



The University of Manitoba

AN ANALYSIS OF FACTORS INFLUENCING THE LOCATION
OF MANUFACTURING INDUSTRIES IN THE PRAIRIES

by

MOHAN APPANA

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in Partial Fulfillment of the
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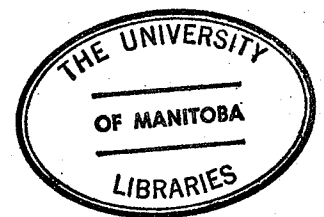
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of the degree of

MASTER OF ARTS

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ABSTRACT

This study examines the factors that influence the location of manufacturing industries in Alberta, Saskatchewan and Manitoba. Location factors are analysed in terms of spatial decision-making at three geographical scales. These are the Prairies as a whole, individual Prairie provinces, and specific cities or communities. The significance of the organizational structure and internal operating policies of manufacturing enterprises in influencing industrial location is investigated.

Three approaches are adopted for the study. A historical analysis indicates that the geography of Prairie manufacturing is related to proximity to material inputs and internal markets, railway freight rates and certain regional advantages which are not explicit, but nevertheless evident, as a consequence of export-oriented firms locating in the region.

The second approach is a quantitative analysis of location factors. Shift-share data indicates that markets and resources contribute to the development of, and shifts in, Prairie manufacturing employment. Spatial correlation between 1970 manufacturing employment and 13 economic variables suggest that manufacturing is spatially associated with the market as represented by population and retail sales. An analysis of the population thresholds necessary for manufacturing provides further explanation of the significance of market elements in relation to the location of manufacturing activities in cities. Within Prairie cities the location of manufacturing

activity is not entirely market-oriented.

The findings of the historical and quantitative analyses are generally substantiated by an empirical investigation of location decision-making of Prairie manufacturing enterprises. A sample of 401 large Prairie manufacturing enterprises was surveyed by post. Of this total, the returns of 164 firms were analysed. The survey results indicate that the decision to locate in the Prairies as a whole, and individual Prairie provinces in particular, is strongly influenced by proximity to markets. The choice of a particular city as an industrial site is also influenced by its proximity to markets as well as the proximity of clients for face-to-face contacts. Established business connections and personal considerations were also of some significance for the industrial location decision. These factors were generally important regardless of the structure and ownership characteristics of the organization or the size of the responding enterprise.

The survey does reveal, however, that internal operating policies of enterprises do influence the location of industries. Branch plants and subsidiaries of Prairie-based enterprises tend to be located close to their parent firms. By doing so these corporate establishments can develop complementary production processes within the organization and obtain administrative services from the main enterprise operations.

The study indicates that location theories provide a valuable frame of reference for the analysis of industrial location and behaviour. However, theories do not incorporate location decision-making at different geographical scales and the effects of enterprise

internal operating policies on the spatial organization of manufacturing activities. Further research into these two areas is suggested. A knowledge of such considerations can contribute to a clearer understanding of locational preferences in space and implications for planned distribution of industries and regional economic development.

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LIST OF FIGURES

FIGURE	PAGE
1 Location Map	6
2 The Manufacturing Development Process	35
3 Manufacturing in the Prairies 1931-1971	73
4 Manufacturing in the Prairies	84
5 Manufacturing Employment by Industry and Census Divisions: Manitoba	89
6 Manufacturing Employment by Industry and Census Divisions: Saskatchewan	90
7 Manufacturing Employment by Industry and Census Divisions: Alberta	91
8 Per Cent Change in Manufacturing Employment 1961-1970	96
9 Shift-share Characteristics and Components of Regional Change 1961-1970	102
10 Population Thresholds for Manufacturing at Different Manufacturing Employment Levels 1901-1961	123
11 Population Levels and Population Thresholds for Manufacturing: Hypothetical Cases	125
12 Population Levels and Population Thresholds for Manufacturing for Selected Prairie Cities	128
13 Population Levels and Population Thresholds for Manufacturing for Selected Canadian Cities	130
14 Population Levels and Population Thresholds for Textile Manufacturing in Prairie Centres	132
15 Population Levels and Population Thresholds for Clothing Manufacturing in Prairie Centres	133
16 Population Levels and Population Thresholds for Non-metallic Mineral Manufacturing in Prairie Centres	135
17 Population Levels and Population Thresholds for Food and Beverage Manufacturing in Prairie Centres	136
18 Population Levels and Population Thresholds for Chemical Manufacturing in Prairie Centres	138
19 Population Levels and Population Thresholds for Printing and Publishing in Prairie Centres	140
20 Distribution of Survey Enterprises (Usable Returns) Designated by Type of Head Office Organization	153
21 Geographical Origin of Parent Companies of Prairie Manufacturing Enterprises Designated as Divisional, Regional or "Canadian" Head Office Organizations	194

LIST OF TABLES

TABLE	PAGE
1 Manufacturing in the Prairies 1901	39
2 Value of Primary Manufacturing Allied to Agriculture as a Percentage of Basic Production in Agriculture, Prairie Provinces 1953, 1961-64	41
3 Five Leading Manufacturing Industries in the Prairie Provinces 1931 Ranked by Gross Value of Production	43
4 Location Quotients of Manufacturing Industries in the Prairie Provinces, 1961 and 1971	61
5 Location Quotients for Sectors of the Prairie Economy 1931-1971	65
6 Percentage Distribution of Employment in Prairie Manufacturing Industries 1971	66
7 Location Quotient for Economic Sectors of the Prairie Provinces 1931-1971	69
8 Value Added for Goods-producing Industries in the Prairies 1970	71
9 Growth of Prairie Manufacturing Industries 1961-1971	76
10 Distribution of Manufacturing Employment in the Prairies 1970	86
11 Coefficients of Localization for Manufacturing in Manitoba, Saskatchewan and Alberta, 1961 and 1970	95
12 Important Manufacturing Industries Affecting the Net Relative Change in Census Divisions in Which the Regional Share Component is Significant	103
13 Correlation Between the Distribution of 1970 Manufacturing Employment and 13 Economic Variables in the Prairies	110
14 Correlation Between the Distribution of 1970 Manufacturing Employment and Selected Variables in Manitoba, Saskatchewan and Alberta	114
15 Correlation Between the Distribution of 1970 Employment in the Food and Beverage and Printing and Publishing Industries and Selected Variables in the Prairies	117
16 Linear Prediction Equations for Population Thresholds for Manufacturing 1901-1961	119
17 Linear Prediction Equations for Population Thresholds for Selected Manufacturing Industries 1921-1961	120
18 Response to Survey	150

