)	0·81 (4)	0·39 (4)
Moderately connected					
Non-profit services	0·49 (2)	0·91 (1)	59 (4)	0·82 (4)	0·78 (2)
Miscellaneous business services	0·55 (2)	0·62 (3)	165 (3)	0·77 (3)	0·35 (4)
Entertainment	0·57 (3)	0·83 (2)	129 (3)	0·61 (2)	0·76 (2)
Weekly connected					
Primary industry	0·75 (4)	0·51 (4)	73 (4)	0·78 (3)	0·40 (3)
Transport equipment	0·63 (4)	0·22 (4)	226 (2)	0·74 (3)	0·59 (3)
Textiles, leather and clothing	0·70 (4)	0·61 (3)	92 (4)	0·98 (4)	0·45 (3)
Gas, electricity and water	0·67 (4)	0·21 (4)	125 (3)	0·70 (3)	0·05 (4)
Food wholesaling	0·74 (4)	0·66 (3)	50 (4)	0·80 (4)	0·51 (3)
General wholesale merchants	0·76 (4)	0·04 (4)	135 (3)	0·86 (4)	0·09 (4)
Export and import merchants	0·63 (4)	0·48 (4)	162 (3)	0·76 (3)	0·09 (4)
Commodity brokers	0·49 (4)	0·16 (4)	82 (4)	0·84 (4)	0·36 (4)
Insurance companies	0·55 (3)	0·19 (4)	8 (4)	0·78 (4)	0·10 (4)
Other insurance	0·62 (4)	0·09 (4)	43 (4)	0·82 (4)	0·05 (4)
Accounting	0·53 (2)	0·54 (4)	56 (4)	0·79 (4)	0·72 (2)

Numbers in brackets refer to quartile of each sector according to ranking of each index.

APPENDIX 7

EMPLOYMENT OF OFFICE WORKERS BY INDUSTRIAL SECTOR 1964-66 AND NUMBER OF OFFICE ESTABLISHMENTS IN THE CITY OF LONDON

Industrial Sector	Employment in offices in the City of London	% of total office employment	No. of office establishments in the City of London	% of total no. of office establishments
Banking	50,005	19.12	404	
Other Finance	24,279	9.28	771	
Insurance	49,822	19.05	735	
Wholesale Markets	15,612	5.97	926	
Commodity Markets	14,031	5.36	982	
Shipping	20,947	8.01	591	
Professional Services	32,835	12.55	1,431	
Printing & Publishing	13,177	5.03	366	
Central Offices	12,375	4.73	529	
Transport	5,888	2.25	55	
Income Absorbing	15,959	6.10	1,570	
Others	6,522	2.49	140	
All Types of Office Activity	261,452	100.00	8,500	

Source: Dunning, J. and Morgan, E. (1971) Op. Cit., pp 68, 75

APPENDIX 8

INDUSTRIAL EMPLOYMENT IN OFFICES SECTOR IN THE CITY OF SYDNEY C.B.D.		% OF TOTAL EMPLOYMENT IN C.B.D. 1971 [1]	% OF TOTAL OFFICE SPACE OCCUPIED [2]
Agriculture, Mining, etc	1,528	0.8	2
Manufacturing	13,940	7.3	7
Electricity, Gas, Water	840	4.4	4
Construction	668.5	3.5	insignificant
Wholesale and Retail Trade	35,717.0	18.7	9
Transport and Storage	15,089.0	7.9	6
Communication	859.5	4.5	4
Finance and Business Services	58,102.2	30.2	29
Public Admin. and Defence	23,684	12.4	21
Community Services	9,932	5.2	7
Entertainment, Recreation etc	916.8	4.8	2
Others and not stated	573.0	0.3	insignificant
	191,000	100.0	100.0 (does not add to 100% due to rounding)

Source: City of Sydney Council (1978) Central Business District Study, Vol. I, pp 26, 42

1. As there is no data for office employment by industry in the C.B.D. total C.B.D. employment figures have been used as an alternative as the majority of employment in the C.B.D. today is office employment.

2. Note no figures were available to demonstrate the number of office establishments and hence the intensity of employment per industrial sector is illustrated by reference to % of floorspace occupied which should reflect the employment intensive sectors.

