

LOCAL INDUSTRIAL DEVELOPMENT AND DYNAMICS:
THE EAST ANGLIAN CASE

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Abstract

This study was commissioned by and written for the Royal Swedish Academy of Engineering Sciences IVA, Stockholm, as part of an international comparative investigation into the nature of and driving forces underlying local industrial development in selected European, North American and Japanese regions. The paper analyses the recent historical evolution of East Anglia's economy, identifies growing and declining sectors, evaluates the key driving forces underpinning and resources utilised for successful industrial growth, examines the role of local entrepreneurs and inward investment, and assesses institutional and policy impacts on development. Industry is interpreted broadly to include primary, secondary and tertiary sectors, not just manufacturing. The paper thus attempts to provide a broad review and evaluation of East Anglia's recent industrial development, as an example of a British region whose economy has experienced very significant and relatively successful structural changes and growth over the last four decades.

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Introduction

This study was commissioned by and written for the Royal Swedish Academy of Engineering Sciences IVA, Stockholm, as part of an international comparative study of the nature of and driving forces underlying local industrial development in selected European, North American and Japanese regions. Its terms of reference included analysis of the historical evolution of East Anglia's economy, identification of growing and declining sectors, evaluation of the key driving forces underpinning and resources utilised for recent successful industrial growth, and assessment of institutional and policy impacts on development. Industry is interpreted broadly to include primary, secondary and tertiary sectors, not just manufacturing. The paper thus attempts to provide a broad review and evaluation of East Anglia's recent industrial development, as an example of a British region whose economy has experienced very significant and relatively successful structural changes and growth over the last four decades.

1. East Anglia: Regional Development Characteristics

1.1 Population and economic growth

The East Anglian region, comprising the three counties of Cambridgeshire, Suffolk and Norfolk, represents the smallest standard region of Great Britain measured by population and economic activity, but has also been the fastest-growing region of the United Kingdom in terms of these development indicators ever since the 1960s. A major consequence of this growth, especially of economic activity, has been a rise in East Anglia's regional personal income and GDP per head from below the national average in the 1960s to values above the national average by the 1990s. The region is also characterised by very low unemployment with a regional rate in 1995 which was lower than all other UK regions except outer

South East England. This is notwithstanding the severe impact on the region's economy of the acute early-1990s UK-wide recession.

The region's city-system structure, aspects of its communications infrastructure, and the location within it of government policy assisted areas, are shown in Figure 1. The region's economy is structured around four medium-sized towns namely Norwich, Cambridge, Peterborough and Ipswich, the largest of which is Peterborough (160,000 residents), the smallest Cambridge (113,000). Historically a predominantly agriculturally-based region, East Anglia also contains a number of smaller market towns acting as rural service centres, with numerous villages and rural settlements containing the bulk of the region's relatively dispersed, low-density population. Despite growth, East Anglia has the lowest population density of all the English regions and the second highest proportion of its population living in rural areas of all British regions (after South West England).

Dramatic growth of population in this traditionally rural and agriculturally-based region since the 1960s is charted in Table 1. As this shows, growth was particularly rapid in the late 1970s, and substantial in the 1980s, but has slowed appreciably with recession in the 1990s. By the far the dominant component in its demographic growth is net immigration, especially from London and South East England, which provides over half of all migrants to East Anglia. Despite the sharp recent fall in immigration, because of recession, net migration still accounts for a volume of population growth which is more than double that generated by the region's natural increase (births minus deaths). Within the region, Cambridgeshire is by far the fastest-growing locality, with a growth rate four times faster than that of the UK since 1981. This partly reflects the designation of Peterborough as an official "New Town" in the late 1960s, to take overspill population and industry from the congested South East region. But the Cambridge region and Huntingdon have also grown very rapidly, without policy intervention or stimulus.

The growth of economic activity and employment in East Anglia has also been exceptional by UK standards, with a rate of growth of total

employment (employees and self-employed) over seven times faster than that for the UK between 1975 and 1996 (Table 2). Indeed, the region's 21% growth in employees contrasts with the national decline of -3%. A secondary but distinctive feature of this growth is the importance of self-employed workers in the East Anglian case, the number of which doubled over the period. The region possesses the second highest proportion of self-employed workers within the labourforce of all UK regions, reflecting both an above-average representation of self-employment in key recent UK growth sectors, and the stimulus to self-employment resulting from East Anglia's rural and dispersed settlement pattern. A second noteworthy feature of Table 2 is the fact that although employment growth was most substantial during the 1980s, growth has continued during the 1990s, despite the very severe early-1990s recession. This suggests that the region's economic growth is associated with powerful if not self-sustaining economic forces, which even national recession cannot reverse other than temporarily.

1.2 Economic Structure

East Anglia's economic structure is documented in Tables 3 and 4. The first of these shows that in employment terms at least, the region's single largest sector at the so-called "Section" level of disaggregation of the UK 1992 Standard Industrial Classification is manufacturing, with one-fifth of total employment. Manufacturing's share of regional GDP is similar (21%), although for GDP, the region's largest sector is business and financial services, grouped together (24% compared with only 15% of employment). Other important sectors include retailing and wholesaling (17% of employment) and health and social work. The very small share of agriculture in current employment (3%) and GDP (5%) is also noteworthy, in a region historically dependent upon this sector. East Anglia's economic structure is thus characterised by considerable sectoral diversity, rather than specialisation. The wide range of economic activities contributing to the region's economic base includes various manufacturing industries, advanced business and professional services, telecommunications services, tourism, and

health and education, as well as agriculture. However, one specialisation not brought out by the table is in “high-technology” sectors, both manufacturing and services, as charted in Keeble (1992) using a sectoral classification proposed by Butchart (1987). Cambridgeshire in particular recorded the greatest volume of growth of high-technology employment of any county in the UK during the 1980s, with continuing vigorous expansion, primarily of high-technology services, in the 1990s (see Figures 2 and 3).

Within a diversified economic structure, East Anglia does therefore exhibit a relative orientation, compared with other UK regions, towards technology-based and knowledge-intensive sectors, many of which straddle the traditional - and increasingly questionable - manufacturing/services classificatory divide. This is further indicated by Table 4, which disaggregates the region’s biggest single sector, manufacturing, into specific industries. Again, within a context of wide diversity of manufacturing activity, the leading growth sectors are all research-intensive and technologically-dynamic activities, the four fastest-growing industries being electrical and electronic engineering, computers and office machinery, motor vehicles, and radio, TV and telecommunications equipment. A fifth growth industry is publishing, printing, reproduction and recorded media, again a rapidly changing and technologically-intensive sector. It should be stressed that the region’s motor vehicle sector is not concerned with mass production, but with high performance racing and sports cars, and technologically-advanced components. More generally, as Table 3 reveals, the fastest growing sector of East Anglia’s economy in recent years, at the one-digit level, has been business and professional services, with a remarkable 17% growth in the 1990s¹ following rapid expansion in the 1980s. This sector covers a range of dynamic, knowledge-intensive activities - management, marketing and technology consultancies, market research agencies, design studios, computer software and systems houses, consulting engineers and architects, for example - most of which are inextricably linked to and part of the regional and national productive base, serving and enhancing the competitiveness of export-oriented sectors such as manufacturing. In contrast, traditional key elements in the region’s

economic base such as food manufacturing (Table 4) and agriculture (Table 3) have been recording declining employment over recent years, although increasing productivity is a major factor in both these trends. Rapid growth in employment in health and social services (Table 3) reflects both national trends and exceptionally rapid regional population growth, with a consequent above-average multiplier impact on these labour-intensive consumer services.

1.3 Infrastructure and Political Organisation

Perhaps significantly, improvements in the region's transport and communications infrastructure have tended to lag behind those of the rest of the UK, because of the small size of the region, its low density of population and economic activity, and absence of large urban centres. It possesses only one section of motorway (the M11) linking the Cambridge area to London, although there is an East-West dual carriageway route (the A14) linking the East Coast ports of Felixstowe and Ipswich to the industrial Midlands. The latter serve national rather than regional needs, and there is little or no evidence of location close to these Europe-facing ports being of significance in recent firm location or investment decisions. Rail links are relatively limited, as is the use of regional airports. General proximity to nearby major international airports in South East England (London Heathrow and London Stansted in particular) is however an important locational advantage for many East Anglian businesses engaged in international activity, with the Cambridge region benefiting most from this factor because of its geographical accessibility. This region also stands out in terms of information and technological infrastructure, because of the historic significance of Cambridge University and associated research institutions as an internationally-outstanding centre of scientific and technological research.

In socio-cultural terms, the high proportion of East Anglian residents who are relatively-recent immigrants has perhaps militated against the development of close local social and institutional networks, although these may to some extent exist in the more agricultural and isolated parts of the region such as Norfolk. A sense of regional identity is

also strongest amongst the residents of this part of East Anglia, together with those of central and northern Suffolk. Many Cambridgeshire residents do not identify greatly with the concept of "East Anglia", their personal, social and business networks being much more oriented towards London and South East England.

The role of the public sector and the political/institutional structures present in East Anglia are perhaps distinctive in two ways. First, East Anglia has received a disproportionate share of UK government defence expenditure on airbases and personnel ever since the Second World War, because of an historic legacy of such defence facilities (close to mainland Europe and the availability of spacious sites). Correspondingly, its economy has suffered since 1990 from the closure or scaling down of such bases consequent upon the "peace dividend" following the end of the Cold War. Secondly, the region has been broadly characterised (with some urban exceptions) throughout the post-war decades by low-expenditure, non-interventionist local government authorities, reflecting a political dominance by Conservative (and Independent) councillors. There is little or no historic tradition of pro-active local government development policies, while county and district authorities² have only relatively recently co-operated, somewhat reluctantly, in region-wide planning activities. These began in the 1970s in competitive response to the establishment during the previous decade of a central government-appointed regional economic planning advisory committee, the East Anglian Economic Planning Council. The latter attempted to help co-ordinate the regional development activities of central government ministries (Environment, Roads, Industry, Agriculture, Employment) in East Anglia, but was abolished in 1979 by the incoming national Conservative government. A weak joint local government regional planning consultative organisation (SCEALA) has existed since then, with little effective power. A Government Office for the Eastern Region, based in Cambridge, has however recently been set up in an attempt to bring together the executive activities of the central government Departments operating at the regional level. But this covers a wider region than East Anglia (including the counties of Essex, Hertfordshire and Bedfordshire),

with greater weight of economic activity and population concentrated in the other three counties. In common with the rest of England East Anglia has no regional-level political authority or structure. Links between the local authorities and the regional business community are relatively weak, while the regional business community is fragmented, for example between agricultural and manufacturing interests, and because of the relatively high proportion of small and medium-sized enterprises (SMEs) in the region (see section 3.8.3), and wields very little political influence nationally. What regional business organisations do exist (for example, the Eastern Regional Council of the Confederation of British Industry) represent and are concerned with firms in a much wider region than just East Anglia. The region generally lacks a cohesive or vocal organisation representing its business community.