19	Kolmogorov-Smirnov Test of Significance Between Usable Returns and Survey Sample	152
20	Summary of Chi-Square Tests	156
21	Location Factors of Prairie Manufacturing Enterprises at Different Geographical Scales	159
22	Important Location Factors of Manufacturing Enterprises in Individual Prairie Provinces	163
23	Important Location Factors of Manufacturing Enterprises in Five Prairie Cities	165
24	Type of Head Office Organization and Important Location Factors Ranked According to Number of Enterprises Citing Factor	168
25	Ownership Organization and Important Location Factors Ranked According to Number of Enterprises Citing Factor	170
26	Employment Size and Important Location Factors Ranked According to Number of Enterprises Citing Factor	171
27	Size by Value of Shipments and Important Location Factors Ranked According to Number of Enterprises Citing Factor	172
28	Manufacturing Activity and Important Location Factors Ranked According to Number of Enterprises Citing Factor	174
29	Number of Enterprises Citing Important Attributes for the 'Ideal' Location	177
30	Type of Head Office Organization and Important Attributes for the 'Ideal' Location Ranked According to Number of Enterprises Citing Attribute	178
31	Ownership Organization and Important Attributes for the 'Ideal' Location Ranked According to Number of Enterprises Citing Attribute	179
32	Employment Size and Important Attributes for the 'Ideal' Location Ranked According to Number of Enterprises Citing Attribute	180
33	Value of Shipments Size and Important Attributes for the 'Ideal' Location Ranked According to Number of Enterprises Citing Attribute	181
34	Manufacturing Activity and Important Attributes for the 'Ideal' Location Ranked According to Number of Enterprises Citing Attribute	182
35	Record of Relocation of Surveyed Enterprises	184
36	Reasons for Relocation and Geographical Characteristics of the Movement	185
37	Number of Enterprises Reporting Branch or Subsidiary Operations in Different Geographical Areas	188
38	The Provision of Services Within Enterprises	191

ABSTRACT	Page
	ii
ACKNOWLEDGEMENTS	v
LIST OF FIGURES	vii
LIST OF TABLES	viii
CHAPTER I INTRODUCTION	1
Objective	1
Purpose of Study	1
Methodology	4
Study Area	5
Data for Thesis	7
Plan of Thesis	8
CHAPTER II INDUSTRIAL LOCATION: SOME THEORETICAL CONSIDERATIONS	10
Economic Theories of Location	10
Least-cost Location Theory	
Locational Interdependence Theory	
General Theories of Location	
Behavioural Theories of Location	21
Large Manufacturing Enterprises and Industrial Location	23
The Organizational and Spatial Structure of Large Manufacturing Enterprises	
Rationale for Multiplant Operations	
Internal Operating Policies and Implications for Location	
Other Aspects of Large Enterprises and Implications for Industrial Location	
Summary and Conclusion	31
CHAPTER III DEVELOPMENT OF MANUFACTURING AND HISTORICALLY IMPORTANT LOCATION FACTORS IN THE PRAIRIES	34
Factors in the Development of the Prairie Manufacturing	34
Developments in Agriculture and Implications for Manufacturing	36

The Impact of Wheat	
The Impact of Livestock	
The Impact of Specialty Crops	
Developments in Railway Transportation and Implications for Manufacturing	45
The Impact of Railway Construction	
The Impact of Freight Rates	
Mining Developments and Implications for Manufacturing	50
The Impact of Oil and Natural Gas	
The Impact of Metallic Minerals	
The Impact of Non-metallic Minerals	
Other Resource Developments and Implications for Manufacturing	55
The Impact of Timber	
The Impact of Fisheries	
The Impact of Furs	
Growth of Markets and Prairie Manufacturing	57
Internal Markets and Manufacturing	
The Impact of External Markets	
The Status of Manufacturing	64
Prairie Manufacturing vis-a-vis Canada as a whole	
Structure of Manufacturing	
Provincial Specialization in Manufacturing	
Growth of Manufacturing	70
Aggregate Growth	
Growth of Individual Industries	
Historically Important Factors of Location	77
Proximity to Raw Materials	
Transportation Costs	
Proximity to Markets	
Other Factors	
Summary	81
CHAPTER IV SPATIAL DYNAMICS AND ORGANIZATION OF MANUFACTURING IN THE PRAIRIES	83
Distribution Patterns of Manufacturing	83
Aggregate Manufacturing	
Major Industry Groups	
Regional Shifts in Manufacturing	93
Intra-provincial Shifts	
Intra-regional Shifts	

Shift-share Analysis	
Observations on the Prairies	
Interpretations of Shift-share Characteristics and Components of Regional Change	
Selected Economic Variables and the Distribution of Prairie Manufacturing	108
Correlation Analysis	
Correlation Coefficients for the Prairies	
Correlation Coefficients for Individual Provinces	
Correlation Coefficients for Selected Industries	
Population Thresholds for Manufacturing	116
Computation of Linear Prediction Equations	
Population Thresholds and Different Levels of Manufacturing Employment	
Profiles of Population Levels and Thresholds for Manufacturing: Interpretation	
Profiles for Selected Prairie Cities	
Profiles for Selected Industries and Cities	
Summary and Conclusion	139
CHAPTER V PRAIRIE INDUSTRIAL LOCATION FACTORS: EMPIRICAL MEASUREMENT AND ANALYSIS	142
Techniques for the Analysis of Industrial Location Factors	142
Choice of Technique	144
The Sample Enterprises	145
Questionnaire Design	147
Survey Procedure	149
Response to Survey	149
Frequency Distribution and Characteristics of the Usable Returns	151
Geographical Distribution of Usable Returns	151
Statistical Attributes of the Usable Returns	154
CHAPTER VI LOCATION FACTORS OF PRAIRIE MANUFACTURING: EMPIRICAL EVIDENCE	157
Factors of Industrial Location and Geographical Scale	158
The Prairies	
The Prairie Provinces	
The Prairie City	
Location Factors and Enterprise Characteristics	166
Head Office Organization and Location Factors	
Ownership Organization and Location Factors	

Size of Enterprise and Location Factors	
Manufacturing Activity and Location Factors	
Important Attributes and the "Ideal Location"	176
Aggregate Response	
Important Attributes and Enterprise Characteristics	
Relocation	183
Enterprise Organization and Industrial Location	186
Expansion, Markets and Industrial Location	
Diversification, Production Linkages and Location	
Internal Operating Policies and Effects on Location	
The Geographical Origin of Parent Companies and the	
Location of Divisional, Regional or "Canadian"	
Head Office Organizations	
Summary	195
CHAPTER VII CONCLUSION	198
BIBLIOGRAPHY	205
APPENDIX	
A DATA FOR CORRELATION ANALYSIS	216
B DATA FOR ANALYSIS OF POPULATION THRESHOLDS FOR	
MANUFACTURING	233
C SURVEY LETTER AND QUESTIONNAIRE	248
D RESULTS OF QUESTIONNAIRE SURVEY	258

CHAPTER I

INTRODUCTION

Objective

This study examines the factors that influence the location of individual manufacturing enterprises in the Prairie Provinces¹ of Canada. The objective is to identify the elements that entrepreneurs consider significant when locating manufacturing plants. Special attention is placed upon the location decision-making process in terms of different geographical scales, namely the Prairies as a whole, a Prairie province and a specific city or community within the Prairies. In addition, the significance of enterprise organization as a factor affecting the distribution and spatial structure of Prairie manufacturing is examined.