APPENDIX 9

Table 1. Classification of offices

1. Agriculture, forestry, fishing, mining and quarrying
3. Food, drink and tobacco
4. Chemical and allied industries
5. Metal manufacture
6. Engineering and electrical goods
7. Shipbuilding and marine engineering
8. Vehicles
9. Metal goods not elsewhere specified
10. Textiles
11. Leather, leather goods and fur
13. Bricks, pottery, glass and cement
14. Timber, furniture, etc.
15. Paper and board manufacture
16. Printing, publishing of newspaper and periodicals
17. Other printing and publishing (books)
18. Other manufacturing industries
19. Construction
20. Gas, electricity and water
21. Rail transport, road passenger transport and road haulage
24. Sea and air transport—shipping companies and airlines
25. Port and inland water transport (Port of London Authority)
27. Postal services and telecommunications
28. Transport services—ship and freight brokers, shipping and forwarding agents
29. Any other transport services—travel agents
30. Storage associated with transport—bonded warehouses
31. Wholesale distribution—grocery and provisions
32. Wholesale distribution—other food
33. Wholesale distribution—tobacco
34. Wholesale distribution—footwear and textiles
35. Wholesale distribution—paper, stationery and books
36. Wholesale distribution—other non-food goods
38. Wholesale distribution—general wholesale merchants
39. Retail distribution
40. Life insurance
41. Non-life insurance
42. Life and non-life insurance combined
43. Lloyds insurance brokers
44. Other insurance brokers
45. Underwriters and underwriters' agents
46. Other insurance (reinsurance brokers, insurance agents)
47. London Clearing Banks—headquarters offices
48. London Clearing Banks—ordinary City branches
49. London Clearing Banks—foreign exchange departments
50. London Clearing Banks—any other departments
51. Scottish and Northern Irish banks
52. British Overseas and Commonwealth banks
53. Foreign banks
55. Other banks registered with the Bank of England
77. All other banks
56. Members of the Discount Market
57. Accepting Houses
58. Finance Houses
59. Stockbrokers and jobbers
60. Investment and unit trusts
61. Other finance—building societies, property companies
62. Accountants
63. Education, medical and religious services
64. Legal services
65. Other professional services—consultancy
66. Catering and hotels
67. Consumer services
68. Advertising agents and public relations consultants
69. Employers', trade and professional associations
70. Any other business services—employment agencies, typing, etc.
71. Head offices of firms operating abroad
72. Miscellaneous services not elsewhere specified
73. Head offices of firms interested in more than one activity
74. Import and export merchants
75. Grain dealers
76. Metal dealers
78. Tea and coffee merchants
79. Rubber merchants
80. Dealers in other Plantation House commodities
81. General produce merchants
82. Wool dealers
83. Fur dealers
84. Diamond merchants
85. Timber dealers
86. Miscellaneous commodity dealers

The terms "merchant" or "dealer" are used loosely to cover all firms concerned with the product, including brokers and importers

The full list of eight-six types of office were reduced to eighty to suit program dimensions—hence the missing numbers indicating amalgamation.

Source: Goddard, J.B. (1973) Op. Cit., pp 180.181

CLASSIFICATION OF PRIVATE SECTOR OFFICE ACTIVITIES IN SUBURBAN CENTRES ACCORDING TO EXTENT OF MARKET AREA[a]

Local/District serving	State/Metropolitan serving	Nation/Interstate serving
Professional services: Doctors Dentists Veterinary surgeons Other medical Solicitors/Barristers Accountants *Business services* Employment agency Printing/typing etc. *Financial services:* District office: insurance co. District office: finance co. Insurance broker Development financiers *Other:* Local office of manufacturing co. Local office of distribution co. Local office of transport co. Building contractor	*Professional services* Architects Engineers Surveyors Town planners *Business services:* Advertising agencies Managerial consultants Data processing Market research *Financial services:* NSW branch office of insurance co. NSW branch office of finance co. *Manufacturers etc.* NSW branch office of manufacturing co. NSW sales office of manufacturing co. Manufacturers representatives, agents Only office of NSW-serving manufacturing, service industry, mining, distribution company, or division of such company *Development:* Head or Sydney office of NSW development co. NSW office of national development co.[b]	*Financial:* Head (Australian) office of national insurance/finance co. *Manufacturers etc:* Head office of national manufacturing or multistate co. Head office of national distribution or multistate co. Head office of national mining or multistate co. Head office of national transport, communication or multistate co. Head office of national development or multistate co. Head divisional office of above