2. The Industrial History of East Anglia

2.1 Historic Trends and Industrialisation Processes

As one of Great Britain's historically most agricultural regions, East Anglia's industrialisation has involved dynamic if not revolutionary changes in its economic structure over the last 40 or so years, with a rapid and continuing industrialisation³ process ever since the 1950s. Much of what little manufacturing industry existed in the region before then was closely linked to its agricultural base, with agriculture itself employing over a quarter of the regional workforce in 1911, and still nearly 10% in 1971. Grain milling, brewing and confectionary were supplemented from the 1960s onwards by food processing, including fruit, vegetable and poultry processing, often on a substantial scale. This key historic specialisation is of course rooted in the local availability of high quality material inputs and the locational imperative of processing close to agricultural produce because of transport costs and perishability. It remains an important and competitive element of the region's industrial base, serving national if not international markets. However, historic local small-scale textile, clothing and shoe manufacturing industries have declined considerably, as has local small-scale shipbuilding and fishing.

Since the 1950s, however, East Anglia has experienced a remarkable growth of a range of other, new, manufacturing sectors, especially technologically-dynamic and research-intensive industries such as electrical and electronic engineering and scientific instruments (1911, 2,000 employees; 1951, 12,000 employees; 1971, 30,000 employees; Sant and Moseley, 1977, 17). Other manufacturing sectors such as mechanical engineering and metal products also however grew steadily (1911, 15,000 employees; 1951, 22,000 employees; 1971, 36,000). A scattering of firms in new sectors had been set up in the 1920s and 1930s by particular local entrepreneurs, as with Pye Electrical (radio, TV) of Cambridge and Baker-Perkins (diesel engines) of Peterborough, with some early university spin-off companies in the Cambridge region producing scientific instruments. These benefited from easy access to the neighbouring South East and Midlands markets, and relatively low wage and premises costs. They also provided a base of local skills, sub-contracting opportunities, and potential entrepreneurs which perhaps helped begin a process of endogenous SME growth in the area.

Though beginning in the 1950s, industrialisation was particularly rapid from the early 1960s onwards, East Anglia as a whole being the only region of Britain to record net growth of manufacturing employment between 1965 and 1976, of 29,000 jobs or 17% (Keeble, 1980, 178). This growth reflected three key influences or processes. First, the historic absence of what elsewhere in the UK were by this time major declining 19th century industries (such as iron and steel, ship building, coal, railway engineering, heavy chemicals, and textiles) and the presence of some small scale, newer, electrical and scientific instrument engineering firms resulted in a relatively-favourable regional manufacturing structure, biased to sectors for which market demand was growing not declining. In 1959 the Cambridge sub-region was in the top 11 UK sub-regions (out of 62) in terms of an industrial structure index measuring the relative share of growing or declining manufacturing sectors (Keeble, 1976, 100), with two other East Anglian sub-regions in the top 20. This structural advantage has persisted and intensified ever since.

Secondly, and more directly and substantially influential in shaping East Anglia's industrial development during the 1960s and 1970s, was a vigorous process of manufacturing firm relocation and movement into the region from London and South East England. This decentralisation process, from an urbanised, congested, costly and constraining local environment to one offering ample space for expansion, lower premises and costs, an attractive high quality living environment for directors, managers and key staff, and the local availability of a productive and non-unionised labour force, was both spontaneous and directly promoted by government regional planning initiatives. The latter involved the designation after 1952 of eight small East Anglian towns as official "expanded towns" for the receipt of "overspill" firms and population from congested London, as well as of Peterborough new town, designated in 1969. Thus the three most frequently cited reasons for choosing East Anglia given by manufacturing firms moving to the region in the 1960s were labour availability (93%), the environmental attractiveness of the region as a residential location for directors, managers and key staff (81%), and encouragement by expanded town and other local authorities (79%; Keeble, 1980, 179). Constrained as such migration was by distance, most migrant firms chose to locate in the more accessible southern and western parts of the region, rather than less accessible Norfolk. Between 1966 and 1970, firm immigration accounted for 40% of East Anglia's net manufacturing employment growth, a proportion which rose to 66% between 1971 and 1974, with over 250 migrant firms involved during this 8-year period alone. Nearly 90% of these were previously located in the South East, Greater London itself providing 53% (Keeble, 1980, 178). Most of these moves involved complete transfers, the firm moving lock, stock and barrel to East Anglia rather than just setting up a branch factory in the region. Most firms were SMEs (mean employment size 65 employees, 1971), not large firms, while movement was almost invariably promoted by business growth and the need for expanded capacity. These mobile firms were thus a self-selected sample from the most buoyant and dynamic sectors of the South East's manufacturing economy. This reinforced East Anglia's existing structural bias towards growth sectors. Though continuing since the mid-1970s, this decentralisation process has

diminished substantially in volume and importance as the stock of manufacturing firms in London and the South East has itself shrunk dramatically⁴ and planned government decentralisation initiatives have been terminated. For various reasons, discussed later, foreign inward investment has remained limited and targeted at relatively few sectors and locations.

Since the 1970s, therefore, the most important driving force behind the continuing industrialisation of East Anglia has been an endogenous and vigorous process of creation and subsequent growth of entirely new and small firms. This has involved active entrepreneurship with numerous start-ups and spin-offs, both from existing firms and other organisations (such as Universities, research laboratories, or hospitals). This key process will be discussed in greater depth in the next section; but in historical terms, it was especially active in the later 1970s and 1980s, with a decline in new firm formation - and increased death rates - with recession in the 1990s. There has also been a shift over time in new firm formation from manufacturing to business, professional and technology-intensive services. A very important but specific component in this endogenous SME growth has been the explosion of new and small high-technology enterprises in the Cambridge region, which really only began in the mid-1970s, following the inauguration of Trinity College's Science Park in 1970. Finally, it must be stressed that the majority of East Anglia's entrepreneurs and new firm founders are themselves immigrants to the region, rather than locally-born residents. This is particularly true of Cambridgeshire where 70% of new manufacturing firm founders in the 1970s were in-migrants (compared with 56% in East Anglia as a whole; Keeble and Gould, 1985). So decentralisation of population from South East England to East Anglia, which has been spearheaded by more mobile, higher-income professionals, managers and skilled workers, has been of crucial significance in the growth of a regional pool of potential entrepreneurs.

2.2 East Anglia's Industrialisation; Key Actors

The key actors in these historic processes of regional industrialisation are thus numerous and varied, most notably in terms of the many entrepreneurs, new firm founders, and directors and managers of immigrant SMEs, whose activities have underpinned the region's continuing industrial dynamism. Central and local government have in general played only a minor and at best supportive role, with many regional observers in fact complaining of inadequate central and local government, and national utilities, investment in roads and key infrastructure as a constraint on endogenous economic growth. However, the expansion of Peterborough during its government-designated and funded new town phase (1969-1992) was an important minor component in regional development, while particular government policy decisions such as the approval of Stansted, to the south of the region, in the 1960s as the site for London's Third International Airport, or the 1960s establishment in Cambridge of the government-funded Computer-Aided Design Centre, have had some influence. So too has the benign if not pro-active role of Cambridge University since its famous Mott Report of 1969 in enabling and encouraging high-technology science-based spin-offs and investment (from Trinity College's Cambridge Science Park, begun in 1970, to its 1997 agreement with Microsoft for the establishment within the University of Microsoft's first-ever non-US research laboratory). The University's influence on the remarkable development of the Cambridge high-technology SME complex since 1970, discussed later, though often indirect, is clearly of fundamental importance. No similar largescale development has, however, taken place around the region's other main university, the University of East Anglia, which was established in the 1960s in Norwich. Cambridge is also the location of a third regional university, Anglia Polytechnic University.

3. East Anglia's Industrial Development

3.1 East Anglia; Declining and Stagnating Industries

As noted earlier, East Anglia's inherited economic structure has been relatively favourable for regional economic growth since the 1970s, in that it lacks major declining 19th Century industries. Nonetheless, the region is not without declining or relatively stagnating sectors, in the shape of fishing and the footwear, clothing and textiles group of labour-intensive manufacturing industries. Fishing, severely hit since the 1950s by the decline of the North Sea Herring industry formerly vital to East Anglian ports such as Lowestoft, is now restricted by declining stocks to a scattering of local boats employing only 100 people (1995). Norwich's historic shoe and footwear industry which still employed over 10,000 workers in 1951 and 6,000 in 1971 (Sant and Moseley, 1977, 17), has now dwindled to only 1,400 workers (1995), with decline continuing in the 1990s. Its virtual disappearance reflects corporate reorganisation since the 1960s into larger, national firms, and their relocation of production sourcing in this labour-intensive industry and in a globalising world with shrinking tariff and other barriers, away from Britain to lower-cost foreign manufacturers. The same global competitive pressures underpin the continuing declining of East Anglia's textile and clothing firms, although here the corporate structure remains one of independent small and medium-sized firms, some of which have survived and developed by targeting specialist and high quality clothing niche markets. Regional employment in clothing manufacturing actually increased slightly between 1991 and 1995 as a result, from 1,460 to 1,630 workers, although this may also reflect firm relocation of production from South East England.

In contrast, although declining or stagnant in employment terms, agriculture and food processing cannot be viewed as declining sectors in terms of the value of their output and relative competitive efficiency. East Anglia is one of England's - and the European Union's - most economically successful farming areas, specialising in high-yield cereal, vegetable (the Cambridgeshire and Norfolk

Fenland) and arable farming, but also with substantial poultry (Norfolk turkeys) and pig production. Agriculture is highly mechanised and employs technologically-advanced varieties, inputs and equipment. Farms are often large, enjoying economies of scale, and employing multi-skilled farm workers. Most farms are prosperous and achieve much higher profitability than those elsewhere in the UK, East Anglia's agricultural income per hectare of agricultural land (£476, 000 in 1994) being higher than all but one other UK region and more than double the UK average (£233,000). The sector's development has of course been powerfully influenced by the European Union's Common Agricultural Policy and the price guarantees and reforms of the past decade, including the 1992 set-aside and monetary compensation reforms. Employment has however shrunk continuously over the past four decades, with a relatively massive loss of 13,000 agricultural workers or -31% in the decade 1981-1990, and continuing decline since (Table 3). This reflects new farming technology, scientific farming methods, increasing productivity and intense pressures on the sector to minimise costs in order to maintain profitability. A direct consequence of this rapid agricultural employment decline has been the designation of wide areas of the region (see Figure 1) by the European Commission as Objective 5b areas eligible for the receipt of EU Structural Funds. These are designed to stimulate job creation schemes and employment diversification away from agriculture in these rural areas. As the CAP moves to embrace lower world prices for cereals, cost-reduction pressures in East Anglian farming will intensify rather than diminish. Employment is however at some point bound to achieve an equilibrium and cease declining, given the basic fundamental need for a minimum workforce on the land.

Food manufacturing, concerned historically with grain milling and brewing, now includes newer more dynamic components such as the packaging of vegetables, processing of poultry and pig meat, and manufacture of soups and convenience foods of all kinds. As noted earlier, it is East Anglia's single largest manufacturing industry (Table 3), but has declined in employment in the 1990s because of recession and technological change resulting in increased labour

productivity. As an inherently labour-intensive industry, this trend is likely to continue. Locationally, the industry is important in being widespread throughout the region, providing employment and an economic base for rural as well as urban settlements.

