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## CHAPTER 1

### INDUSTRIAL GEOGRAPHY

The purpose of this chapter is to briefly introduce the subject of industrial geography by outlining the principal approaches that define it and the activities that are central to its concerns.

#### APPROACHES TO INDUSTRIAL GEOGRAPHY

The fundamental rationale for industrial geography, commonly also referred to as manufacturing geography, rests on the geographic unevenness and constantly changing geography of manufacturing activity. Following several pioneering studies which sought to explain the geographic distribution of particular manufacturing activities (Hartshorne 1928, 1929) or the concentration of activities in specific localities (Wise 1949) specialized text books in manufacturing geography were first published (in English) in the 1960s (Estall and Buchanan 1980; Miller 1961; Alexandersson 1967). These books reveal the growing interest in industrial (manufacturing) geography and a 'systematic' approach based on the classification of location conditions and factors. A mushrooming and vibrant research literature soon led to new theoretical perspectives and research designs, and raised new questions. A few well known, relatively comprehensive books which reflect the development of the literature since 1970 include Chapman and Humphrys (1987), Collins and Walker (1975), Hamilton (1974), Hamilton and Linge 1979, Massey (1984), Rees, Hewings and Stafford (1981), Scott and Storper (1986), Sayer and Walker (1992), Storper and Scott (1992), Storper and Walker (1989) and Taylor and Thrift (1984). In turn, mounting research and shifts in the research frontier encouraged the publication of additional text books on industrial geography notably those by Smith (1971), Bale (1976), Webber (1984), Chapman and Walker (1987), Watts (1987), Malecki (1991) and, most recently, Harrington and Warf (1995).

Despite considerable debate over approach and forms of analysis within manufacturing geography, however, location, location change and implications for local development, have been constant themes in the development of the subject. As Watts (1987: 1) says:

"The central task of contemporary industrial geography is to describe and explain changes in the spatial pattern of industrial activity.....  
.....The emphasis in industrial geography is on explaining where and why changes in location of industrial activity have taken place and on trying to understand why some areas experience industrial growth and areas experience industrial decline and other areas experience industrial decline."

Simply put, industrial geography seeks to explain the location dynamics of manufacturing activity and the local development implications of these dynamics. In a broader context, if economic geography explains geographical variations in how people gain a livelihood and "how place makes a difference to the economic process" (Barnes 1987: 307), industrial geography is an integral part of this task. From an inter-disciplinary perspective, the concerns of industrial geography are clearly at the core of the industrial transformation problem defined above as 'the ability of nations, regions and communities to initiate, rejuvenate and retain viable industrial structures which meet long term goals, however these goals may be articulated.'

#### From the idiographic to the nomothetic

As contemporary introductory text books suggest, it is common to recognize that a watershed in approaches to explanation within economic geography occurred around the late 1950s and 1960s (Berry, Conkling and Ray, 1993; Healey and Ilbery 1990). Before the watershed, the various traditional approaches to economic geography, including industrial geography, are summarized as 'idiographic' in contrast to the 'nomothetic' or theoretical approaches of contemporary times. This book is clearly rooted in contemporary research and a note on traditional industrial

geography sets the stage for brief comments on the various theoretical approaches that inform industrial geography.

Within industrial geography, the idiographic tradition is impressively exemplified by Warren's (1970) meticulously detailed analysis of the British iron and steel industry from 1740 to 1968. For him, theories and principles may define how industry should be located but they cannot come to grips with understanding actual location dynamics. In Warren's (1970: viii) view, "analysis in economic geography requires a resolution to probe as far as possible into the reasons for location decisions, to master the rudiments of technology and to look into the contingencies of industry and company development." Such a statement indicates that idiographic approaches go beyond description and are interested in explanation and the causal processes underlying location outcomes. In practice, Warren's search for "the reasons for location" is fundamentally historical; his understanding of the various steel districts of Britain is based on an extraordinarily detailed historical account of decisions by individuals and companies in the steel industry in the particular (historical, geographical and technological) circumstances they were made and of how the (intended and unintended) outcomes of one decision shape subsequent behaviour. In this account there are no universal notions of rationality. For Warren, the economic geography of the British steel industry can only be understood by going back to its origins and connecting the present with the past through an intricate maze of decisions. Ultimately, British steel regions are each unique and each region should be considered idiographically, that is, as a separate case study.