Purpose of Study

The study contributes to the further understanding of Prairie manufacturing industries and seeks empirical evidence regarding the impact of geographical scale and enterprise organization upon industrial location.

There is a dearth of empirical data on the manufacturing geography of the Prairies. Most current information sources are in the context of wider analyses of Prairie historical and economic

¹ The term "Prairie Provinces" refers to Manitoba, Saskatchewan and Alberta. It is used interchangeably with the "Prairies" in this study.

development (see for example Bellan, 1958; Craick, 1950; Grose, 1953; Stabler, 1968; Wilson and Darby, 1968).

The question of geographical scale in industrial location has received only meagre attention in either theoretical or empirical studies. Greenhut (1956, 103) drew attention to "general" factors which influenced location at the state or regional levels and "specific" factors which direct location to a particular city. Later Greenhut (1964) distinguished between demand as an area determining factor and locational interdependence as a site determining factor. Stafford's (1972) model of industrial location decision-making noted that demand influences the choice of a region while cost is the basis for selecting a number of alternative sites. Final site selection is evaluated in terms of cost and more importantly, personal judgement and attitudes. In the case of empirical investigations, the geographical scale is usually specified in terms of, a state (see Katona and Morgan, 1952), part of a state (see Wallace and Ruttan, 1961; Hunker and Wright, 1963), or sites (see Greenhut, 1956). Only one study by Hayes and Schul (1968) makes explicit reference to the significance of scale, in relation to factors of industrial location. It presents evidence that location factors differ at the Macro- (Regional) scale, Mid- (Local) scale and Micro- (Site) scale.

An analysis of modern manufacturing cannot ignore the aspect of enterprise organization, because of the dominance of large multiplant enterprises or corporations (McNee, 1960). The different plants are frequently decentralized in location and remotely controlled through a head office, regional or divisional head office which usually

specializes in providing services such as accounting, marketing, market research, legal and computer services (Parsons, 1972). As such, manufacturing operations, particularly branch and subsidiary plants are not strictly independent in function or location. For example, branch or subsidiary operations have been found established close to the parent company (Fullerton and Hampson, 1957, 46). This spatial proximity facilitates consultation on technical and policy matters between parent firms and branch or subsidiary operations (Ray, 1965, 21). However, these effects of enterprise organization on the location of manufacturing industries in general, and on individual operations in particular, are not clear.

The results generated by the study indicate that industrial location in the Prairies is strongly influenced by the market factor. This element emerges at all three geographical scales of investigation regardless of enterprise characteristics such as manufacturing activity, the type of head office organization, size of enterprise and type of ownership. It is of some significance that economic (market) factors of location are considered an important element in decision-making at larger geographical scales (i.e. the Prairies or an individual province). At the city or community level, economic factors are important, but location decisions are also influenced by non-economic factors which include, for example, personal considerations, education, cultural and social amenities.

The impact of organizational elements upon location were not explicit in the analysis of industrial location factors. However, other evidence gathered in the study, related to the distribution of branch

plants and subsidiary operations, revealed that enterprise operations could determine industrial location patterns. For instance, branch or subsidiary operations were usually established and located close to the parent facility. The reasons for this spatial proximity is because the parent facility, i.e., the head office, regional or divisional head office, usually provides specialized services such as advertising, marketing, market-research, hiring of personnel, accounting, legal advice, computer service, etc., to the branch and subsidiary operations. Though not overwhelmingly important, it did emerge that other organizational requirements i.e., face-to-face contacts with personnel within an enterprise organization were important, particularly at the lower geographical scale of decision-making.

Methodology

In order to gain an insight into the question of Prairie industrial location factors, three broad approaches were adopted in the study. Firstly, location factors were analysed in an historical context. The variables which stimulated the emergence and expansion of manufacturing and contributed toward its present status were examined. On the basis of the development of manufacturing, the historically important factors of location for Prairie industries were identified.

Secondly, Prairie industrial location factors were examined in the context of the geographical patterns and spatial dynamics of manufacturing. The initial step involved the spatial correlation between manufacturing employment and 13 selected economic parameters

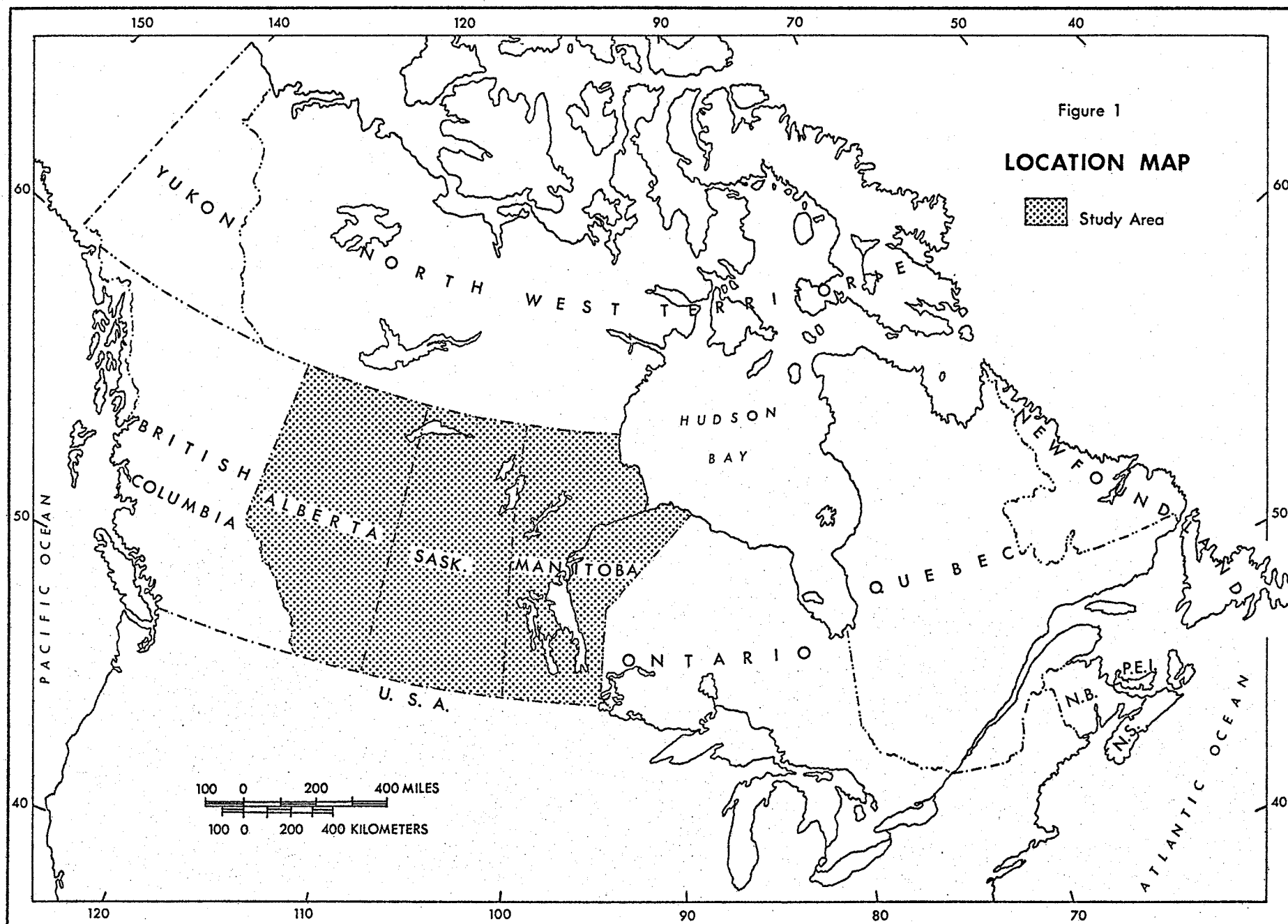
including population, income distribution, labour force and retail sales. The next step was an analysis of manufacturing in Prairie communities employing the concept of population thresholds for manufacturing, to evaluate the significance of the market element.