3.2 East Anglia: Expanding Industries

As noted briefly above, the recent economic dynamism of East Anglia involves a wide range of sectors, with a diversity of expanding industries. Perhaps three main groups of such industries can however be distinguished, namely technologically-advanced manufacturing industries, knowledge-intensive business and professional services, and, to a much lesser degree, tourism and leisure services. These can all be regarded as contributing to East Anglia's economic base, generating income for the region from wider national and international sales. While employment in the health and social service sectors has also grown rapidly in recent years (Table 3), much of this is geared to serving the region's own population and has been stimulated by rapid population growth, rising incomes, and increasing government expenditure on the National Health Service. A special and significant category of expanding industries, which overlaps the first two groups listed above, is what is often termed "high-technology industry", comprising a mix of technologically-intensive and research-based manufacturing and service sectors. The role of East Anglia, and especially of the Cambridge sub-region, in the recent growth of high-technology industry warrants special attention.

Of the three "basic" expanding sectors⁵ generating external income for East Anglia, possibly the least dynamic is tourism and leisure services, components of which (hotels and restaurants; see Table 3) have actually recorded slight employment decline in the 1990s. East Anglia has historically attracted significant numbers of UK tourists to its coastal resorts and historic towns and villages, but has not shared greatly in the growth of the UK as an international tourist destination: in 1994, only 25% of total tourist expenditure in the wider Eastern Region (including also Essex, Hertfordshire and Bedfordshire) was by overseas tourists, compared with 40% for the UK as a whole, and a

staggering 76% for London. That said, particular tourist sites in East Anglia do attract substantial numbers of visitors and tourist expenditure, including its many stately and historic homes, commercial resorts and facilities as in Great Yarmouth, Cromer and the Centre Parks Leisure Complex at Thetford, and the special case of Cambridge, which attracts 3.4 million tourists a year to a town of only 100,000 residents.

The remarkable recent growth of business and professional services documented earlier covers a great range of specialised activities, which exist to provide know-how and professional expertise to clients - other firms, government and public sector organisations, voluntary organisations, personal consumers - needed in a rapidly-changing and increasingly knowledge-dependent economy. The growth, which is a national phenomenon (Keeble, Bryson and Wood, 1991) has involved both a host of new and small enterprises (Bryson, Keeble and Wood, 1993) and branches of large national and international firms, which have located in centres such as Cambridge as a natural base to serve the growing regional market of eastern England. Many are however oriented not so much to the East Anglian as to the far bigger London and South Eastern client market, with appreciable overseas sales. A striking cluster of consulting engineering firms - Atkins, Mott MacDonald, Ove Arup, Hannah Reed, Sibley Robinson - in the Cambridge region, for example, generates millions of pounds of turnover each year from overseas contracts. Their location in this area, and the growth of numerous small professional service firms in and around Cambridge, Norwich and other towns, owes much to the perceived residential attractiveness of East Anglia to high-qualified professionals and their families, coupled with reasonable accessibility to London and its concentration of clients. Modern telecommunications and computer networking have further aided decentralisation of small business service firms to rural East Anglia. In volume terms, however, the growth of professional and business services has of course been greatest in the region's main urban centres, with their better rail and road communications.

As already noted, East Anglia's exceptional manufacturing growth over the last two decades is highlighted by the fact that in the 1970s, it was the only region of the UK to record any increase in manufacturing employment (Keeble, 1987, 12), whilst since 1981, East Anglia has recorded the second best regional manufacturing employment performance, after Wales. As Table 4 indicates, growth has been particularly rapid in the radio, TV and telecommunications equipment, computer manufacturing, electrical and electronic engineering, motor vehicle manufacturing, and publishing, printing, reproduction and recorded media industries. Many firms in these sectors can properly be categorised as "high-technology" enterprises, which although found throughout East Anglia are especially concentrated in the Cambridge region (Keeble, 1989). However, two other related but perhaps distinct regional manufacturing specialisations worthy of note are racing and sports car manufacturing, and audio and hi-fi equipment manufacturing.

The first of these forms part of a wider outer Southern England arc or set of sub-clusters of this technologically-dynamic industry (Henry, Pinch and Russell, 1996), the East Anglian sub-cluster comprising both Formula One and other racing car manufacturers (Pacific Grand Prix, Bowman), sports car manufacturing (Lotus), and at least 15 specialist sub-contractors and component manufacturers serving the British motor sports industry. Many of these are relatively young and growing businesses. In their study of this fascinating sector, in which English designers and producers dominate world activity, Henry, Pinch and Russell (1996) stress the importance of informal territorially-based networks and "untraded dependencies" between the predominantly small firms involved in developing new designs and products, in a context of very rapid technological change and globalisation: "untraded interdependencies determine the framework of production for this agglomeration of motor sport firms" (Henry, Pinch and Russell 1996, 34), of which the East Anglian sub-cluster forms a significant part.

A second specialised East Anglian cluster of technologically-advanced manufacturing activity is the concentration of audio and hi-

fi equipment manufacturers located in the Cambridge-Huntingdon area. This cluster, which has been studied by Milne (1991), is again dominated by independently-owned small and medium-sized indigenous firms, many of which have been established very recently (33% since 1980, 67% since 1960). Second in size only to that of London, this East Anglian cluster is characterised by small innovative and technologically advanced specialist producers of high-quality audio reproduction equipment (loud speakers, amplifiers, tuners, components) catering for niche rather than mass demand, in a context of rapid technological change and market growth through rising incomes. Milne argues that the evolution of this distinct spatial cluster does not reflect current inter-firm production links, along lines of the Third Italy's industrial districts, but rather an historical process of relocation from London to an area with good road access (the A1) to the South East market and space for expansion, coupled with subsequent local spin-offs and new firm start-ups by employees leaving firms for which they previously worked and in which they gained essential expertise.

3.3 High-Technology Industry and the Cambridge Phenomenon

Perhaps the single most important specialisation - albeit embracing a diversity of sectors - which has developed in East Anglia since the 1960s is that of high-technology industry. Though criticised by some researchers on theoretical grounds (McCarthy, 1990), the concept is useful in focusing upon the importance of scientific and technical research, and of technologically-dynamic and sophisticated products, in a number of manufacturing and service sectors. On this basis, workers such as Butchart (1987) have argued that a group of research-intensive 4-digit SIC sectors (Table 5) can be regarded as high-technology industries. While most of these are manufacturing activities, they include three high-technology services, namely telecommunications, computer software and services, and research and development services. During the 1980s, East Anglia recorded the fastest growth rate of all UK regions (+ 22%) for employment in this group of high-technology industries, the growth of which was dominated by the expansion of SMEs (Keeble, 1994). Growth

occurred in Suffolk, perhaps associated with the British Telecommunications national research laboratory at Martlesham, and Huntingdon where both decentralised electronics firms from the South East and spin-offs have expanded their activities. But the unrivalled focus of this diverse sector is the Cambridge sub-region, where a remarkable and vigorous process of new high-technology firm creation, start-up and spin-off, from Cambridge University and other firms, has been underway ever since the 1970s. Labelled by Segal Quince Wicksteed (1985) “the Cambridge Phenomenon”, this process has transformed the sub-region’s economic structure, with the Vice Chancellor of Cambridge University even claiming that the Cambridge area represents “the British equivalent of Silicon Valley” (Broers, 1996). Numbers of local high-technology firms have mushroomed, from only 30 in 1960 and 100 in 1975, to 330 in 1985 and 715 in 1996 (Segal Quince Wicksteed, 1985; Cambridgeshire County Council, 1996; see Figure 2). By 1996, high-technology employment (Figure 3) in the sub-region provided 24,000 jobs, or perhaps 20% of total employment, with continuing growth 1991-96 of 3,300 jobs or 16% despite national recession (Keeble and Moore, 1997). Interestingly, as Figure 4 demonstrates, most of this recent growth has been in high-technology services, not manufacturing.

The diverse nature of the phenomenon is noteworthy (Figures 2 and 3), and in many ways of benefit to the sub-region’s economy in that decline in any one sector is unlikely to have a severe negative impact overall. Indeed, sectors such as computer hardware and scientific instrument manufacturing have declined since the early 1980s, but this has been more than compensated for by the growth of new Cambridge Phenomenon micro-clusters, notably telecommunications services and biotechnology. Locally-founded telecommunications firms have mushroomed in the 1990s, partly linked to the growth of the internet, partly to national de-regulation of telecommunications, with up to 40 such firms, depending on definitions, operating by 1996 (Ablett, 1996). While Ionica, one of the largest such start-ups with 900 employees at its peak, has experienced very mixed fortunes since being floated on the UK stock market in July 1997, others such as Uunet (formerly Unipalm) still employ over 300 staff locally.

Equally, Cambridge has witnessed a dramatic 1990s growth in new start-up biotechnology companies, with up to 50 firms by 1997, exploiting radical new genetic and biological technologies in part developed in Cambridge's Medical Research Council, University and other local research institutes (Segal Quince Wicksteed, 1998). Though very few have yet to make profits, many - Celsis, Chiroscience, Cantab Pharmaceuticals, Cambridge Antibody Technology, Genosys - are attracting national attention for their high stock market valuations. High recent start-up rates may be further encouraged by the 1997 establishment of a new Bioscience Innovation Centre on the St John's Innovation Park to house and support fledgling local biotechnology companies. These two distinctive "micro-clusters" thus represent new and important components, within overall diversity, of the sub-region's dynamic high-technology economic base.

3.4 Industrial Development in East Anglia: The Driving Forces

Conceptualising and understanding the reasons for East Anglia's recent economic growth demands awareness of two sets of factors. On the one hand are the macro-economic forces initiating and driving economic change at the national and global level, while on the other there are the region's inherited and distinctive socio-economic structure and locational characteristics. As argued in Keeble (1991b), the extent to which the former impact on individual European regions is not deterministic or inevitable, but powerfully conditioned by each region's particular characteristics. The result is a "regional mosaic" of European regional development trajectories. And in the East Anglian case, the interaction between macro-economic forces and regional socio-economic structure has been generally very positive, resulting in parts of the region, at least, experiencing a process of cumulative causation, entrepreneurial vitality, and even self-sustaining growth via endogenous business creation and spin-offs. East Anglia would seem broadly to fit into the second category of spatial outcome recognised in the European "regional mosaic" model (Keeble 1991b, Table 2), namely regions characterised by "small and medium-sized enterprise

creation and high-technology industrialisation in high-amenity rural and “sunbelt” regions”.

In this East Anglian case, at least five key macro-economic driving forces associated with advanced capitalist modes of production appear to underpin the region’s recent economic development, to lesser or greater degree, namely:

1. Rapid technological change and innovation, associated with new products, services and rapid market growth;
2. Tertiarization, involving the growth both of “producer services” (the rise of the information economy) and of tourism and leisure services;
3. Corporate restructuring and the growth of new and small enterprises;
4. Globalisation and European economic integration;
5. Counter-urbanisation and decentralisation of population and economic activity from large cities to smaller towns and rural areas.

All five of these could be debated at length, but space permits brief comments only. The key role of technological change in the rise of new products, industries and regions has been highlighted by much economic geographical research, beginning with Hall’s famous 1981 article on the geography of the 5th Kondratiev Longwave in the United Kingdom. His judgement that “tomorrow’s industries are not going to be born in yesterday’s regions” explicitly identified East Anglia as one of “tomorrow’s regions” (Hall, 1981). Other work has provided powerful documentation of the vital role of innovation in business and SME growth (Cosh and Hughes, 1996), firms in rural regions such as East Anglia being shown to be on average more innovative than those in the UK’s big cities and urban agglomerations (Keeble, 1993). The seemingly inexorable growth of service industries, and especially of knowledge-intensive business and professional services, is seen by many as an inevitable outcome of an increasingly complex, turbulent, competitive, technologically-dynamic and globalising capitalist system, in which knowledge and

expertise have become crucial for business success. In contrast, the growth of tourism and leisure services reflects rising real consumer incomes generated by capitalist economic growth, real disposable incomes per head in the UK (and East Anglia) for example rising by +73% 1971-1991 despite three severe recessions (Keeble and Tyler, 1995).