There was a 'systematic' (generalizing) side to traditional industrial geography which primarily took the form of inductive classifications of location factors and of industrial regions (Estall and Buchanan 1980). By and large, however, these classifications were seen more as the summary outcome of idiographic studies than as a basis for theorizing about location behaviour and regional industrial change.

For a variety of reasons, during geography's watershed years (and since), idiographic approaches were widely criticized - indeed Warren's (1970) book, if not the last, is one of the last

substantive studies in industrial geography in this tradition. The criticisms are profound (see Johnston 1987). Suffice to say that, pre-occupied with uniqueness, many idiographic studies seemed overwhelmed by detail, were deemed to be overly descriptive and ignored, or at the very least, underestimated, broader economic, political and social processes which in important ways encourage tendencies towards similarities, as well as differences, between places. Idiographic studies did not offer clear yardsticks by which to judge what is important for explanation (say, regarding industrial location) and the lack of theories created growing difficulties in articulating ideas with other disciplines, participating in general (but not local!) policy debates and communicating skills and critical thinking among students. Indeed, as industrial geography's information base has exploded the problems underlying an idiographic approach have mounted. After all, theories and models seek to present complex realities in ways that can be 'readily' or at least parsimoniously understood and critically evaluated. From this perspective, theories, models and frameworks seek to emphasize 'important' causal relationships and processes and in so doing provide ways of looking for, structuring and evaluating evidence. Moreover, theories make explicit the values by which evidence is assessed.

Given that what is theoretically important is judgmental and value based, several theoretical perspectives have emerged in industrial geography over the last 30 years or so. Just how to classify these perspectives is open to some debate. The most common starting point is to distinguish neoclassical, behavioural and structuralist theories and to further characterize neoclassical and behavioural as 'conventional' or mainstream and the latter as 'radical' (Lever 1985; Watts 1987; Healey and Ilberry 1990). Yet this trichotomy of approaches omits reference to the geography of enterprise, a major theme of industrial geography since the mid-1960s, whose enduring legacy has been to explicitly incorporate organization, especially (large) business organizations, as a key dimension of industrial location change (Krumme 1969). Indeed, Storper (1981) argues that industrial geography's radical tradition comprises a structuralist view and what he terms an open system view which overlaps substantially with the geography of enterprise. In addition, over the past decade the influence of structuralism has



neoclassical theories evolved from classical theory pioneered by Adam Smith (1776) at the end of the 18th century, then a truly radical idea suggesting that free markets, rather than custom, tradition and manipulation, should govern economic behaviour.

Several general characteristics of the neoclassical explanation of industrial location can be noted here before its fuller discussion in chapter four (Smith 1971). First, it focuses solely on 'economic' variables (transportation costs, labour costs etc.) with history, political economy and social processes ignored or interpreted as 'complications' to the basic economic forces. Second, neoclassical location theory analyses economic factors in an abstract, deductive manner to derive generalizations as to where industry should locate. The theory so derived provides a 'normative' yardstick to compare with actual behaviour (and specific hypotheses by which to empirically examine theory). Third, neoclassical models assume 'universal' economic laws, based on 'universal' notions of rationality, that govern behaviour. Alternatively put, iron laws of economics govern behaviour, not the idiosyncrasies of individual agents. In neoclassical perspectives where 'free' competition prevails the characteristics of individual firms ('agents') are essentially irrelevant as the competitive process itself sorts out the most efficient (or profitable) location pattern. That is, whether production and markets are organized by small firms or giant firms ultimately depends on (universal) rational notions of efficiency (Williamson 1975).

In summary, neoclassical theory constituted a completely different (and in this sense radical!) form of explanation of industrial location than that offered by idiographic studies and the antithesis of the idiographic view that places are unique, only to be understood in terms of their own history. In practice, neoclassical theory encouraged a 'positive' approach to explanation in which theory provided a basis for specific hypotheses which searched (tested) for generalized statistical relationships among representative samples of factories which linked industrial location to measurable economic variables (e.g. Auty 1975; Stafford 1960; Watts 1971).