Source: Alexander, I. (1975) Op. Cit., p.92, Appendix II

APPENDIX 11.(a)

(Continued)

City	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956
San Diego	399	613	470	614	614	471	520	587	508	438	506
Memphis	1,016	1,016	1,016	1,016	1,075	1,075	1,075	1,001	1,070	1,070	1,141
Akron	461	469	471	466	469	413	451	482	459	483	479
Toledo	*	326	108	436	435	375	374	387	215	315	637
Springfield, Mass.	*	125	125	125	125	125	128	128	452	454	427
Fort Worth	912	912	885	915	47	950			1,218	1,218	1,251
Omaha	657	845	1,277	1,117	1,331	1,208	1,203	1,214	1,242	832	1,326
Hartford	283	425	177	325	287	203	282	358	242	389	*
Oklahoma City	1,482	1,492	1,561	1,524	1,524	1,491	1,594	1,651	1,676	1,677	1,705
Bridgeport	105	68	100	100	100	100	100	100	100	100	100
Nashville	331	331	211	214	325	393	276	679	596	644	642
Jacksonville	409	414	289	314	346	311	315	315	247	372	372
Scranton	177	287	152	293	178	143	178	157	210	211	*
Phoenix	164	249	256	405	267	406	277	297	263	268	290
Tulsa	1,170	1,030	886	1,064	1,009	1,634	1,312	1,389	1,373	1,660	1,600
Des Moines	*	800	523	968	1,273	1,310	1,216	1,491	1,545	1,447	1,406
Davenport	303	315	263	331	271	140	134	197	133	134	133
Spokane	537	637	644	687	687	745	720	741	869	883	868
Harrisburg	120	120	78	120	120	172	120	118	118	145	118
South Bend	289	324	229	340	173	292	334	351	361	305	305
Chattanooga	207	222	215	231	129	155	74	246	252	253	235
Reading	62	81	65	77	81	169	59	59	58	58	58
Peoria	439	446	481	481	441	437	440	441	441	313	473
Little Rock	305	297	265	189	154	253	187	254	152	152	211
Binghamton	177	201	102	197	185	137	136	147	116	113	149
Duluth	394	389	402	420	413	393	408	414	415	416	387
Evansville	186	186	196	197	197	180	180	137	137	137	137
El Paso	186	185	155	114	179	150	154	154	155	154	*
Portland, Me.	153	153	206	165	140	140	38	165	126	126	*
Saginaw	127	128	128	128	72	106	112	134	58	102	98

*Incomplete data. The 1955 and 1947 figures were shifted to represent the 1956 and 1946 figures, respectively, in the correlation and regression analysis.

Source: Horwood, E. and Boyce, R. (1959) Op. Cit., p.49

APPENDIX 11.(b)

REPORTED OFFICE SPACE IN SELECTED CITIES
(thousands of square feet)