Thirdly, Prairie location factors were analysed empirically through a survey of factors influencing the decision-making process amongst entrepreneurs. This approach focussed upon the significance of geographical scale as well as enterprise organization in industrial location.

The three approaches are related methods useful for the understanding of industrial location in the Prairies. The historical approach helps in the perception of the role of past factors and events in Prairie manufacturing geography. The study of spatial patterns and dynamics of manufacturing provides the statistical basis to assess the significance of location factors at different geographical scales. Finally, the empirical approach constitutes a direct method of investigating factors of location. The data obtained can verify the results derived from the two earlier approaches.

Study Area

The study focuses upon the region occupied by the provinces of Manitoba, Saskatchewan and Alberta (Figure 1). They are considered a region because of the geographical similarity of at least a portion of each province, their proximity and common history. Further, the structure of each Prairie Province's economy is characterized to an extent by specialization in agriculture, and the lack of a well



developed manufacturing sector. The Canadian Prairies also appear as a logical study area since in government and other publications the Prairies are frequently referred to as a region per se. A further case for the choice is that it satisfies the purpose and design of this research. As a research area, the Prairies enable the analysis of location decision-making with reference to different geographical scales that encompass a region, a province and a community level of analysis.

Data for Thesis

Data for the analysis was obtained from two main sources. Material on the historical development, distribution and spatial dynamics of manufacturing in the Prairies was drawn from government, business, economic and geographical literature. Information on factors influencing industrial location and spatial organization of Prairie manufacturing were obtained through a mail questionnaire survey of a sample of industrial enterprises and the examination of trade and business journals.

There were significant data limitations that emerged at several stages in the research. The appraisal of Prairie manufacturing from a historical and developmental standpoint was limited by lack of data as well as changing definitions, creating problems of incomparability of statistics on the one hand, and poor disaggregation of data by consistent spatial units on the other. The latter problem which was a characteristic of government statistical publications restricted the spatial analysis of manufacturing to broad regions. Data obtained

from the survey of location factors must necessarily be interpreted with due respect to the advantage and limitations of this research method.

Plan of Thesis

The remainder of the thesis is organized into six chapters. Chapter II reviews briefly theories of industrial location. It stresses the complexity of industrial location decisions in terms of numerous factors, their complex interaction, and the geographical scale at which decisions are conceived and acted upon. The purpose of this chapter is to provide a guide for the empirical verification of Prairie industrial location factors.

Chapter III focuses upon the development of manufacturing in the Prairies. The special significance of agricultural, transportation and natural resource developments and the growth of internal and external markets are examined as forces contributing to growth and the spatial organization of manufacturing in the Prairies.

In Chapter IV, regional structure and the spatial dynamics of manufacturing are analysed. Elements influencing industrial location are examined, through the application of shift-share analysis, spatial correlation and population thresholds for manufacturing.

Chapter V deals with the empirical verification of industrial location factors conducted as part of this study. Details concerning the survey methodology, questionnaire design, nature of the survey enterprises, and the survey response are presented.

The results of the survey on Prairie industrial location factors

are analysed in Chapter VI. Factors influencing location decisions are examined in terms of the geographical scale, enterprise characteristics, including type of head office organization, manufacturing activity, size and form of ownership. The aspects of relocation and the impact of enterprise organization and operating policies upon industrial location are also examined.

Chapter VII, the conclusion, summarizes the principal findings. It indicates the importance of the market factor in Prairie manufacturing and also the need to consider geographical scale and enterprise organization in the study of industrial location and the relevance of theory in explaining the spatial organization of manufacturing in real-world situations.

CHAPTER II

INDUSTRIAL LOCATION: SOME THEORETICAL CONSIDERATIONS

Theoretical works by economists and geographers have rigourously examined the factors influencing the location of manufacturing enterprises. Theories, however, are not all encompassing in their explanations of real-world location decisions. Nevertheless, they provide a valuable guide towards understanding complex plant location behaviour in reality. For example, manufacturing plants are located in response to markets, sources of material inputs, such as labour supplies, the price geographies of factors, agglomeration economies, and spatial competition. In addition, the location may be dependent upon the personal ability of the entrepreneur and his accessibility to, the necessary information upon which decisions are based.

This chapter reviews important theoretical approaches that contribute to an understanding of the spatial behaviour of decision-makers in siting manufacturing enterprises. The chapter also explores the organizational structure adopted by large manufacturing enterprises and examines their implications for industrial location.

Economic Theories of Location

Economic theories of location can be examined under three broad categories; least-cost location theories, locational interdependence theories, and, general theories of location. Each group of theories stresses the significance of different elements in the industrial location decision.

Least-cost Location Theory

The least-cost approach towards location decision-making stresses the importance of cost factors. The principal proponents of this theory were Weber (1929) and Hoover (1937). In his theory, Weber (1929) assumes a simplified economic environment in which raw materials, fuels and markets possess distinct locations. The labour supply is fixed for each producer and a perfectly competitive market governs the relations between firms. Given these conditions, Weber argues that transportation costs, the nature of the material input, labour costs and agglomerative or deglomerative forces influence the location of firms.