Within industrial geography, neoclassical location theory was quickly criticized from a behavioural perspective (Pred 1967, 1969). The behaviouralists emphasize that in the real world,

decision makers differ in terms of goals, preferences, knowledge, abilities and rationality. In an important sense, behavioural models may be seen as attempts to make neoclassical theories more realistic by incorporating issues of location preference and organizational structure in explanations of industrial location patterns. Thus, the behaviouralists sought to develop theories of the (location) decision-making process to improve understanding of location choices, especially in advanced societies where there are many location options even within the economic constraints imposed by competition. In this regard, behaviouralists recognize that location behaviour varied considerably between large and small firms and so helped reinforce industrial organization as an important variable in explanations of industrial location. If behavioural and neoclassical theories are complementary they are nevertheless inspired by different approaches to explanation. In particular, while the starting point for neoclassical location theory takes the form of spatial variations in economic costs and revenues that for behavioural studies is the



contradictory tendencies within capitalism in which competitive processes do not automatically guarantee socially desirable outcomes. Whereas in neoclassical theories, competition generates stable and fair outcomes, in radical theories competition, unless regulated, generates unstable and unfair outcomes. Economic growth both generates great wealth and is crisis ridden.

It might also be noted that radicals are often critical of neoclassical theory's reliance on research methods which favour a 'linear' way of thinking (statement of theory, formulation of hypotheses, the collection of data, the testing of hypotheses, and the re-evaluation of theory) and for statistical explanations of industrial location patterns which narrowly focus on measurable economic variables, isolate location from underlying ('deeper') processes and fail to assess the

The structuralist criticism of neoclassical theory went deeper (Bradbury 1979; Massey 1979; Massey 1984; Peet 1983). Drawing explicitly on Marx, structuralists emphasize that economic growth under capitalism is a crisis ridden, disequilibrium process at the heart of which is capital's *inherent* tendency to exploit labour, that is to pay workers less than the value extracted from their labour, and to create class divisions. Simply put, the interests of capital and labour are diametrically opposed. In the structuralist view, explanations of industrial location have to be placed within the context of broader global forces and broader relations of production in which the key element is the labour process. In taking this view it might be noted that structuralists are dismissive of enterprise geography (Walker 1989). In general terms, structuralists criticize enterprise geography for not articulating with broader theories of development and for its focus on individual corporations which deflects from the structuralist analytical priority, the labour process.

There are also profound criticisms of structuralism. Critics have noted that structuralist explanations are often opaque, lack clear forms of evaluation, and are prone to economic determinism by over-emphasizing macro-economic forces and underplaying the experience and power of individuals and institutions (Duncan and Ley 1982; Johnston 1987; Taylor 1984). Moreover, structuralism's criticism of neoclassical theory that it is essentialist, by its attempt to explain or 'reduce' economic activity to the effect of universal, abstract economic laws of economic rationality (Barnes 1987), can also be leveled at structuralism. Indeed, in structuralist accounts of location patterns and regional industrial change (e.g. Bradbury 1979; Peet 1983), capital and labour (and government) are often treated in a standardized, largely undifferentiated way in which, for example, labour is essentially treated as dupes, capital as relentlessly hyper-mobile and placeless, and states serving only to support capital. The critics of structuralism stress that agencies such as business, labour and governments are not passive players orchestrated by forces totally beyond their control but pursue strategies that can and do make a difference (Walmsley and Lewis 1984). Moreover, these strategies, including the ways in which institutions relate to one another, develop differently in different places. In this regard, Walker's

(1989) recent requiem for enterprise geography might have been better directed towards structuralism.

Indeed, recent developments in radical arguments, notably critical realism and regulation theory, are giving much greater stress to the role of agency than previously admitted under structuralism (Lipietz 1986; Tickell and Peck 1992; Sayer 1982; Storper and Scott 1992; see also Barnes 1987). From this perspective, explanations of industrial location dynamics give priority to the policies of nation states, the structure of labour markets and business strategies and structures, as well as to the relationships between them.