City	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956
New York City	59, 913	59, 058	59, 657	59, 558	56, 238	60, 908	61, 380	62, 069	64, 135	66, 078	67, 294
Chicago	27, 336	27, 403	27, 963	27, 820	27, 919	28, 220	27, 751	28, 274	28, 081	27, 870	28, 057
Los Angeles	10, 328	9, 358	9, 622	8, 283	9, 482	8, 713	8, 734	8, 685	10, 016	9, 498	9, 658
Philadelphia	10, 819	10, 729	10, 192	10, 070	10, 085	9, 818	9, 710	9, 755	9, 851	9, 708	10, 399
Detroit	7, 129	7, 552	7, 805	7, 797	7, 701	7, 248	6, 430	6, 612	6, 359	5, 330	5, 554
Boston	5, 539	5, 848	5, 896	6, 236	6, 354	6, 455	6, 820	6, 677	6, 967	6, 558	*
San Francisco	10, 270	10, 940	11, 356	11, 581	11, 603	11, 821	12, 538	12, 640	12, 801	12, 791	13, 289
Pittsburgh	4, 160	4, 029	4, 283	4, 267	4, 231	4, 089	4, 030	4, 887	5, 029	5, 071	5, 138
St. Louis	3, 137	3, 132	3, 035	3, 032	3, 106	3, 184	3, 279	3, 303	2, 771	2, 692	2, 449
Cleveland	6, 553	6, 643	6, 599	6, 757	6, 744	6, 698	6, 457	6, 539	6, 660	6, 883	6, 875
Baltimore	1, 596	1, 057	1, 168	1, 148	1, 505	1, 261	1, 742	1, 777	1, 878	1, 911	1, 719
Minneapolis St. Paul	4, 920	4, 662	4, 876	4, 840	4, 723	4, 770	4, 785	4, 646	4, 752	4, 727	4, 897
Milwaukee	1, 074	1, 364	1, 744	1, 927	1, 196	1, 500	943	1, 877	1, 192	1, 590	1, 667
Cincinnati	2, 138	2, 173	2, 626	2, 569	1, 565	1, 687	1, 925	1, 789	1, 737	2, 025	2, 041
Buffalo	1, 323	1, 412	1, 395	1, 432	1, 512	1, 532	1, 535	1, 432	1, 406	1, 306	1, 253
Houston	2, 390	2, 390	3, 093	3, 614	3, 191	2, 897	2, 518	3, 315	3, 957	4, 026	4, 024
Kansas City, Mo.	2, 499	2, 526	2, 560	2, 503	2, 529	2, 529	2, 608	2, 626	3, 709	2, 795	2, 773
New Orleans	1, 586	1, 487	1, 402	1, 477	1, 423	1, 553	908	1, 156	1, 147	1, 190	1, 207
Seattle	3, 308	3, 434	3, 475	3, 412	3, 426	3, 611	3, 632	3, 381	3, 382	3, 403	3, 427
Providence	969	1, 058	1, 025	882	430	779	789	885	750	698	701
Dallas	2, 831	2, 831	2, 906	(?291)	2, 496	2, 672	3, 649	3, 286	3, 488	3, 735	3, 760
Portland, Ore.	1, 618	1, 626	1, 733	1, 817	1, 643	1, 703	1, 719	1, 656	1, 698	1, 788	1, 784
Atlanta	2, 771	2, 815	2, 827	1, 191	2, 347	990	1, 540	3, 381	3, 602	2, 612	3, 947
Indianapolis	2, 161	2, 155	2, 155	2, 102	2, 153	2, 173	2, 173	2, 183	2, 157	2, 157	2, 220
Denver	1, 873	1, 886	1, 934	1, 941	1, 879	1, 826	1, 805	1, 792	1, 740	2, 424	2, 437
Louisville	*	589	496	634	647	721	609	726	686	687	726
Miami	618	609	420	454	547	434	532	895	644	468	602
San Antonio	*	760	435	1, 006	818	818	854	693	711	699	676
Birmingham	576	801	644	852	914	785	1, 125	1, 196	887	1, 022	823
Columbus	366	462	544	616	626	634	685	844	914	885	*

Source: Horwood, E. and Boyce, R. (1959) Op. Cit., p.48

Appendix 12

EXPENDITURE REVENUE (1976-7 to 1978-9)

A. *Salaries and Payments in the Nature of Salary*

		1976-77 $	1977-78 $	1978-79 $
Salaries and Wages		3,316,979	3,576,977	3,787,894
Temporary Assistance		273,029	307,169	343,968
Allowances		55,602	60,817	63,888
Annual Leave Loading		22,279	43,282	28,345
Retirement Leave		28,511	41	17,854
Overtime		9,352	48,501	11,649
Total of A Items	$	3,705,752	4,036,787	4,253,598
B. *Maintenance and Working Expenses*				
Workers Compensation Insurance		20,631	21,876	3,522
Tea Money		896	5,488	1,529
Rent		442,496	449,744	451,238
Maintenance, Alterations, Additions, and Renewals		9,605	13,888	28,965
Building Insurance		9,776	8,314	8,871
Travel and Removal Expenses		226,823	237,874	313,619
Maintenance and Hire Motor Vehicles		84,310	88,476	99,515
Freight, etc.		3,229	4,688	5,127
Books, etc.		2,996	2,847	3,090
Fees for Services Rendered		11,351	5,828	4,386
Postal and Telephone Expenses		9,631	10,481	1,562
Stores/Provisions		298,824	307,436	573,356
Other Insurance		2,387	3,064	4,545
Minor Expenses		85	25	45
Total of B Items	$	1,123,040	1,159,989	1,499,370
C. *Other Services*				
Aerial Photography		78,775	96,728	104,277
Purchase and Installation of Major Plant		133,806	63,300	146,915
University and Other Fees		800	1,064	638
Special Home Finance Assistance Relocation		97,508	2,373	1,084
Surveys and Permanent Marks		25,127	29,776	28,981
Cost of Relocation		2,235	Nil	Nil
Overseas Visits		Nil	Nil	1,000
Total of C Items	$	338,251	193,241	282,895
Revenue				
Map Sales		78,411	139,585	230,960
Commonwealth Map Sales		162	938	638
Project Aerial Photography		108,119	120,509	78,877
Survey Information		480	280	311
Project Photogrammetry		125,064	145,355	178,523
Aerial Photo Sales		3,662	3,706	11,532
Project Cartography		47,013	120,223	435
Sundries		28	Nil	Nil
Total	$	362,939	530,596	501,276