Transportation cost is the primary factor of location and it is considered a function of weight carried and the distance travelled. Assuming that other costs, namely labour, or benefits such as agglomeration are not important, entrepreneurs will locate at the point of least transportation cost. At this point the total ton miles of assembling materials and distributing the output is minimized.

The least transport cost location can be the source of material inputs, the point of consumption or another point altogether. The ultimate location depends upon the distribution and weight characteristics of material inputs as they enter the production process. If ubiquitous materials dominate, production will be located at the point of consumption because transportation becomes unnecessary. Production which utilizes several pure materials¹ will also take place

¹ Pure materials are obtainable only in geographically well-defined localities. Their full weight enters into the final product.

at the point of consumption because the final product weight gain is equal to the sum of the inputs. If material inputs utilized tend to lose weight, production will be attracted to the material source (Daggett, 1955). Although Weber emphasises an optimum location based upon minimum transport costs, he recognizes the possibility of other viable locations as a consequence of additional factors. Cost savings due to cheap labour, economies of agglomeration or deglomeration could both more than offset the additional transport costs incurred in locating away from the least-cost point.

One major shortcoming of the Weberian theory is the assumption of linear transport costs in space. Hoover (1937; 1948) recognizes this fault and improves Weber's theory by introducing a more realistic consideration that transport costs do not increase proportionately to distance. In addition, there are loading costs, and other terminal charges that accrue to the basic cost of transportation. These separate costs incurred in transferring materials and/or finished products tend to influence the location of firms at markets, source of materials or at transshipment points with a greater force than Weber suggested. In proposing these considerations, Hoover brings location theory closer to reality.

Locational Interdependence Theory

Locational interdependence theories emphasize that each manufacturer, in selecting a location, seeks to control the largest possible market area. The position and extent of the market will be influenced by consumer purchasing habits and the locational behaviour of rival manufacturers. Important contributors to location inter-

dependence theory include Fetter (1924), Hotelling (1929), Hoover (1937), Lerner and Singer (1937), Smithies (1941), Ackley (1942), Lösch (1954) and Devletoglou (1965). The contributions of Smithies, Hotelling and Lösch, who provide the foundation for later theoretical developments are reviewed here.

In locational interdependence theories, as in the least-cost approaches, certain characteristics of the economic environment are assumed. All firms have similar production costs. Markets are evenly distributed in space in contrast to the 'point' markets, supposed by Weber. The selling price to consumers varies with the cost of delivering goods from the point of production.

Hotelling (1929) asserted that, given the aforementioned assumptions, as well as conditions of inelastic demand, two competing firms in a given market area would locate at the mid-point. This position enables each firm to have monopolistic control over half the market area. A third firm entering the scene will attempt to locate close to the two original firms but not between them.¹ Similarly, later entries would join the cluster of existing firms.

Smithies (1941) who subscribed to Hotelling's arguments, amended the basic theory by varying the elasticity of demand. When demand is perfectly elastic, Smithies demonstrates that firms are inclined to disperse rather than concentrate at one location. The reason being

¹ The firm located between two others will be deprived of a share of the market. This situation arises because it will be marginally further from potential customers and thus have slightly higher transportation costs compared to the two other firms. The new entrant will only be able to locate between the two existing firms if its production costs are lower, *ceteris paribus*.

that under conditions of elastic demand, a slight price increase causes a substantial decline in demand. Since production costs are assumed constant, freight will be the only factor that causes product price to rise and hence become the limiting factor to sales. Accordingly, entrepreneurs find it profitable to disperse and monopolise their own market areas. This pattern of location enables entrepreneurs to disperse sales and minimise transport costs.

The theory proposed by Lösch (1954) explains how firms are arranged in space when numerous entrepreneurs in an industry compete in a given market area. Assumptions of the theory are a uniform economic landscape with an even distribution of resources, fixed production and procurement costs, the existence of perfect competition, and given locations for the producers. Lösch proceeds to argue that the market area of each producer is circular in shape. The boundary of this market is defined by a locus of points at which the price of the good is of a level that discourages further sales.

The first firm to produce in the given market area will enjoy a monopolistic position and earn abnormal profits. The presence of abnormal profits attracts more firms to enter the industry (and market area) until all abnormal profits are competed away. The new firms will tend to disperse over the entire market region until no area is left unserved. Each producer is then left with the monopoly of a hexagonal-shaped market area. This particular shape enables the producer to obtain the highest demand per unit area and minimizes the total distance from the production point to all other points within the market.

General Theories of Location

The preceding discussion indicated that location theory developed into two major schools. One emphasized the search for the least-cost site while the other focussed upon firms locating to gain control of the largest market area. Both approaches feature important considerations for plant location and several attempts were made to integrate existing theories into broader general theories of spatial behaviour (Greenhut, 1956; Isard, 1956; Smith, 1971).

Greenhut (1956), in developing a general theory, evaluates the empirical factors that influence the location of manufacturing firms. He identifies these as transportation, processing costs and demand. Additionally, Greenhut introduces cost-reducing, revenue-increasing and purely personal factors.

Greenhut, like Weber, considers that an entrepreneur will seek the least-cost location if freight charges vary significantly at different locations in space. Material orientation due to transport costs occurs when materials are perishable and when transport costs on raw materials are higher than on finished products. In the case where a good is durable and cost more to transport than its raw materials, production will take place near the market. Processing cost factors such as labour, capital and taxation tend to exert a strong influence on location when transport costs or the demand factor do not require material or market orientations respectively.

In analysing the demand aspect of location, Greenhut adhered to concepts of locational interdependence. Greenhut suggests the general rule that increasing elasticity of demand causes the dispersion of

firms in space.

Greenhut, also recognizes that plant location is influenced by "cost-reducing" and "revenue-increasing" location factors. "Cost-reducing" factors, or forms of external economies, are obtained by the firm, as a consequence of agglomeration. "Revenue-increasing" factors are special qualities of a location, which tend to enhance a firm's sales. In addition, a distinction is made between "personal cost-reducing" and "personal revenue-increasing" factors. They refer to friendly contacts and familiarity between entrepreneurs and business associates. Such factors supposedly have the effect of decreasing locational costs and increasing revenue earned by firms.

Greenhut further suggested that purely personal factors can influence plant location. Such factors may take the form of certain personal preferences or "satisfactions" that can be ascribed some pecuniary value which Greenhut (1956, 175-6) calls "psychic income".