*Places and institutions matter* - In the old, for the most part forgotten, industrial geography idiographic studies stressed the role of individuals and organizations (agents) in the creation of areally differentiated landscapes in which individual regions are unique (Warren 1970). But such studies were highly detailed and failed to systematically link regions and industrial locations within a wider world of competition. Neoclassical and structuralist theory rejected the idea of regional uniqueness and the importance of agents and gave priority to this wider world of competition. But such a rejection denies the richness (if not the existence) of economic geography and the role played by agents in creating differences among regions. As theoretical positions have evolved, however, from within both conventional and radical vantage points there has widespread acceptance that institutions, not only of business, but also of labour and the state, do matter in the creation of industrial geographies (Peck 1993a). Similarly, it turns out that regions, after all, are unique (Johnston 1984) and geography (still) matters (Massey and Allen 1984; Wolch and Dear 1988).

As Johnston (1984) stresses, regions may be unique but they are not singular but which he means they are not isolated, closed systems but (increasingly) tied to wider forces of globalization. The theoretical challenge is how to conceptualize the interplay of local and global forces. In Barnes (1987, 1988) view, no one theory can account for the variability and dynamism of industrial geography. Rather, "There is no Industrial [Economic] Geography, only

industrial [economic] geographies" (Barnes 1988: 349). In this view, different 'local' models have to be developed to explain different local situations. If recent traditions are instructive, any pursuit of local models is likely to emphasize, among other considerations such as those of physical geography and relative location, institutional structures and the distinctive ways these structures unfold in particular places.

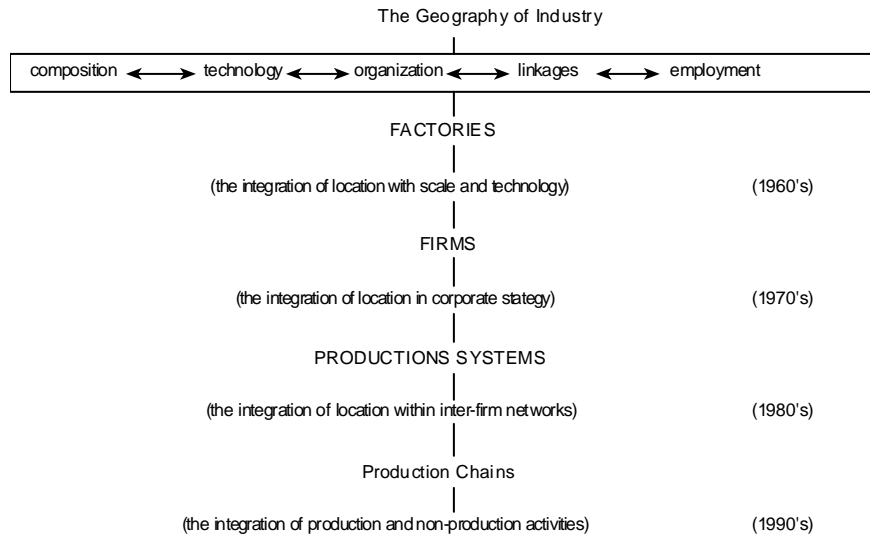
Places matter because people matter. People in different places have distinct attitudes and beliefs and organize their lives and economies in distinctive ways. Industrialization both threatens and creates these differences. On the one hand, the spread of industrialization contains powerful tendencies to standardize forces of demand and supply. On the other hand, industrialization is a geographically uneven process and its geographical spread is continually modified in light of local circumstances. The development and diffusion of industrialization is intimately shaped by the actions, policies and institutions of people.

#### This book's structure

Ultimately, industrial location patterns and regional industrial change needs to be understood in terms of prevailing global forces and how economic agents respond to, modify and even lead such forces within particular places. Within industrial geography, the business firm is widely recognized as the main 'agent' of change. While enterprise geography first gave explicit reference to the role of the firm, especially in the form of the large corporation, analyses of the locational implications of corporate strategies and structures, and more generally of the relationships between forms of industrial organization and regional development, are now widely

this geography is not neglected in this book. Nevertheless, within capitalist societies, it is the individual firm which is the principal decision making unit and the principal dynamic of change. The substantive core of this book largely 'sees' industrial location and industrial location change from the perspective of organization.