Corporate restructuring has involved both the process of down-sizing and de-layering by large companies, involving replacement of large factories and offices by more flexible units employing much smaller numbers of workers, and substantial growth in numbers of SMEs through high rates of new firm creation, at least until the 1990s. Thus during much of the 1980s, “the stock of [mainly small] businesses in the Community has been expanding at an estimated rate of 2.5-3.0 percent per annum. This is equivalent to the net annual creation of about 360,000 firms” (European Commission, 1990). In the UK, the number of small businesses rose by +430,000 or +31%, 1980-1991 (Table 6), before falling back with recession during the early-1990s. Though much debated, the reasons for these striking trends almost certainly include changing market demand and the growth of numerous new market niches suitable for small firms, increased involuntary entrepreneurship as a result of rising unemployment, technological change and innovation, large firm fragmentation and externalisation of peripheral activities, and government policies including de-regulation and privatisation (Keeble, 1990).

Globalisation and European economic integration are widely recognised as important processes affecting business competitiveness in the Europe of the late 20th Century, especially in newer, technologically-based activities. For example, technologically-intensive SMEs in the Cambridge region on average export 44% of their total turnover to clients in other countries (Keeble, Lawson, Lawton Smith, Moore and Wilkinson, 1997), with 27% of their collaborative research activity being with overseas firms. Finally, empirical evidence unequivocally reveals that the single most powerful spatial trend in the location of population and employment in the UK since 1970 has been a massive shift from big cities and

large towns to small and medium-sized towns and rural areas. Again much debated, the causes of this striking “counter-urbanisation” trend are argued by Keeble and Tyler (1995) to be strongly associated with rising personal incomes and car-based mobility, and marked spatial variations in residential preference in favour of perceived higher-amenity, less-urbanised rural and small town locations. In turn, selective migration of higher income and more qualified individuals to such locations, especially in Southern Britain, has created a pool of potential entrepreneurs and small firm founders, a key element in “enterprising behaviour” theory of the urban-rural business and employment shift (Keeble and Tyler, 1995).

3.5 Why the Cambridge Phenomenon?

East Anglia’s recent rapid economic development reflects the impact of these major macro-economic driving forces upon a region of Britain whose inherited economic, social, locational and institutional characteristics are exceptionally attractive and advantageous for individuals, firms and organisations seeking to exploit the new opportunities created by these forces. The development of the Cambridge Phenomenon, and East Anglia’s exceptional performance generally in high-technology industry and new technology-based firm (NTBF) development, reflect three key underlying regional inherited advantages, namely the central role of Cambridge University, the residential attractiveness of the region, and the region’s general accessibility to London (Keeble, 1989). Although various studies reveal that only a minority (17%; Segal Quince Wicksteed, 1985) of Cambridge new technology-based firms are actually direct spin-offs from Cambridge University, there is no doubt that the University’s presence, as a major international centre of scientific and technological research, has been crucial to the phenomenon itself (see Table 7). First, firms which have spun-off from the University have usually in time themselves spun-off numerous additional NTBFs, Segal Quince Wicksteed (1985) therefore claiming that “the University has indirectly been the ultimate origin of virtually all the companies” they studied, either for this reason or because firms were attracted to set up in the area by the perceived advantages of

proximity to the University. The latter with its exceptional scientific reputation in fact operates like a spotlight within an illuminated globe, lighting up the Cambridge area on the global map in a way few other knowledge centres in Britain and Europe can emulate. The publicity and credibility advantages of locational association with Cambridge University for local NTBFs are therefore extremely valuable, 70% of a sample of local high-technology SMEs rating “credibility, reputation and prestige of a Cambridge address” as important or very important in a recent Cambridge University Centre for Business Research interview survey (Keeble and Moore, 1997). A third important advantage is the possibility of research links with the University, 50% of the CBR sample reporting such links since formation. Fourthly, the University is an important local source of highly-qualified research staff and graduate recruitment, the CBR survey revealing that 53% and 33% of local high-technology firms employ at least one member of their research and managerial staff, respectively, who possesses a Cambridge University degree.

Finally, the University’s historic buildings, green spaces, and broader cultural and educational impact, have been central in creating a highly attractive living environment for the research scientists and “boffin” entrepreneurs whose activities are vital for the ongoing dynamism of the phenomenon itself. Such individuals are both highly mobile, on a global as well as national scale, and very “choosy” in terms of where they - and their families - are willing to live. Because their skills and abilities are in turn vital to competitive success in research-based industries, Cambridge’s residential attractiveness, as clearly documented in historic “mental map” studies of the UK (Gould and White, 1968), is arguably of great importance in enabling firms to recruit and retain such individuals. Indeed, an “attractive local living environment for staff and directors” was ranked higher by high-technology firms in the 1995 ESRC Centre for Business Research Survey than any other of 19 potential advantages of operating in the Cambridge region, with 80% of firms reporting it as important or extremely important. Finally, the area’s geographic proximity to London is very valuable for high-technology firms in Cambridge and East Anglia generally, both for easy access to sources of venture

capital (the City of London is one of the world's three leading financial centres), to large company headquarters (London is Europe's leading single centre of headquarter offices), and perhaps most of all, to London's international airports, especially Heathrow (Europe's leading international airport in terms of scheduled flights and passenger numbers). The last point reflects the great importance of international sales to high-technology firms, many of which exist to supply specialised and global market niches, as noted earlier. Proximity to London has also been very important for high-technology development in other parts of East Anglia, such as Huntingdon and Suffolk.

These three underlying and historically-evolved advantages underpin the growth of technologically-innovative firms in the Cambridge sub-region. But it is also probable that by the 1990s, this growth had achieved a sufficiently large critical mass of activity, skills, expertise and highly-qualified and entrepreneurial individuals to render the Cambridge Phenomenon broadly self-sustaining, via mechanisms of new firm spin-off, inter-firm research collaboration, and local scientific and professional labour market mobility. Much recent business growth therefore bears little or no direct relationship to Cambridge University, although the latter's continuing involvement is clearly evident from events such as Microsoft's 1997 decision to invest £50 million in building its first-ever non-US research laboratory to employ 100 researchers on the University's West Cambridge science campus. Again, the publicity and credibility impact of such a decision is likely further to enhance the cumulative growth of the sub-region as a global high-technology complex.

3.6 Other Regional Comparative Advantages

Inevitably, the residential and locational advantages listed above for Cambridge are echoed more widely in the East Anglian region. Residential attractiveness has played a key role in the substantial migration of population to East Anglia since the 1950s, along with lower house prices compared with London and South East England. While there has been a considerable flow of retirement migration to

coastal East Anglia, professional, managerial and skilled workers and their families have been attracted to historic villages and small towns in southern Cambridgeshire, Suffolk and Norfolk. This population growth has not only fuelled expansion of consumer services (health, education) but has created a pool of qualified, informed ex-urban potential entrepreneurs, whose activities and links with urban clients have led to a high rate of new firm formation (Keeble and Tyler, 1995: see also Section 3.8.3).

That East Anglia's social and economic structure has provided fertile soil for new enterprise creation represents, more generally, a further major regional comparative advantage for economic growth, in a period of corporate reorganisation and SME expansion (Section 3.4). While many of its small firm entrepreneurs are immigrants, the region has always possessed an occupational structure bias towards self-employment (see Section 1.1) and employment in small rather than large enterprises. This in turn has encouraged an above average rate of small-firm creation, given the strong empirically- and theoretically-established link between local small firm structures, especially in manufacturing, and above-average rates of new firm formation because of the greater opportunities for entrepreneurial training and development of appropriate expertise provided by employment in small firms (Storey, 1994, 64-71; Keeble and Walker, 1994). Conversely, the absence of monolithic, large firm-dominated industries such as those historically associated with regions such as North-East England or Scotland, with their "upas tree" negative shadow effects⁶ on small and new firm creation (Lloyd and Mason, 1985, 74), represents a further major East Anglian advantage in respect of SME growth. So too perhaps is the absence of a regional industrial history and legacy of management-labour conflict, East Anglia being historically characterised by a very low level of trade union affiliation - in 1995, it had the second lowest regional rate in the UK (25.1% of total employees) after South East England, and lowest rate of working days lost through labour disputes (3 days per 1,000 employees, compared with a UK average of 19 days) - and a generally productive and flexible labour force.

A third important comparative advantage for economic development afforded by East Anglia's inherited and evolved socio-economic structure is the availability of a relatively highly-qualified and educated labourforce, an especially important resource for knowledge-intensive firms and industries, whether in producer services or high-technology industry. In 1995, the proportion of the economically-active population of working age in East Anglia possessing university degrees or their equivalent (graduate membership of a professional institute) was 12.1%, the third highest share (after South East England and Scotland) of all UK regions: while the region's share of working age population with GCE 'A' Level or equivalent qualifications (the highest 18-year old school-leaving qualification) was 14.5%, the fourth highest proportion of all UK regions (Office for National Statistics, 1996, Table 5.9). While there is of course an element of circular and cumulative causation here, these above-median shares in part reflecting the demand from the region's advanced producer service and technologically-based industries for more educated and qualified staff, the greater relative availability of such workers is likely to represent an important resource for the continuing development of these sectors in East Anglia.

Finally, the region's geographical accessibility and proximity to London and South East England, the UK's dominant focus of market demand, investment capital, head office and government decision making, and international communication networks, undoubtedly advantages regional firms serving national and international clients. Past and continuing decentralisation of population and economic activity from the South East is also distance constrained, benefiting East Anglia rather than more distant UK regions.

3.7 East Anglia: Resources for Industrial Development

The above analysis of how the key driving forces of macro-economic change in the UK and internationally have interacted with East Anglia's inherited socio-economic structure to define a particular regional trajectory of industrial development has inevitably

incorporated considerable reference to both the region's key development resources, and the most important regional agents and processes of change. This and the following sections, which deal with these two issues, therefore inevitably overlap to some degree with the earlier discussion, but also attempt to document and elaborate further on it.

3.7.1 R & D resources

East Anglia is exceptionally well-endowed with R & D resources, in the form of private sector indigenous and multi-national company research laboratories and R & D consultancies, higher education institutions (mainly universities) carrying out scientific and technological research, and public sector government-funded research institutes. Many of the last group have however been privatised by the Conservative governments of the 1980s and 1990s, with some resultant decline in employment and expenditure. The region's rich resource endowment in this respect is highlighted by Table 8 which reveals not only that the value of R & D carried out in East Anglia in 1994 as a proportion of regional GDP was markedly higher in all three categories than the UK average, but that East Anglia in fact ranked top of all eleven UK regions on this key R & D resource index in each case. This striking finding is of course closely and directly associated with East Anglia's above-average economic growth and focus on high-technology and knowledge-intensive sectors. This resource endowment reflects the historic role of Cambridge University and associated research institutes; of former public sector research laboratories located in the region because of its accessibility to London, attractive living environment for research staff, and the availability of suitable historic buildings and low cost sites (British Telecommunications national research laboratory at Martlesham in Suffolk is a good example); and the growth of research-intensive sectors and businesses for reasons discussed above, including the major R & D consultancies of the Cambridge sub-region. East Anglia's R & D laboratories and research scientists are a crucially-important resource underpinning the exceptional dynamism of parts of the region, notably Cambridgeshire.