In essence, Greenhut's theory states that:-

"... each firm entering the competitive scene will seek that site at which its sales to a given number of buyers (whose purchases are required for the greatest possible profits) can be served at the lowest total costs.... [With] the entry of more and more competitors ... costs ... [and] relative demands will change. In time, the successful attempts of competitors to locate at the profit maximization site will so shrink the relative demand as to cut profits, thereby leaving eventually the state of locational equilibrium. Such equilibrium would find (1) marginal revenues equated with marginal costs, (2) average revenue (net-mill price) tangent to average costs, and (3) concentrations and scatterings of plants in such order that relocation of any one plant would occasion losses." (Greenhut, 1956, 285).¹

¹ Words in square parentheses are author's.

Changes in demand can upset the state of locational equilibrium and cause locational readjustments. Locational adjustments can also be brought about by changes in tastes, and production costs due to technological improvements. Although the location of a firm is based upon economic motives, the significance of purely personal factors is acknowledged. The latter remain important from the standpoint of site-selection as well as general equilibrium in space.

Although Greenhut's primary contribution is his general theory of location, there is an important observation he makes that location theorists before and after him failed to consider. It concerns the relationship between location factors and the geographical scale at which location decisions are made. Greenhut (1956, 103) distinguishes between "general factors" which influence location at the state or regional levels and "specific factors" which direct location to a particular city or district within a city. Unfortunately, he does not identify the factors that he describes as "general" or "specific". However, this is done in a later study (see Greenhut, 1964). Demand is described as an "area-determining" factor of location. This factor influences the choice of a particular region for location in place of others. The "site-determining" factor is related to the spatial behaviour of competitors, or locational interdependence.

Isard (1956), like Greenhut, draws heavily upon assumptions and the framework of existing location theories in his formulation of a general theory. He reemphasizes the significance of transportation cost factors in location and the spatial organization of firms. The notable contribution Isard makes is the application of the

"substitution principle" to location theory.¹ Each input, namely transportation, materials, labour, etc., is considered a factor of production. Basically his theory explains the process whereby an entrepreneur combines expenditure on various factors of production in making his choice of location. For example, the optimum location of a firm under transport orientation is determined by substituting transport inputs for some production inputs, such as cheap labour or lower production outlays as a result of agglomeration economies. Given a transport outlay, Isard's theory can predict the optimum factor combination at the optimum location.

Smith (1966; 1971)² formulates a theoretical model for industrial location analysis based upon the fundamental principles of classical location theories. He assumes that cost and price in space are constant and are unaffected by the actions of any individual firm, economies of large-scale production, alterations in manufacturing techniques or input combination, or entrepreneurial skill. Other assumptions require the firm's output to be constant in space and variations in demand to be reflected in price differences from one place to another. In addition, Smith recognizes that there are entrepreneurs who seek the maximum profit location and there are others who do not.

¹ A later contribution by Moses (1958) also stresses the principle of substitution.

² Smith's theoretical model first appeared in an article published in 1966. It was later incorporated in his book published in 1971. The discussion here refers to his book.

The substance of Smith's (1971, 182) theory is that "location [is] determined solely by the interaction of unit costs and price, all other influences having been assumed away". The spatial interaction of both cost and price (revenue) for an industry creates "spatial margins" within which firms can locate to attain profits. The "spatial margin" of an industry is the area bounded by a locus of points where total costs is equal to total revenue. Within this margin, total revenue exceeds total cost. Changes in the cost of input factors, entrepreneurial skill, subsidies and external economies, affect the spatial variations in cost and subsequently the size and shape of the spatial margin. In addition, the passage of time affects the spatial margin, due to changes in firm revenue, factor costs, techniques of production and the combination of factors used.

If a firm endeavours to maximize profits, it will locate at the point within the spatial margin, where the difference between total cost and total revenue is greatest. Firms which are not required to maximize profits are free to locate anywhere within the margin. This occurs when location decisions are made by entrepreneurs who are neither completely rational or "economic". In such instances, plant location can occur within an area defined by the availability of profits rather than at the specific point where profits are maximized.

Economic theories of location offer a systematic approach toward understanding the processes in spatial decision-making and industrial location. In retrospect, they stress important principles and considerations. Firstly, the decision to locate is motivated by

desire to find the point in space which ensures the lowest cost on each unit of product sold. Alternatively, location is guided by the desire to monopolise sales within a given market area where rival producers exist.

Secondly, in spatial decision-making process, entrepreneurs are influenced by a range of factors. The most important of these factors include transportation costs, sources of raw materials, markets, labour, and concentrations of related industries. In addition, entrepreneurs are affected by personal preferences which may have some economic implications or none at all.

The use of economic theories to explain industrial location in the real world have been found to be useful in certain instances. For example, Weber's theory has been successfully applied to elucidate the location of the Mexican steel industry (Kennelley, 1955). The applicability of other theories to the real world are less apparent on account of their highly abstract nature (for example, Lösch, 1954). The location factors suggested in theories have been found to be relevant in numerous empirical studies (see for example Katona and Morgan, 1952; Stafford, 1960; Mueller and Morgan, 1962; Hunker and Wright, 1963; Carrier and Schriver, 1968; Greenhut and Goldberg, 1962; Hayes and Schul, 1968).

However, principles with regard to industrial location are not confined to economic theories exclusively. Alternative approaches and considerations that explain industrial location exist. They are incorporated within behavioural models of location and decision-making, and aspects relating to the organization and internal operating policies of

large enterprises and their role in influencing industrial location.

Behavioural Theories of Location

The behavioural approaches to industrial location represent practical attempts to explain the complexities of decision-making and behaviour in the real world, without the rigid assumptions and constraints that characterize economic theories of location.

Pred (1967; 1969) conceptualized the idea of the locational decision-making process by assuming that man possesses limited knowledge and limited ability to use such knowledge. How closely a location which is selected by an entrepreneur approaches a "theoretical optimum" as portrayed in economic theories, depends upon the entrepreneur's exposure to the quality and quantity of information, and his ability to use the information. Those with exceptional abilities and good information will select locations close to the "theoretical optimum". Others who possess good abilities but poor information or those with poor abilities but good information may locate within or just outside the margin of profitability. The entrepreneurs with both poor abilities as well as poor information will most likely locate beyond the area where profits can be made.

Stafford (1972) proposes an interesting behavioural model of industrial location based upon an analysis of different stages (which correspond to separate geographical scales) in the decision-making process. This behavioural model is summarised below:¹

¹ Stafford's model presented here excludes in-site expansion decision-making since the discussion in this chapter focuses upon new-site location.

Stage	Appropriate techniques (*most commonly utilized)	Location principles
<hr/>		
(a) Delimitation of region for location of new production facility	regional demand projections*; regional and inter-regional input-output tables; linear programming comparative cost	
(b) Selection of finite number of feasible sites	linear programming; extrapolation from past experience	least cost
(c) Final site selection	comparative costs; judgemental integration of data and attitudes*	maximize 'psychic' income; minimize 'difficulties' (e.g. unions, governmental regulatory agencies, etc.)