The remainder of Part I provides the broad context for analysis of industrial location dynamics by reviewing the broad temporal (chapter 2) and geographical dimensions (chapter 3) of the industrialization process since the Industrial Revolution. In this discussion, emphasis is given to institutional as well as to technological change. Subsequently, Parts II, III and IV provide an interpretation of industrial geography progressively based on theories and principles which have been developed explain the location of factories, the geography of firms and the geographical structure of production systems. The factory, the firm and the production system have provided three principal units of investigation for much conceptual thinking and empirical work in manufacturing or industrial geography over the last several decades (Figure 1. 1).



Each unit has a strong rationale in theory and practice and each progressively complements the other while it is the firm that provides the organizational and decision making framework in which to understand the location of factories and the location structure of production systems



established discussion of production systems, in this book discussion is restricted to production systems.

*Research designs in industrial geography* - Research designs, that is the way in which empirical information is collected and analyzed, vary considerably in the practice of industrial geography. As a way of illustrating these differences useful, closely related distinctions are between extensive and intensive research methods (Sayer and Morgan 1985) and standardized and non-standardized interviewing techniques (Healey and Rawlinson 1993). Brief comments on these approaches serve as an introduction to the main ways industrial geographers have conducted empirical research and thereby to the main sources of information for this book.

Extensive research methods principally involve obtaining highly structured information from a large sample of respondents, such as firms which are chosen in a way that ensures, as far as possible, the sample is representative of the population from which it is chosen. Highly structured information on a sample of firms may be obtained from standardized interviews which are based on questionnaires which as far as possible emphasize factual and pre-coded answers. Randomness is typically an important design feature of extensive surveys in order to ensure that samples are (statistically) representative which in turn allows the data so collected to be analyzed by a wide range of statistical techniques. Samples may be stratified in some way, for example, by firm size or ownership status, in order to facilitate comparisons (and remove complications). Samples may also be chosen from one particular type of industry ('industry surveys') or from across several industries ('cross-sectional surveys') and from one or more regions. If the data collected are for one point in time they are labeled 'static' surveys, if for two points in time they are labeled 'comparative static' and if for many, sequential points in time, the surveys are said to be 'longitudinal.' Extensive surveys, it might be noted, may also draw on the structured information provided in government census's which may be based on information derived from an entire population of firms or from a sample of firms.

The major empirical advantages of extensive surveys are twofold. First, they generate statistically valid general characteristics and trends which are representative of the population as a whole. Second, they generate a consistently collected, data base which can be analyzed by a battery of statistical techniques to test for hypotheses, for example, regarding factors which are purported to explain the location pattern of a particular industry. Indeed, questionnaires ('survey instruments') are normally structured to collect information to test specific hypotheses which are directing the research. Typically, extensive research is associated with quantitative or statistical



Schoenberger 1991, 1992). Second, they can document distinctive and unusually important processes which cannot be effectively subjected to extensive research and can illuminate arguments, reasons and debates over alternatives that would otherwise would remain uncovered. Although not as prevalent as extensive research, non-standardized surveys have a long lineage in industrial geography. Idiographic approaches, including Warren (1970), frequently relied on such surveys while the emergence of the geography of enterprise and behavioural geography signaled a growing commitment to these methods (Hayter 1976; Krumme 1969; Stafford 1974). Since then there have been a growing number of corporate case studies and some recent examples include Clark (1992), Patchell (1993b) and Schoenberger (1994).

It is tempting to suggest that extensive and intensive research designs can be classified according to theoretical perspective (Healey and Rawlinson 1993; Schoenberger 1991). There is some substance to this suggestion in that conventional theorizing, especially from a neoclassical perspective, is closely allied to a positive methodology and the quantitative testing of precisely stated hypotheses. Moreover, structuralists were strongly critical of such approaches and suggested that statistical models provided only description and did not address the deeper causes of behaviour that are rooted in the capitalist system itself (Massey 1984). On closer inspection, however, it is extremely difficult, possibly misleading, to simply classify research methods by theoretical perspective. The methods themselves are not mutually exclusive (or inherently ideological). After all, the strengths and weaknesses of extensive and intensive research are largely mirror images and where resources have permitted both approaches have been effectively combined. A recent study of the geography of labour markets combined an extremely large scale survey (of over 700 firms) with case studies of individual plants (Hayter and Barnes 1992; Barnes and Hayter 1993; see also Barnes and Hayter 1990). More generally, there is much conventional theorizing which has employed case studies - the Harvard Business School was an important pioneer in this respect. Similarly, some radical analyses have been rigorously quantitative (for example, Rigby 1991; Webber and Rigby 1986). Finally, it might be noted that

there has been much discussion of the pros and cons of alternative research designs from within particular theoretical perspectives.