3.7.2 Education and the regional labour market

As a traditionally rural region with a dispersed population, East Anglia's local labour markets are often restricted in size, resulting in diseconomies of scale in terms of business access to the volume and range of workforce skills needed for growth. Constraints on the availability of skilled manufacturing workers in a region with a limited industrial tradition are particularly severe in many areas. Secondary school education levels in the region's rural areas also often lag behind those achieved in the UK's more urbanised, and especially suburban, locations. As a result, the proportion of economically-active residents of working age with no or limited educational qualifications (at best Certificate of Secondary Education below Grade 1) is higher at 34.6% than the national average (32.4%).

In contrast, and on the positive side, the region's share of highly-educated and degree-level workers is, as noted earlier, above that of most other UK regions, reflecting both the activities of the region's universities and higher education institutes and the recruitment to the region of highly-qualified staff from elsewhere by knowledge-intensive businesses. There is therefore some limited degree of polarisation of the regional workforce into high-skill and low-skill components, with some tendency spatially for the latter to be associated with rural areas and more isolated Norfolk, the former with urban centres and southern Cambridgeshire-Suffolk. Overall, however, the region's educated workforce is a very valuable resource for industrial development, while a further positive characteristic of this labourforce is its general productivity and reliability. Thus the proportion of East Anglia's employees reporting absent through sickness is the lowest (3.4% in 1995) of all UK regions, as also is its record of days lost through industrial disputes as noted earlier. Labour turnover rates are also lower than in most other regions. These findings probably reflect the positive psychic benefits of residence in an environmentally attractive and less-urbanised region, the regional importance of SMEs in which there can be close links between staff and managers, and the absence of an industrial tradition of management-labour conflict. Certainly surveys of East Anglia

business managers generally record above-average levels of appreciation of workforce productivity, stability and commitment, notwithstanding somewhat lower average weekly earnings than in more urbanised regions such as South East England. Living costs in East Anglia are however correspondingly lower, with the possible exception of the Cambridge sub-region.

East Anglia's lack of an industrial tradition, at least in terms of historic major manufacturing industries and strong trades unions, has arguably been an important comparative advantage, not disadvantage, for industrial development as discussed in Section 3.6. As noted there, East Anglian firms report high levels of labour productivity and commitment, and generally very good labour-management relations. Perhaps the only negative consequence of this lack of industrial tradition are skills shortages in engineering and other manufacturing industries, although this is undoubtedly as much a national as regional problem.

3.7.3 Communication infrastructure and access to international technological networks

As already discussed in Section 1.3, the region's communications infrastructure of trunk roads and rail links is at best adequate, rather than good. Norfolk County Council has campaigned for decades for the upgrading of its main road link with London, the A11, to at least dual-carriageway if not motorway status (much of it remains single carriageway) without success. Rail links are best in the west of the region (electrified between London and Cambridge - Kings Lynn, and London - Huntingdon - Peterborough). Local airports (Norwich, Cambridge) provide only a few scheduled services, although southern East Anglia is within easy reach of London Stansted, a growing international airport 30 miles south of Cambridge, with London Heathrow within a two hour drive. Communication improvements have followed, not preceded, the region's economic development.

Telecommunication networks are also adequate rather than good, notwithstanding the remarkable growth of telecommunications firms

and consultancies in the Cambridge region and the presence in Suffolk of British Telecom's national research laboratory (Section 3.3). However, many of the region's high-technology enterprises are undoubtedly closely linked into global technological and telecommunications networks, as indicated by the recent survey of Cambridge high-technology firms discussed earlier. This revealed (Keeble, Lawson, Lawton Smith, Moore and Wilkinson, 1997) that one-third of these carried out 40% or more of their collaborative inter-firm research activity with firms outside the UK, and that 52% reported that at least one very significant source of their recent technological innovations was also located outside the UK. Some 36% of firms had recruited at least one of their three most recently appointed research or managerial staff from outside the UK. This shows clearly the high level of international technological networking in which these East Anglian enterprises are engaged, as an essential requirement for competitive success in a globalised, technologically-dynamic market. It is probable that they are aided in this by East Anglia's general proximity to London's airports and to Europe's leading metropolitan centres (East Anglia actually falls within Brunet's famous European "dorsale" or banana-shaped urbanised core backbone; see Brunet, 1989, 78-9), as well as by Cambridge's reputation and "visibility" on the map of global technological activity.

3.7.4 Finance and venture capital

The UK financial system is one of the most centralised in Europe, focusing heavily on the activities of a small group of dominant retail banks and the City of London's investment banking and stock exchange activity. British SMEs, and especially newer and more innovative enterprises of the type which characterise East Anglia, regularly report shortages of finance capital as a constraint on growth (Small Business Research Centre, 1992, Chapter 3; Keeble, 1996, 36). While academic research has challenged the degree to which British SMEs are in practice capital-rationed (Cosh and Hughes, 1994), the 1990s have seen several private sector initiatives to channel finance capital to East Anglian SMEs via regionally-focused venture capital funds. This is particularly true of the Cambridge sub-region, where

Barclays Bank played an initial key supportive role in the late 1970s and early 1980s (Segal Quince Wicksteed, 1985, 53), and where recent venture capital initiatives aimed at providing seed and growth capital for high-technology firms include the Cambridge Quantum Fund, Cambridge Research and Innovation Limited, Prelude Technology Investments Limited, 3i Plc and the Great Eastern Investment Forum. The last is particularly targeted at “business angels” (private individuals who invest in local companies), while another new Cambridge venture capital fund, Amadeus, set up by Herman Hauser the former founder of Acorn, has attracted £10 million from Microsoft for local investment in promising high-technology start-ups. As a result, East Anglia receives a significantly higher share of national venture capital investment than the size of its economy would suggest (Martin, 1992). With Conservative governments strongly wedded to free-market ideologies in power in the UK until recently, East Anglia has not been assisted by any government initiatives over capital provision, with the limited exception of some high-technology small firm schemes and small-scale grants in its Rural Development and Intermediate areas (see Section 4).

3.8 Agents and Processes of Industrial Development

As stressed earlier, the single most important group of agents active in the industrial development of East Anglia are the entrepreneurs, directors and owner-managers responsible for the creation and growth of its numerous SMEs. Inward investment has been limited and mainly operates via take-over and acquisition of successful East Anglian businesses.

3.8.1 Entrepreneurship, new firms and small firms: the key to East Anglia’s economic development

The East Anglian economy, with 78% of its businesses recording sales turnovers in 1995 below £250,000 (Table 9) and 91.3% employing fewer than 20 workers (Gallagher, Robson and Kerr, 1993), is dominated by SMEs. In 1987, East Anglia had the fourth

highest density of SMEs per thousand of its population of all British regions (Gallagher, Robson and Kerr, 1993). Equally, East Anglia recorded the third highest regional rate of new firm formation in the 1980s (Table 6), although as nationally, small firm deaths exceeded new firm births in the region during the early 1990s recession. As a result of active entrepreneurship and a vigorous process of new firm formation, the stock of SMEs in East Anglia rose by 14,500 or 28%, 1980-93, notwithstanding recession (Table 6). High levels of entrepreneurship are also indicated by the exceptional growth of self-employment in the region since 1975 (Table 2).

As already noted, the supply of entrepreneurs in East Anglia has been powerfully augmented by population immigration, 56% of new manufacturing firm founders in the 1970s being migrants (Keeble and Gould, 1985). This process is of dominant importance for entrepreneurship in Cambridgeshire (70% of founders), but less so in Suffolk (52%) and especially Norfolk (39%), although numbers of both immigrants and immigrant entrepreneurs have undoubtedly risen in the two latter counties since the 1970s. As argued by enterprising behaviour theory (Keeble and Tyler, 1995), migration to rural East Anglia has tended to be selective of higher income, more skilled, qualified and hence mobile workers, who have often brought to the region expertise in new sectors and market contacts based on their previous urban employment in cities such as London. This know-how and market information have provided opportunities for entrepreneurship and new firm creation subsequent to migration and most commonly when leaving a local SME for which the entrepreneur had previously been working. As a result, existing local SMEs are the prime immediate source of new entrepreneurs and ideas relevant to enterprise creation. Thus the Keeble and Gould study found that 63% of new manufacturing firm founders had previously been employed by small local firms, while the ESRC Centre for Business Research survey found that 48% of the Cambridge high-technology firms interviewed reported that at least one former employee had left to set up another new business, 96% of these being located in the Cambridge sub-region (Lawson, Moore, Keeble, Lawton Smith and Wilkinson, 1997). Motives for enterprise creation in East Anglia have

been overwhelmingly positive, 78% of founders in the Keeble and Gould study claiming that ambition, the desire for independence, and financial betterment were the dominant reasons for setting up their new firm. Entrepreneurship by locally-born East Anglian residents, which is still probably the more important component in areas such as Norfolk, is more focused on traditional sectors (agriculture, food processing, tourism). Various studies (Gallagher, Robson and Kerr, 1993) have also found that East Anglia exhibits an exceptionally high rate of enterprise “churning”, that is of both births and deaths. While this is mainly driven by its high birth rate (new firms are notoriously vulnerable to failure, so high regional birth rates are inevitably followed by high death rates: see Keeble and Walker, 1994), it does suggest that East Anglia is characterised by considerable enterprise turbulence and dynamism with flows of entrepreneurs in and out of new firms and employment. Overall, East Anglia’s relatively highly educated and entrepreneurial workforce constitutes an enormously valuable human capital resource for entrepreneurship and industrial development into the 21st Century.

3.8.2 Inward and multi-national investment

In contrast to its high rate of indigenous SME growth, official data suggests that East Anglia is one of the least attractive regions of the UK for recent foreign inward investment, whether in manufacturing or services. Thus over the 1991-94 period, the much larger Eastern region (including Essex, Hertfordshire and Bedfordshire) attracted the lowest number of “direct foreign inward investment project successes” of all UK regions, East Anglia alone therefore recording an even tinier number (Office for National Statistics, 1996, 185). This undoubtedly partly reflects the fact that until 1993, no part of the region was eligible for government regional policy assistance and financial incentives, which have been of dominant importance in attracting large foreign manufacturing branch plants to Scotland, Wales and Northern England. However, and perhaps surprisingly, East Anglia also exhibits an above-average share of foreign-owned manufacturing activity, gross value added in manufacturing by foreign-owned enterprises as a proportion of regional manufacturing

GVA being higher (26%) in 1990 than the UK figure (22%), and fifth highest of the eleven UK regions (Central Statistical Office, 1993). The reason for this is almost certainly a high rate of foreign acquisition and take-over of successful East Anglian firms, Garnsey and Cannon-Brookes (1993, 180) for example reporting that no less than 34% of the Cambridge Phenomenon companies studied by Segal Quince Wicksteed in 1985 and surviving to 1992 had become subsidiaries by then, including “many foreign acquisitions”. While such acquisition has had some negative impacts, with occasional subsequent rationalisation and closures, most East Anglian firms have welcomed foreign takeover because of greatly enhanced access to capital resources and global markets, and as a way of realising value for the entrepreneurs themselves. Entrepreneurs have often then set up a further new local firm in a related field using the capital they have received from the takeover. In addition, of course, some leading foreign multinationals have set up R & D laboratories (see Table 7) or other facilities in the region, to tap local research expertise (Microsoft, Schlumberger, Olivetti) or supply markets in Southern Britain (Nokia).