After Stafford (1972, 212).

In reality, decision-makers (entrepreneurs) simultaneously deal with interacting variables, such as markets, transportation costs and raw materials, under conditions of uncertainty that include the behaviour of rival firms. According to Stafford, (1972, 213) practical location decision makers simply isolate the major variables and deal with each separately and in turn.

Decision makers first respond to market considerations and endeavour to maximise demand.¹ Demand conditions are observed to define the larger region in which a plant is to be located. Of significance is the fact that market considerations always come first,

¹ See Greenhut's comments on area-determining factor on page 17.

even when so-called "material-oriented" or "foot-loose" industries are located.

Within the delimited region, specific sites are considered on the basis of costs. The fundamental principle that guides location decision-making is thus least-cost consideration.

Lastly, with respect to final site selection, decision makers decide on the basis of comparative cost. More significantly, final site selection depends on intuition, attitudes, experience and best judgement that together influence industrial locations and compensate for the uncertainty that exists.

Large Manufacturing Enterprises and Industrial Location

The modern industrial state is increasingly dominated by large manufacturing enterprises (McNee, 1960). Such enterprises are large in terms of assets, sales, employment and particularly, geographical scope of operations. They are commonly diverse and complex in function and multi-locational in operation.

The large manufacturing enterprises, or the corporation, is considered one of man's most effective tools in organizing space for human purposes. The area within which the corporation operates is a special type of planned economic region. The spatial interaction and areal pattern of the corporate organization is neither random nor incoherent (McNee, 1958). The component units (i.e. administrative offices, branch plants, subsidiaries, etc.) which comprise the corporate spatial system are organized and maintained for specific purposes appropriate for the corporation's function. Thus it is

credible that enterprise organization is a relevant consideration for analysing industrial location, particularly with reference to branch plants and subsidiary operations. The remainder of this chapter will review the spatial organization and internal operating policies of large manufacturing enterprises. The purpose is to identify the elements of enterprise organization that influence industrial location.

The Organizational and Spatial Structure of Large Manufacturing Enterprises

Large manufacturing enterprises frequently consist of several operating units such as the administrative offices (headquarters, divisional or regional head office), main, branch, subsidiary plants, research and development units, marketing and distribution facilities (see Smith Jr., 1958; Chandler Jr., 1962; Luttrell, 1962; Parsons, 1972). Spatially, enterprise operating units are organized in a hierarchy (see Pred, 1974). The management centre or head office unit which is concerned with planning and making non-programmed or non-routine decisions is located at the top of the hierarchy. In the majority of cases, it is located in a metropolitan complex of national importance.¹

Separate lower level administrative offices such as divisional or regional head offices, preoccupied with programmed or routine decision-making occupy a level below the management centre in the hierarchy. These units are generally located in regionally or nationally important metropolitan centres.

¹ See Ullman, 1958; Gottmann, 1961; Goodwin, 1965; Johnston, 1966; Johnston and Rimmer, 1967; Warneryd, 1968; Tornqvist, 1970; Armstrong, 1972; Westaway, 1973; Pred, 1974.

Below the lower level administrative units in the organizational hierarchy are the production units. Production units serving the entire nation may be situated in cities of varying sizes. However, if such units require a large labour force, or are dependent on a wide range of agglomeration economies, namely spatial externalities, localization economies and urbanization economies, they are likely to locate in populous metropolitan areas, where such economies can be realized.

The production units with a regional orientation are usually found in metropolitan areas of regional significance or in large national metropolises from which regional functions can be performed as well.

Subregionally and locally oriented units occupy the base of the organizational hierarchy. They perform service, marketing, production or administrative functions and have a great variety of locations within different cities, including metropolitan areas of regional and national significance.

Multi-national organizations have a fourth international tier in addition to the national, regional and local hierarchical tiers. Metropolitan complexes of very considerable population customarily serve as the location for international level headquarters units or any related units involved in the coordination or either marketing or research and development.

The locational characteristics of international market manufacturing units are similar to those described for national level production units. The exception is, international market

manufacturing units have a greater preference for metropolitan centres with major port facilities.

Apart from the general spatial hierarchical pattern of large enterprises, other distributional characteristics do exist. Luttrell (1962, 144) observes that branch factories often attain some form of areal grouping. In Canada, for example, there is empirical evidence that branch plants and subsidiary companies tend to locate in proximity to parent companies (Fullerton and Hampson, 1957; Ray, 1965).

Rationale for Multiplant Operations

The spatial organization of multiplant enterprises can be attributed to different reasons. Penrose (1959) asserts that growth of an enterprise can lead to multiplant operations. Growth, through the addition of plant facilities, personnel, etc., can take place at the original enterprise facilities or in a new site. Expansion of the original facilities will be limited by diminishing returns to scale after a certain operational size¹ is reached. Beyond this certain size, expansion would logically take place at a new site.

In an earlier study, von Beckerath (1933) observed that multiplant operations are caused by market transportation conditions permitting large-scale production and distribution only through the medium of several factories. This is particularly true, when the product involved, for technical or economic reasons, has a limited shipping range or where there are insufficient sales potential in the vicinity of a single factory.

¹ This will depend on the type and nature of the operations.

Different production units are also required if the output comprises different articles which cannot be manufactured simultaneously in a plant of uniform structure and in one single productive process. Otherwise the fabrication of one article would not permit the utilization of the entire capital invested without transgressing the optimum or maximum size of the plant in question (von Beckerath, 1933, 106). Fluctuations in the market and the need for different reactions and timing of production operations often preclude the possibility of combining operations into one giant unit. Further, the production processes required for different goods is another reason for multiplant operations. This is especially true of less mechanized production of quality goods, catering to individual tastes, and which demand entirely different technical organization of the plant designed for mass production (von Beckerath, 1933, 106-7).

Branch plants or subsidiary companies are established in foreign countries to take advantage of lower costs of production factors and markets, as well as circumvent trade and tariff restrictions. Hays, et al (1972, 263) note that the incentive to establish plants in other nations is associated with vastly dissimilar wage scales and cost of material inputs in various parts of the world.¹ This leads to substantial differences in manufacturing costs depending upon the place of production. Also, the establishment of overseas

¹ This argument is also applicable to enterprises operating several branch plants or subsidiaries within a country. Branches or subsidiaries will be established and located to take advantage of regional variations in cost of factors of production (Krumme, 1972, 554).

branches and subsidiaries is frequently motivated by the strategy of enterprises to get behind tariff walls or discriminatory trade barriers erected to discourage imports of foreign goods. Another common incentive for enterprises to set up separate overseas companies is the potential markets for their goods.