The fact is that industrial geography is an empirically grounded subject which has traditionally employed a variety of research designs. This tendency will likely continue. What does need emphasizing is that data and forms of data analysis do not speak for themselves. Rather, information needs to be evaluated from particular conceptual perspectives. This book reviews a large number of such perspectives, models or frameworks which provide this kind of evaluation.

## MANUFACTURING INDUSTRY

In the English language literature, the term industry refers to all economic activities such as the mining industry, transportation industry, the hotel industry and the retail industry, as well a manufacturing industry which is sometimes referred to as secondary industry. It is also common within the English language literature to interpret industry as manufacturing! Within (English language) geography, industry and manufacturing are often used as synonyms; text books which focus on manufacturing, for example, have frequently used 'industrial geography' or 'industrial change' within their titles (for example Estall and Buchanan 1980; Watts 1987). This book follows this somewhat ambiguous tradition! As a further semantic matter, it might be noted that the term 'sector' is often used as a synonym for industry, especially when the latter refers to industries of a somewhat aggregate nature, for example, the manufacturing sector.

At the core of what is meant by manufacturing (or secondary) industry are those activities in which raw materials or already manufactured materials are fabricated, assembly, processed or transformed by mechanical, electrical or chemical means into more valuable products. Actual manufacturing activities occur in a bewildering variety of forms. These include spinning, weaving, stitching, knitting, turning, plating, machining, moulding, forging, hammering,

screwing, stamping, pressing, bolting, installing, cutting, edging, heating, melting, mashing, soldering, sorting, polishing, cooking, drying, blowing, packaging, inserting, painting, and welding. Over time, these and other activities in a wide variety of manufacturing industries have been increasingly performed by machines of one kind or another. However performed, manufacturing activities also have to be designed, controlled, coordinated, financed, watched, checked and protected, inputs purchased and outputs sold and distributed. All of these activities, in one way or another, add value and, in essence, manufacturing is a value adding process.

Manufacturing activities are classified in a variety ways. For example, crude dichotomies are made between primary manufacturing (activities which manufacture inputs from the primary sector) and secondary manufacturing (activities which manufacture already manufactured components); durable (fridges, cars) and non-durable goods (food); consumer goods (purchased by households) and capital goods (machinery and equipment purchased by firms to manufacture other goods); high and low tech industries (research and development employees and budgets important in former but not in latter); and heavy goods (iron and steel) and light goods (electronics). In addition, for census purposes, most countries have developed more detailed classes of manufacturing activity as part of 'standard industrial classifications' (SICs). Indeed, it is national SICs that provide the principal source of aggregate data on industries in general and manufacturing industry in particular.

In the case of Canada, for example, the government publishes data on nine major sectors of the economy (Table 1.1).

Table 1.1

Canada: Employment by Major Sector 1971 and 1991

<u>Sector</u>	Employment 000s	
	<u>1971</u>	<u>1991</u>
Agriculture	514	448
Other primary	221	280

Manufacturing	1776	1865
Construction	489	695
Transportation	707	916
Trade	1335	2169
Finance, insurance & real estate	399	760
Service	2128	4376
Public Administration	<u>545</u>	<u>832</u>
	8114	11392

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Source: Canada Yearbook, Ministry of Industry, Science and Technology, Ottawa: Statistics Canada 1993: 208.

According to these data, employment in manufacturing in 1971 accounted for 21.9 per cent of the work force and, in terms of total number of jobs, was the second most important sector after services. In 1991, the employment level in manufacturing was greater than in 1971 but its share had fallen to 16.4 per cent of the work force, and (in terms of total number of jobs) it was the third important sector behind service and trade. To some extent, however, how jobs (or some other variable) are allocated among sectors is arbitrary. Independent lawyers, for example, whose services are contracted by manufacturing firms are in the service sector while lawyers on the staff of manufacturing firms to provide the same legal services are part of manufacturing industry. This point is not unimportant at the present time. Downsizing by large corporations, for example, often involves contracting out services, ranging from computing and legal to cleaning, security and maintenance services, that were formerly provided internally.