Source: Central Mapping Authority of N.S.W.: Annual Report (30/6/79)

SCHEDULE NO. 7

STATEMENT OF INCOME AND EXPENDITURE

Under the Valuation of Land Act, 1916, for the financial year ending 30th June, 1979

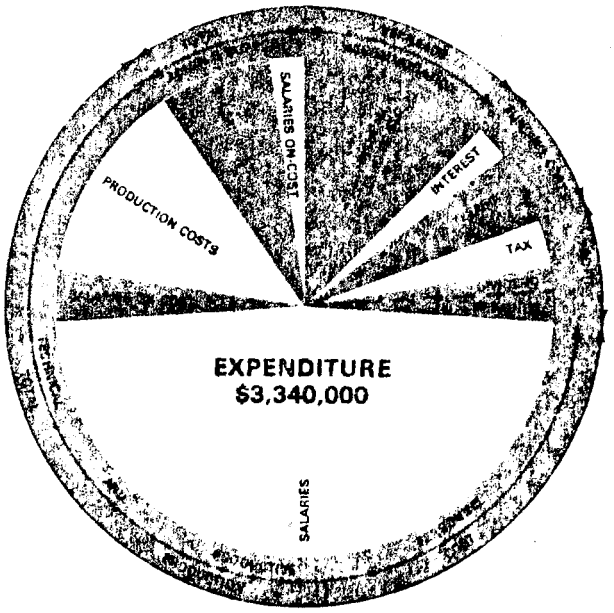
EXPENDITURE	$	$
Salaries and Payments in the Nature of Salary—		
Valuer General and Land Resumption Officer to the Government	42,577	
Other Staff	7,100,635	
Monetary value of leave on Resignation	178,234	
Overtime	2,278	7,323,724
Maintenance and Working Expenses—		
Subsidiary Staff Charges—		
Workers Compensation	6,495	
Meal Allowances	13	
Expenses in connection with Buildings—		
Rent, Rates etc.	234,315	
Subsistence and Transport Expense		
Travelling, Removal and Subsistence	278,331	
Motor Vehicles — Running Costs, Maintenance, Hire and Insurance	70,409	
Freight Cartage and Packing	4,660	
General Expenses		
Books, Periodicals and Papers	1,986	
Postal Expenses	95,220	
Fees for Services Rendered	103,056	
Stores, Provisions, Furniture, Equipment, Minor Plant, etc.	52,517	
Minor Expenses not elsewhere included	1,691	848,693
Other Services		
Valuation Board of Review Expenses	40,750	
Valuers Registration Board Expenses	5,762	46,512
		8,218,929
Expenditure Incurred by other Departments		
Telephone — Rental and Calls	162,037	
Electricity and Gas	32,190	
Printing and Stationery	59,262	
Maintenance of Buildings	815	
Cleaning Wages	235,342	
Advertising	2,323	491,969

INCOME	$	$
Fees#		
Certificates of Valuation	2,555,359	
Valuation Lists#		
Municipal and Shire Councils	1,814,883	
Metropolitan Water, Sewerage and Drainage Board	1,129,724	
Southern Riverina County Council	13,174	
Hunter District Water Board	153,517	
Fees attributable to previous years	24,781	5,691,438
Miscellaneous Services—		
Sundry Collections (fees for services to council and statutory bodies, fees for officers' services, sale of government property and on cost items)	440,853	440,853
Fees—		
Valuers Registration Act	80,588	80,588
		6,212,879
Balance— Excess of Expenditure over Income	2,006,050	
		8,218,929

NOTES: Fees for valuation were not increased during the financial year despite increases in costs of salaries and administrative expenses. Such fees are prescribed by Regulation.