4. National and Regional Policy

As implied by earlier comments (Section 1.3), the UK system of government is highly centralised, lacks any form of regional government or development agency and involves a two-tier structure of subordinate local governments with very limited powers and financial resources. As a result, the recent industrial development of East Anglia arguably owes very little to explicit government policies, the very concept of a government-inspired regional development plan or programme having been anathema to post-1979 Conservative governments, with their ideological commitment to “rolling back the frontiers of the state” and reducing government intervention in the economy. Regional development planning and agencies are only now (1997) back on the political agenda following the election of the UK’s first Labour government for nearly 20 years.

4.1 National Economic and Labour Market Policies with Regional Impacts

Perhaps five types of UK government non-spatial policies may have had some limited significance in influencing East Anglian industrial development over the last two decades. First, since the 1970s Conservative government ideology and rhetoric has led to various policy measures to stimulate small firm growth nationally, with over 100 measures announced 1979-83. These have ranged from Enterprise Allowance grants to unemployed workers setting up new businesses to pressure on retail banks to improve credit provision to small enterprises (Storey, 1994, Chapter 8). While an overwhelming majority of SMEs are sceptical as to the positive impact of these policies (Small Business Research Centre, 1992, Chapter 8), they are likely to have had some unquantifiable affect on the surge in UK new firm formation during the 1980s and hence on regions such as East Anglia with its above-average propensity to generate new small enterprises. Secondly, within a vastly-scaled down industrial policy, recent Conservative governments have targeted high-technology small firms by introducing financial schemes to help overcome their difficulties in raising seed corn and pre-production finance. Schemes such as LINK (grants for collaboration with universities or other businesses), SMART and SPUR (grants for research and development) have been explicitly focused on small high-technology enterprises and have undoubtedly helped some East Anglian enterprises. It is however noteworthy that contrary to expectations, East Anglian firms have in fact received fewer SMART awards than all but two other UK regions, the volume and rate of such awards being much higher in the old industrial regions of Wales, Scotland and Northern England (Keeble, 1994). Third, and negatively, the effects of the post-1979 UK government's privatisation and deregulation policies, which had such a traumatic impact on Britain's older industrial regions and their state-owned industries of coal, ship building and steel, largely by-passed East Anglia since its economy historically lacked these sectors. East Anglia has experienced some privatisation of former government research laboratories, and deregulation has provided new market opportunities for East Anglian

firms in particular sectors such as telecommunications. But again, overall impacts are probably limited.

A fourth and adverse impact has been of cuts in government defence expenditure as a result of the ending of the Cold War, and resultant closure of East Anglian air bases. This has had locally significant short-term impacts in Suffolk and Norfolk, the closure of the USAF Bentwaters/Woodbridge base in 1993 resulting in a loss of 10,000 population and £50 million annual expenditure. Finally, government manpower training, skills and business support policies also impact on the region, via locally-administered Training and Enterprise Councils (TECs) and Business Link offices. Four TECs and four Business Links currently operate in East Anglia. TECs, set up after 1988, mainly exist to administer and deliver national training programmes for unemployed workers and young people, but also play a regional role in targeting skills training at key local industries and sectors, and in promoting new firm start-ups. Business Links are even more recent, and have been set up since 1993 in the four main towns to support already-growing SMEs with consultancy advice and information. The role of both types of agency in East Anglia's recent development is as yet unquantifiable.

4.2 National Spatial Policies

Although East Anglia has been virtually untouched by UK government regional policies, which are aimed at regions with high unemployment, post-war planned decentralisation schemes to relieve congestion in London did have a major impact in the region between 1960 and 1992, via the expanded and new town programmes described in Section 2.1. These were an important catalyst in the region's initial transformation during the 1960s and 1970s. Also of importance locally have been the activities of the Rural Development Commission, a national statutory agency charged with assisting and rejuvenating declining English rural communities. As Figure 1 shows, many rural settlements in the region have benefited from designation by the RDC as Rural Development Areas, with the RDC funding a significant volume of factory building (up to 300,000 sq. ft.) in rural

northern East Anglia in the 1970s and 1980s (Chisholm, 1984). Again, this has undoubtedly been important in enabling and attracting SME expansion to these more remote rural locations, although its overall impact on East Anglian industrial development is almost certainly small. Lastly, and of negligible importance, two small areas of the region experiencing high localised unemployment during the early 1990s recession were designated by the Department of Trade and Industry as Intermediate Assisted Areas in 1993 (Figure 1). Any impact of this on their subsequent development is not yet evident.

4.3 European Union Structural Funds

Since 1994, four rural areas of East Anglia have also been designated as Objective 5b regions under the European Union's Structural Funds Initiatives (see Figure 1). Again, this policy intervention is too recent to have had any impact as yet on the region's industrial development.

4.4 Industrial Dynamics and Policy in East Anglia: Conclusions

This review has argued that the remarkable dynamism of East Anglia since the 1960s is primarily a product of a set of wider powerful macro-economic forces which have impacted on the region via an historic process of business relocation from London and south east England, vigorous recent entrepreneurship, small firm formation, spin-off and self-employment, and some degree of external investment mainly through acquisition and takeover of technologically-dynamic indigenous firms. The most important agents in these processes have been the entrepreneurs, owner-managers, and highly-qualified workers whose embodied expertise and skills have been crucial for the competitive success and growth of the region's vibrant SME sector. In that many of these individuals have moved into the region from elsewhere, the region's residential attractiveness has been a very important environmental advantage for industrial growth, as has the role of Cambridge University, the region's general accessibility to London and the South East, and, perhaps, the greater availability here of space for expansion, lower overhead and premises costs, and broadly favourable labour market characteristics in terms of

productivity and, especially, highly-qualified staff. By the 1990s, industrialisation of this traditionally rural region had resulted, in certain areas at least, in the development of a sufficient critical mass of new industries, businesses, and entrepreneurs to support self-sustaining and cumulative growth, with consequent problems of growing development pressure and traffic congestion. While particular and historic government policies have played some role in the region's industrial development, most notably the regional decentralisation and overspill programme of the 1960s and 1970s, East Anglia's industrial development generally owes little to policy initiatives. Rather, it represents a case study of the restructuring of a formerly rural region, which is fortuitously located not far from the UK's dominant metropolis, by very powerful economic forces operating globally and within the UK's capitalist system. This is not to say that particular policies have not been helpful to particular firms and localities, nor that the lack of any coherent or integrated regional development policy for East Anglia may not have been a constraint on its recent industrial development. Certainly supportive local planning policies, effective regional skill training programmes, and government-funded communications improvements are all potentially valuable government initiatives which would enhance future East Anglian industrial growth. So too, in the longer term, would increased government funding of basic and applied university research, expenditure on which has been reduced in real terms in the UK in the last decade. The future of the region's economy, and indeed arguably that of the UK, is closely associated with research-based and knowledge-intensive industries, for the growth of which East Anglia has provided unusually fertile ground.

Notes

1. Although at very different points in the business cycle, use of data for 1991 and 1995 is enforced on the study by the absence of any longer employment series because of major changes in the UK Standard Industrial Classification (SIC) in 1992.
2. Local government in East Anglia has, until recently, been divided between three higher-tier county councils and twenty lower-tier district councils, with their defined but sometimes overlapping powers and spheres of responsibility, mainly for the provision of services such as education and planning.
3. In section 2 industrialisation is defined narrowly in terms of the absolute growth of regional manufacturing employment. Although data are not available, there is no doubt that employment growth has also been associated with substantial growth of manufacturing output.
4. Greater London's manufacturing employment declined from 1,399 thousand in 1971 to only 296 thousand by 1995, a loss of 1,103 thousand manufacturing jobs or 79% (Londonomics, 1996, 12).
5. The concept of 'basic' and 'non-basic' sectors within a region, defined in terms of their contribution to generating 'export' income for the region from sales in wider national or even international markets, is outlined in Keeble (1967).
6. The mythical "upas tree" of the South Pacific was believed to possess the power to destroy all other plants and seedlings seeking to grow beneath its shade. The myth was used by the economic historian Sidney Checkland (1975) as a metaphor for the impact of Glasgow's 19th-century shipbuilding industry in stifling the birth of other new industries and firms, such as motor vehicles or electrical engineering.

TABLES AND FIGURES

Table 1: East Anglia: Change in Resident Population, 1975-1995

	1975	1981	1991	1995	Change 1975-1995	
					'000	%
Resident Population (‘000)	1,794	1,894	2,082	2,123	+329	+18.3
Change in Resident Population 1981-1995 (%)	Cambridgeshire	Norfolk	Suffolk	UK		
	+17.7	+9.9	+9.2	+4.0		

Source: Office for National Statistics, 1996

Table 2: East Anglia: Change in Total Employment, 1975-1996

	1975	1981	1991	1996	Change 1975-1996		UK % change 1975-96
					'000	%	
Employees in Employment (‘000)	671	681	787	811	+140	+20.9	-2.6
Self-Employed (‘000)	72	92	140	143	+71	+98.6	+66.7
Total Employment	743	773	927	954	+211	+28.4	+3.0

Source: Office for National Statistics, 1996

Table 3: East Anglia: Economic Structure and Sectoral Change, 1991-1995

	Employment 1995		Change 1991-1995	
	Number	% East Anglia	Number	%
Agriculture and Fishing	26,536	3.3	-4,185	-13.6
Mining and Quarrying	3,099	0.4	-350	-10.2
Manufacturing	157,355	19.8	+5,981	+4.0
Electricity, Gas, Water	7,523	0.9	-972	-11.4
Construction	26,397	3.3	-7,190	-21.4
Retailing and Wholesaling	134,659	16.9	+2,600	+2.0
Hotels and Restaurants	42,053	5.3	-98	-0.2
Transport and Communication	55,510	7.0	-3,614	-6.1
Finance	30,983	3.9	-6,869	-18.1
Business Services, Real Estate, Renting	84,622	10.6	+12,271	+17.0
Public Administration, Defence, Social Security	43,856	5.5	+1,515	+3.6
Education	63,087	7.9	-4,121	-6.1
Health and Social Work	89,181	11.2	+11,303	+14.5
Other Services	29,716	3.7	+1,556	+5.5
Total Employment	794,577	100.0	+7,827	+1.0

Source: Unpublished Census of Employment Statistics, from NOMIS (National Online Manpower Information Service)