Even more fundamentally, it is important to appreciate the interdependent nature of the entire economy. Manufacturing industry does not exist in isolation but is closely integrated with several other industries, notably the primary, construction, utility, wholesale trade and transportation industries while important links exist with business service industries. Indeed, there are usually whole departments of governments whose primary function is to service and regulate manufacturing and primary activities. In this regard, the so-called 'goods producing sector' includes all manufacturing activities plus activities in other industries which provide inputs and services to the production and distribution of material goods. Manufacturing

industries are at the heart of the goods producing sector which continues to dominate the employment base of advanced societies. According to Britton and Gilmour (1978: 71), for example, in 1971 about 65 per cent of the Canadian (and the US economy) could be considered as part of the goods producing sector.

The manufacturing sector is itself a highly aggregated mix of activities which can be further broken down into separate industrial categories. SIC schemes vary among countries and in the Canadian case, for example, in 1993 the manufacturing sector was broken down or 'disaggregated' into 22 two digit industries (Table 1.2). Although not always the case, the idea behind this classification scheme is that activities within an industry share similar characteristics (for example in terms of markets, technology, and/or inputs). Each of these two digit industries can be further disaggregated into three and four digit industries (Table 1.3). For example, the wood industries comprise six three digit industries including sawmills, plywood mills, shingle and shake mills and miscellaneous activities, and several of these industries are further disaggregated. The electrical and electronics products industries are broken down into even more categories.

The Canadian census, as do other census's, provides various kinds of information on individual manufacturing, including value added, number of establishments, and employment (Tables 1.2 and 1.3). In fact, the Canadian census also breaks down employment into production and administrative male and female as well as documenting information on total wages, cost of materials and supplies, cost of energy, and value of shipments. These variables provide aggregate indicators of the size and characteristics of manufacturing industries which are useful in comparisons over time, space and between industries. In practice, geographical studies of manufacturing activity often focus on employment change and numerous statistical measures have been devised to describe and summarize the extent to which local employment is specialized, diversified and participates in national trends. Some of the better known of these descriptive statistics are summarized in Appendix 1.

## CONCLUSION

Industrial geography is a dynamic sub discipline which has pursued a variety of theoretical approaches and implemented a variety of research designs.

Table 1.2

Canada: Selected Characteristics of Manufacturing Industries, 1993

<u>Industry</u>	<u>No. of Establishments</u>	<u>Total Employment</u>	<u>Value Added \$M</u>
1. Food	3,008	189,499	15,898
2. Beverages	194	26,602	4,209
3. Tobacco	17	4,778	1,221
4. Rubber	173	22,964	2,142
5. Plastic	1,153	50,410	3,080
6. Leather & allied	230	12,818	495
7. Primary textiles	184	18,346	1377
8. Textile products	744	27,646	1,374
9. Clothing	1,921	82,737	3,131
10. Wood	2,894	109,961	8,344
11. Furniture & fixtures	1,331	44,654	2,139
12. Paper & allied	664	101,926	8,081
13. Printing & publishing	4,655	124,867	8,505
14. Primary metal	409	84,416	7,770
15. Fabricated metal	5,117	132,606	7,906
16. Machinery	1,855	74,379	5,441
17. Transportation	1,349	209,879	21,139
18. Electrical & electronic products	1,365	118,629	9,602
19. Non-metallic mineral products	1,519	42,661	3,401
20. Refined petroleum & coal	157	14,084	2,368
21. Chemical	1,248	90,490	12,317

While there is much evidence of cross-fertilization between approaches there remains a tension between explanations which stress universal tendencies in location behaviour and those which assign greater priority to local

8. Communications Wire & Cable	7,361	- others	<u>2,997</u>
9. Other Electrical Products	7,070	Total	109,961
- batteries	1,441		
- non-current carrying devices	1,293		
- other	<u>4,336</u>		
Total	118,629		

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Source: Statistics Canada 31-203.