Source: Annual Report of N.S.W. Valuer General (30/6/79)

Appendix 12



Sources and Disposition of Funds Employed

The assets and liability position of the group is summarised in the table below.

The assets total shows a further increase of $400,000, which is all reflected in current assets where debtors still predominate with a figure of $920,000. The ratio still shows that current assets are twice the current liabilities of the Company and Shareholders' funds have increased to nearly $550,000. The capital and reserves have increased to $276,000 whereas loans from shareholders and families show a minor decrease.

ASSETS

OWING BY CLIENTS	$918,000	47%
WORK IN PROGRESS	$125,000	6%
OTHER CURRENT ASSETS	$596,000	31%
FIXED & NON-CURRENT ASSETS	$206,000	11%
GOODWILL	$100,000	6%
TOTAL	**$1,945,000**	**100%**

LIABILITIES

CAPITAL & RESERVES	$276,000	14%
SHAREHOLDERS & FAMILY LOANS	$431,000	22%
CURRENT LIABILITIES	$833,000	43%
NON-CURRENT LIABILITIES	$126,000	6%
AMP LOAN	$90,000	5%
DEFERRED TAX PROVISIONS	$189,000	10%
TOTAL	**$1,945,000**	**100%**

Source: Annual Report of Sinclair Knight & Partners Pty. Ltd. (1978-79)

THE NEW SOUTH WALES PLANNING AND ENVIRONMENT COMMISSION
GENERAL FUND
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 30 JUNE 1979

Previous Year $	EXPENDITURE	$
5 788 974	Salaries & Travelling Expenses	6 502 204
393 348	Administration	689 761
293 667	Consultants, Computers & Research	313 311
699 482	Accommodation & Occupancy	697 740
193 255	Printing, Drafting & Photography	180 610
19 742	Contribution – Transport Study	32 665
54 551	Surplus – Transfer to Accumulated Fund	9
$ 7 442 419		$ 8 336 300

Previous Year $	INCOME	$
6 839 328	Consolidated Revenue Reimbursements	7 690 200
Nil	Contributions by Other Bodies	4 971
78 239	Enquiry Fees	–
300 000	Administration Charges on Cumberland Development Fund	350 000
32 153	Sale of Maps & Publications	49 769
68 214	Recoverable Services	68 766
124 485	Sundries	172 594
$ 7 442 419		$ 8 336 300

Housing Loans Insurance Corporation

Profit and Loss Statement For year ended 30 June 1979

	Notes	1979 $	1979 $	1978 $	1978 $
NET PREMIUMS WRITTEN	7		[illegible]		4,665,398
PREMIUMS EARNED			[illegible]		2,998,319
OPERATING EXPENDITURE					
Salaries		[illegible]		523,285	
Payroll tax, superannuation, long service leave	8	[illegible]		81,925	
Part-time Members' fees and expenses	9	[illegible]		10,264	
Rent and office services		[illegible]		72,381	
General administrative expenses	10	[illegible]		218,642	
Depreciation on fixed assets		[illegible]		8,243	
			[illegible]		914,740
CLAIMS	2				
Claims		[illegible]		641,468	
Movement in *Provision for impending claims*		[illegible]		579,500	
			[illegible]		1,200,968
UNDERWRITING PROFIT			[illegible]		862,611
OTHER INCOME					
Income from investments	11	[illegible]		1,949,219	
Interest on mortgage securities	6	[illegible]		52,227	
			[illegible]		2,001,446
OPERATING PROFIT BEFORE ABNORMAL ITEMS			[illegible]		2,864,057
Abormal items	8				4,848
OPERATING PROFIT BEFORE INCOME TAX			[illegible]		2,859,209
Income tax	12		[illegible]		1,280,478
OPERATING PROFIT			[illegible]		1,578,731
DIVIDEND					
Interim		[illegible]		375,000	
Provision for final		[illegible]		375,000	
			[illegible]		750,000
PROFIT TRANSFERRED TO GENERAL RESERVE			[illegible]		828,731

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