Table 4: East Anglia: Manufacturing Structure and Growth Industries, 1991-1995

Manufacturing Industries	Employment 1995		Change 1991-1995	
	Number	% East Anglia	Number	%
Food and Tobacco	30,279	19.2	-1,305	-4.1
Textiles and Clothing	3,073	2.0	-116	-3.6
Wood Products	3,913	2.5	-142	-3.5
Paper Products	6,736	4.3	+925	+15.9
Publishing, Printing, Recorded Media	16,506	10.5	+2,068	+14.3
Chemicals and Pharmaceuticals	8,430	5.4	+587	+7.5
Rubber and Plastics	10,025	6.4	+1,637	+19.5
Other Non-Metallic Products	4,510	2.9	-447	-9.0
Fabricated Metal Products	11,131	7.1	-149	-1.3
Machinery and Equipment not Elsewhere specified	4,824	3.1	-457	-2.0
Computers and Office Machinery	2,274	1.4	+627	+38.1
Electrical and Electronic Machinery	4,824	3.1	+1,344	+38.6
Radio, TV, Communications Equipment	6,732	4.3	+1,436	+27.1
Medical and Precision Instruments	5,850	3.7	-842	-12.6
Motor Vehicles	6,309	4.0	+1,429	+29.3
Other Transport equipment	2,913	1.9	-811	-21.8
Other Manufacturing	7,388	4.7	+346	+4.9
Total Manufacturing	157,355	100.0	+5,981	+4.0

Source: Unpublished Census of Employment Statistics, from NOMIS

Table 5: High-Technology Industries in the United Kingdom

Standard Industrial Classification Activity Heading (1980 SIC) and Industry Description	
2514	Synthetic resins and plastics materials
2515	Synthetic rubber
2570	Pharmaceutical products
3301	Office machinery
3302	Electronic data processing equipment
3420	Basic electrical equipment
3441	Telegraph and telephone apparatus and equipment
3442	Electrical instruments and control systems
3443	Radio and electronic capital goods
3444	Components other than active components mainly for electronic equipment
3453	Active components and electronic sub-assemblies
3640	Aerospace equipment manufacturing and repairing
3710	Measuring, checking and precision instruments and apparatus
3720	Medical and surgical equipment and orthopaedic apparatus
3732	Optical precision instruments
3733	Photographic and cinematographic equipment
7902	Telecommunications services
8394	Computing services
9400	Research and development services

Source: Butchart, 1987

Table 6: East Anglia: New Firm Formation Rates and Small Business Trends, 1980-93

Region	1980-91			1991-93		
	new firms registered for VAT ('000)	new firm formation rate (annual average)	change in business numbers ('000)	change in business numbers (annual average %)	change in business numbers ('000)	change in business numbers (annual average %)
South East	934	9.2	+190.4	+3.7	-27.4	-2.4
East Anglia	87	8.7	+17.6	+2.8	-3.1	-2.3
North	84	5.0	+11.9	+1.9	-2.3	-1.9
United Kingdom	2364	7.5	+427.4	+2.8	-69.0	-2.1

Notes: (a) the new firm formation rate is the number of new firms registered for value-added tax (VAT) per thousand of the civilian labour force, 1981;

(b) because the stock of VAT-registered businesses is dominated by small firms, changes in total stock provide a good measure of trends in numbers of small businesses.

Source: Keeble and Bryson, 1996.

Table 7: The economic and institutional context for Cambridge University-SME interaction

- Cambridge a major national and international centre for scientific research and development
- 6000 workers in R & D in local industry (Location Quotient 7.2) with over 2000 in Cambridge University
- University of Cambridge a global reputation as a centre of excellence in scientific research
- rich layer of research institutes; CAD-CAM, PBI, MRC Molecular Biology, Biotechnology, Agricultural Botany, Welding and Metallurgy, Sanger Centre, Wellcome Laboratories
- a growing number of multinational companies; Philips, Olivetti, AgrEvo, Schlumberger, Spillers-Dalgety, Smith Kline and Beecham, Leica, Sony, Toshiba, Microsoft
- growing cluster of over 700 high-technology SMEs employing 24,000 +
- Institutional infrastructure
- Cambridge Science Park, St John's Innovation Park and Centre, Melbourne Science Park
- 3i, Quantum Fund, Amadeus, Great Eastern Forum, CRIL, Lynxvale (patents), EC Relay Office
- technology consultancies, Cambridge Consultants (ADL), PA, Scientific Generics, Technology Partnership
- Laissez-faire policy by the University towards links with industry; benign and broadly supportive attitude to small technology-based spin-offs following 1969 Mott report; Industrial Liaison and Technology Transfer office to support and promote academic-industry links
- Cambridge University research income from industry, 1993-94, of £6.23m (8.5% of total research income)
- Cambridge University spin-offs 16% of Cambridge region high-technology start-ups: 4-6 spin-offs per annum in 1990s?
- 50% of Cambridge region high-technology firms report research links with Cambridge University since formation
- frequent local recruitment of researchers and graduates from Cambridge University: on average, 22% of research staff and 17% of directors of Cambridge region high-technology firms possess Cambridge University degrees

Source: modified from Keeble and Moore, 1997, Table 2

Table 8: East Anglia: Expenditure on Research and Development, 1994

	R & D performed within:						Total R & D	
	Businesses		Government ¹		Higher Education Institutions			
	£ million	% of regional GDP	£ million	% of regional GDP	£ million	% of regional GDP	£ million	% of regional GDP
East Anglia	476	2.0	141	0.6	167	0.7	784	3.3
United Kingdom	9,529	1.4	2,021	0.3	2,559	0.4	14,109	2.1
East Anglia ranking, % of regional GDP (out of 10 UK regions)		1		1		1		1

¹ includes National Health Service and local authorities' R & D

Source: Office for National Statistics, 1996

Table 9: East Anglia: A Small and Medium-Sized Firm Economy

	Percentage of Businesses with 1995 Turnover Size of (£000):				
	1-49	50-99	100-249	250-999	1,000 and over
East Anglia	31.0	24.5	22.5	15.7	6.5
United Kingdom	29.2	24.0	23.4	16.0	7.4

Source: Office for National Statistics, 1996

Figure 1 East Anglia : Urban System, Infrastructure and Policy Support

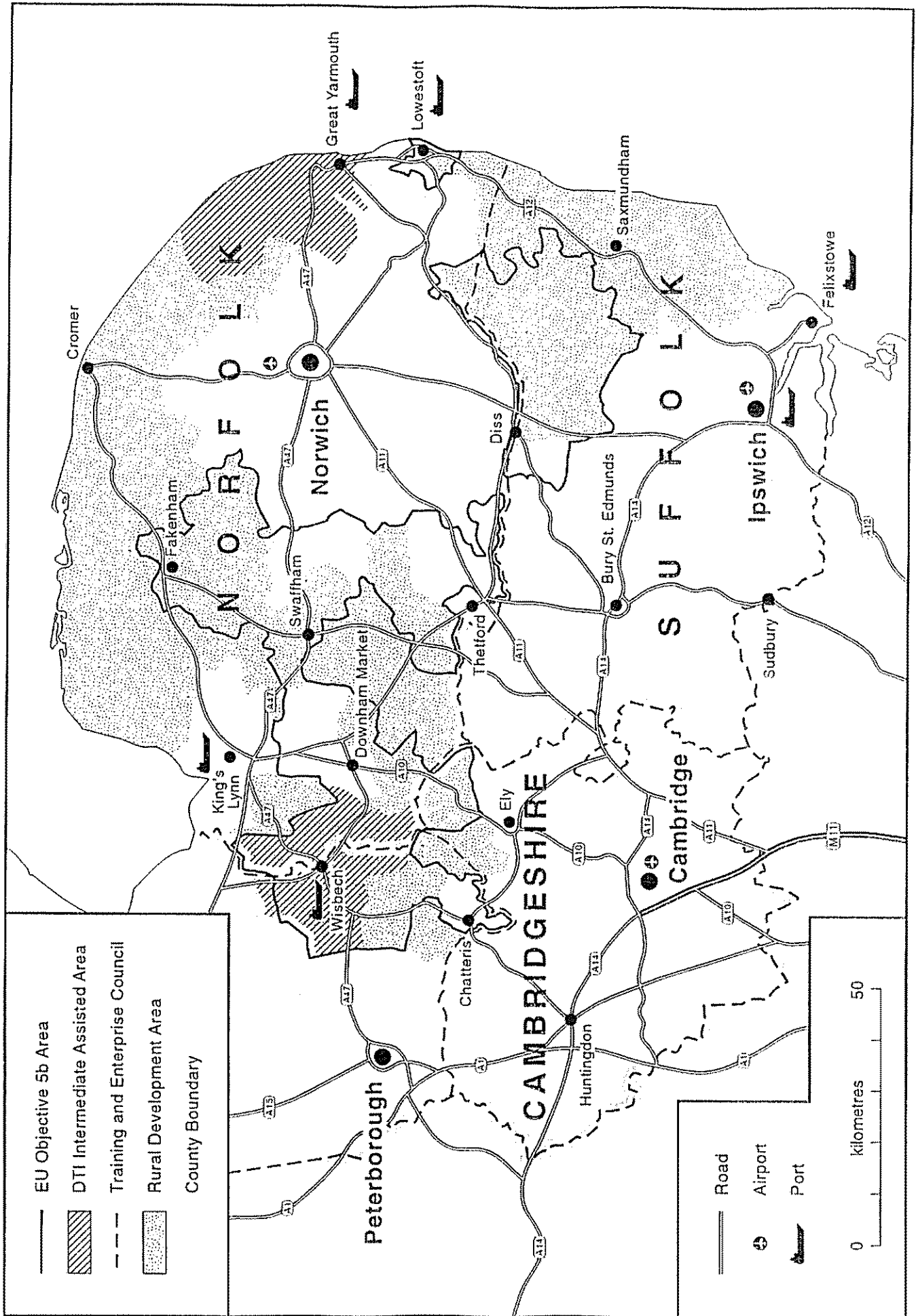


Figure 2 High-Technology Firms and Employment in the Cambridge Region, 1996

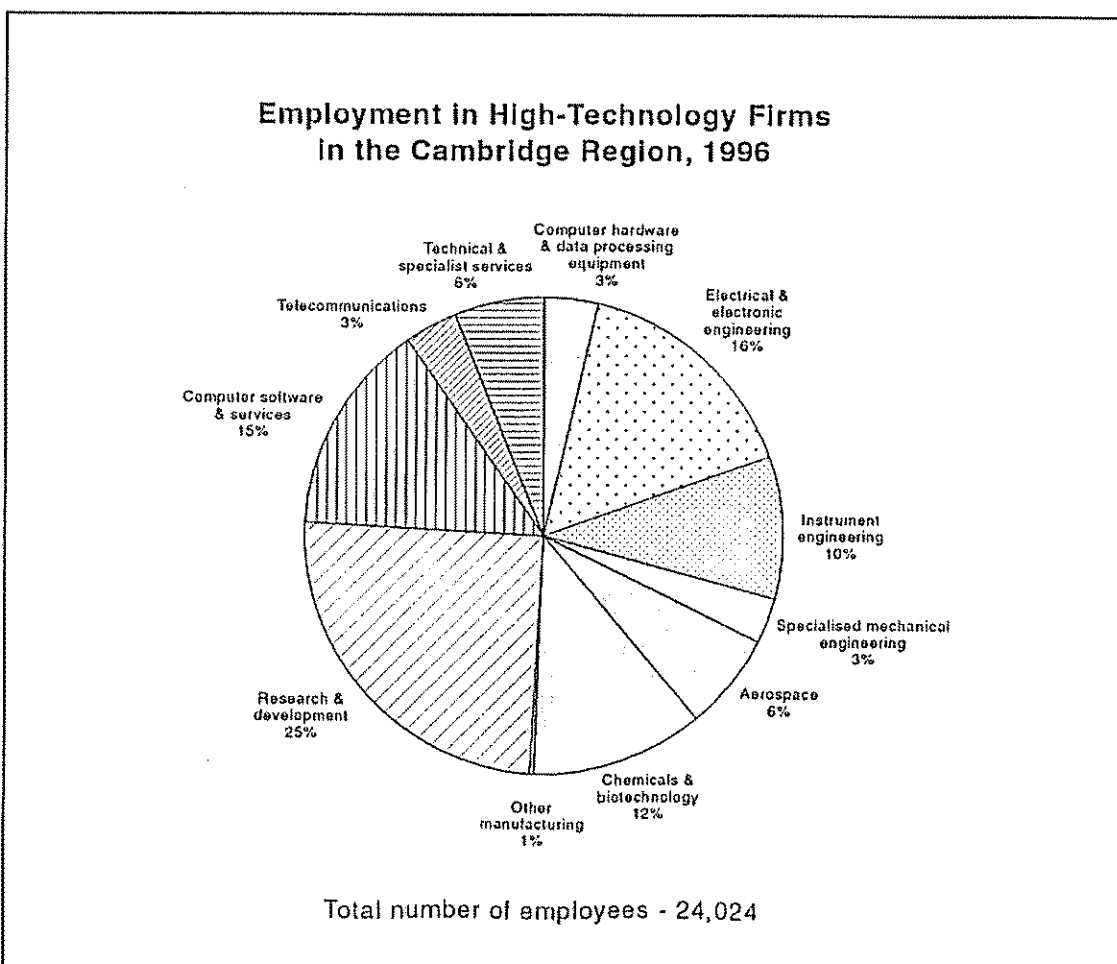
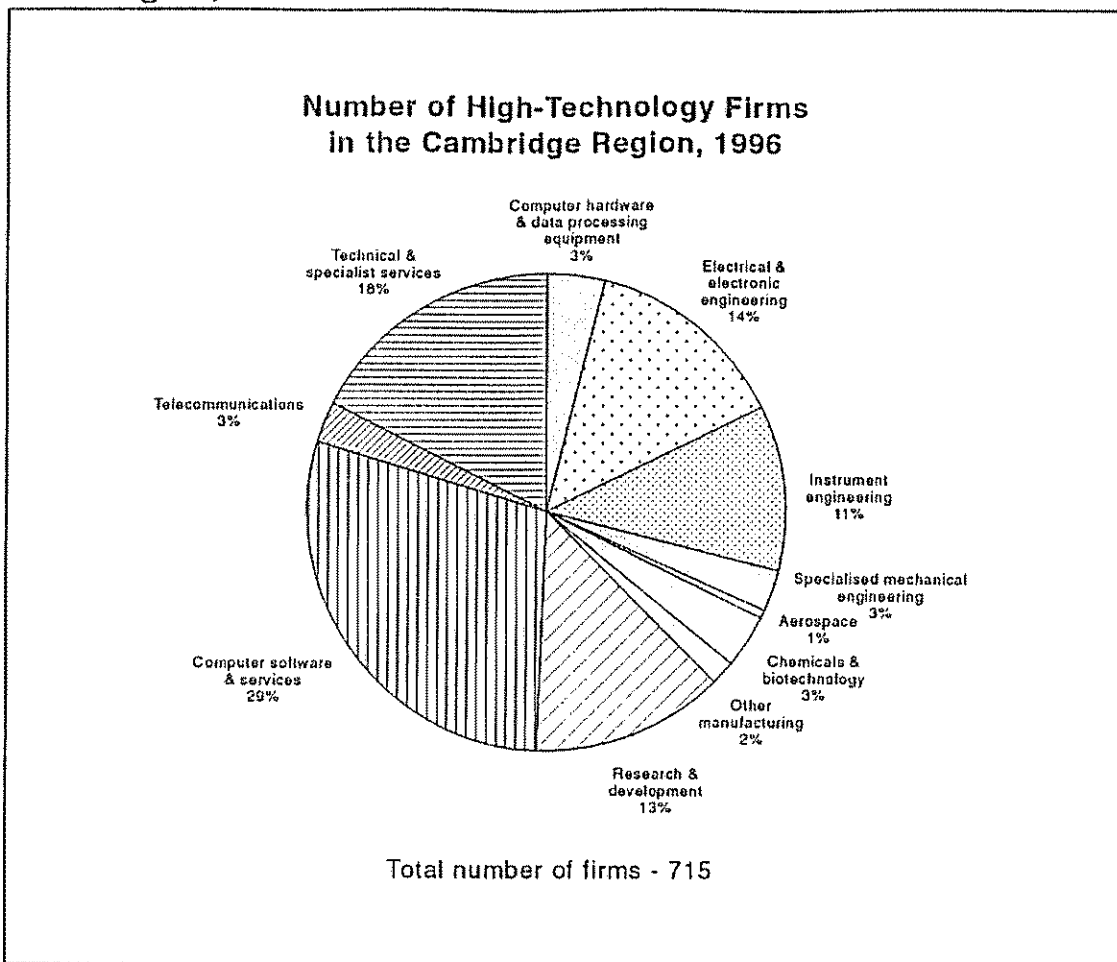
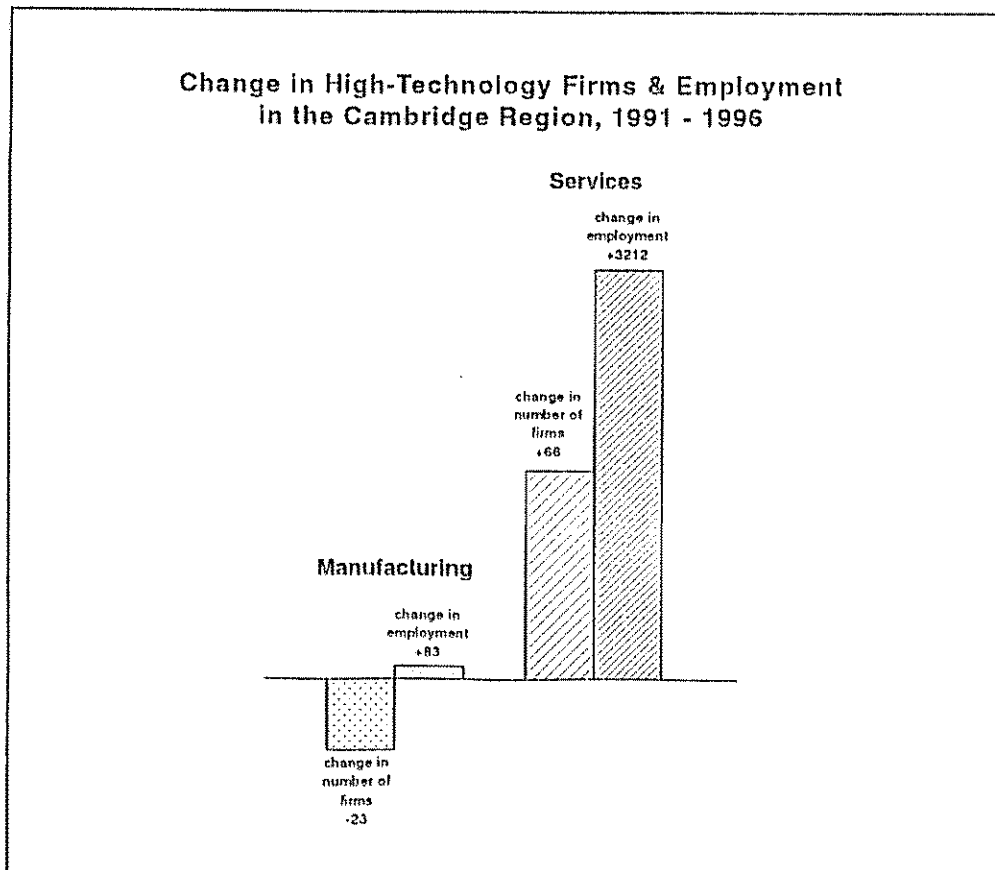
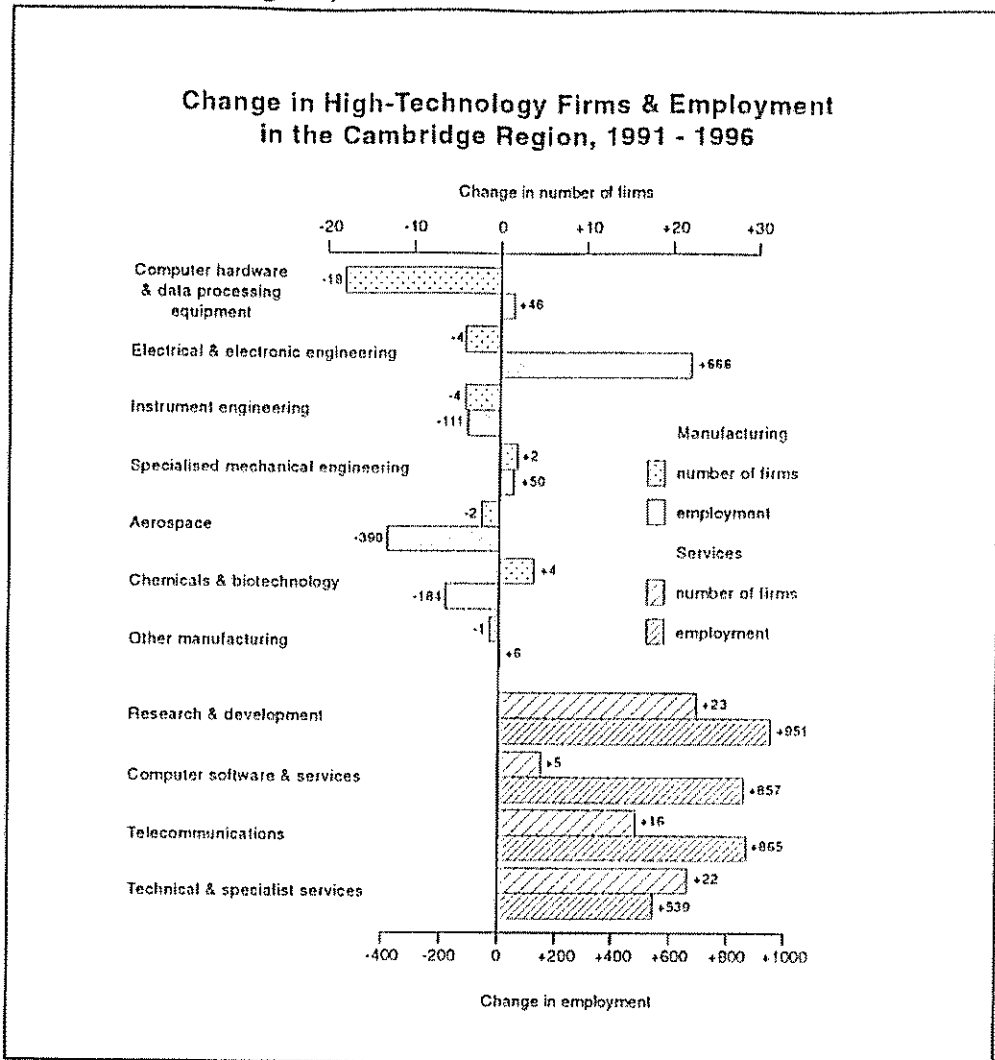


Figure 3 Changes in High-Technology Firms and Employment in the Cambridge Region, 1991-1996



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