Reasons that encourage the establishment of separate branch plants and subsidiaries suggest two relevant thoughts for industrial location. First, the location of branch plants or subsidiary operations depend upon the motives which induce such investments initially. Locations for new plant investments designed to capture foreign markets or surmount trade or tariff restrictions will be predetermined with respect to a country or region. Similarly, the location of new plants designed to take advantage of lower costs of production in a specific region or foreign country is also predetermined. In these cases, the location decision itself is based upon specific motives, which are related to securing new markets, continuing sales in established markets, or production cost advantages.

Secondly, it is necessary to view industrial location motives in a broader context. In this respect, location is also governed by technical considerations such as unique requirements in production, economies of scale, diversification, specialization, internal growth or marketing strategy, etc., apart from traditional notions of cost-minimization or profit maximization stressed in location theory.

Internal Operating Policies and Implications for Location

An enterprise, comprising several units in different locations, depends upon special internal operating procedures and systems of

communication to ensure the proper coordination of its activities. The procedures frequently consist of a system of responsibility and reporting between the management and the production, sales or service units. Basically, they involve the exchange of information in the form of directives and reports transferred via electronic communication equipment and the post or by individuals through face-to-face meetings (see Tornqvist, 1970; Warneryd, 1968).

As part of the management control system, enterprise administrative functions such as accounting, purchasing, legal and computer service, personnel relations, marketing, market research and advertising, are centralized at the head offices (Smith Jr., 1958; Parsons, 1972). These policies are adopted to achieve what may be crudely termed "economies of centralization" for functions which can be economically performed in one or a few strategic locations.

Empirical research indicate that internal operating policies and aspects of organizational control within large enterprises tend to influence the location of branch plants and subsidiary firms. In a study of British industry, Luttrell (1962) observed that firms having branch factories attain some form of areal grouping for certain organizational advantages. Grouping enables certain services or forms of control to be administered jointly to more than one factory. In addition, Luttrell observed that a firm already operating in more than one part of the country and planning to open another factory are inclined to select a location which is close to an existing branch. This strategy enables management personnel to conduct visits of several plants located conveniently in one area rather than scattered

in different regions.

In Canada, Fullerton and Hampson (1958) and Ray (1965) observed that American subsidiaries or branch plants are concentrated at regions which are near their American parent companies in the main industrial centres in northeastern United States. This unique geographical characteristic of United States branch plants or subsidiaries is related to their need to maintain close contact with the parent companies for consultation on technical and policy matters, particularly in the early stages of their organization and establishment (Ray, 1965, 21).

Other Aspects of Large Enterprises and Implications for Industrial Location

Apart from considerations of spatial structure and internal operating policies, there are other aspects for enterprise organization and policies relating to operational goals and location decision-making and behaviour.

Firstly, the enterprise, unlike the independent firm, is likely to be managed by those Galbraith (1967) describes as "technocrats" or paid executives, rather than owner-entrepreneurs. He argues that their motives are "assured minimum level of earnings" (Galbraith, 1967, 171), to preserve their economic welfare and ensure the enterprise's survival and growth. The greater significance of a "satisfactory" as opposed to "optimizing" performance in large enterprises implies the probability of suboptimal behaviour and consequently location-decisions that are similarly characterized.

Secondly, in large enterprises the principle of the local profit centre or the notion that "every subsidiary is responsible for

its profits" (Alsegg, 1971, 34) is losing significance. Performance with regards to profits is increasingly in terms of the whole enterprise. Decision affecting the situation of production facilities in different locations are rationalized to maximize the "total benefit" for the enterprise rather than the individual operation. In view of this total-benefit philosophy, a production unit of the enterprise need not be efficiently located in order to survive. Townroe (1969, 24), observes:-

"For large multiplant companies the exact location of their individual plants will perhaps not be seen as a very important management decision, because it is possible to shuffle production and managers between the plants relatively easily and there are sufficient financial reserves to carry closing down and opening operations..... No longer is the question 'Which site is the most favourable?', but rather, 'Shall the investment project, of which setting up a new site is part, be carried out?'".

Enterprise policies and resources can ensure the viability of any component operation by manipulating revenues and expenditures through accounting and transfer pricing practices (Shulman, 1966). In this extreme case industrial location need not be concerned with efficiency or pure economic rationale. Other considerations, such as policies that will enhance the enterprise's public image, or the overall operating performance may dominate.

Summary and Conclusion

This chapter reviewed various approaches and considerations significant for industrial location analysis. Initially, classical economic approaches to location were examined. The approaches studied were the least-cost location theories (Weber, 1929; Hoover,

1937; 1948), locational interdependence (Hotelling, 1929; Smithies, 1941; Lösch, 1954), and the general theories of location (Greenhut, 1956; Isard, 1956; Smith, 1971). Also the behavioural approaches to industrial location by Pred (1967; 1969) and Stafford (1972) were analysed. Lastly, aspects of enterprise operating policies, spatial structure, goals and decision-making behaviour, were examined as important considerations for investigations into plant location.

The review of location theories and aspects relating to enterprise organization brings into focus three sets of considerations which appear ineluctable for industrial location analysis.

The first concerns various factors that influence the location of industrial firms. In the location decision-making process entrepreneurs and/or paid company executives must confront a variety of issues. These can be cited as the importance of market areas, demand, raw material sources, costs of transportation and labour, economies of agglomeration or deglomeration, competition of rival firms, firm revenues and expenditure. In addition, decision makers have sometimes to assess plant location with respect to their personal preferences or dislikes which have little or no economic implications.

The second pertains to factors of location in relation to spatial decision making at different geographical scales. In general, issues relating to demand tend to influence the selection of broad regions for the location of firms. The choice of more specific locations (i.e. alternative situations or a particular site) is characterized by the attention on cost differentials and personal judgement and attitudes.

The third is the significance of enterprise organization as a determinant of firm location, particularly branch plants and subsidiaries. The significance of new markets, lower factor costs, tariffs, production strategies, etc., suggest that locations are sometimes predetermined. Further, production strategies, structure and internal operating policies through the removal of important administrative functions to head offices leads to spatial proximity between branch operations and parent firms. Lastly, branches need not be efficiently located in terms of economic consideration as long as the performance of branches satisfies the aspirations of the executives in control and contributes to the overall performance of the enterprise.

The three considerations discussed in this chapter will be the subject of further examination and verification in the forthcoming chapters.

CHAPTER III

DEVELOPMENT OF MANUFACTURING AND HISTORICALLY IMPORTANT LOCATION FACTORS IN THE PRAIRIES

Present characteristics of industrial location reflect in part the circumstances and forces that prevailed in the past. In a study of Prairie industrial location factors, an understanding of the Region's manufacturing development process is imperative.

This present chapter examines briefly the historical background to manufacturing in the Prairies. The analysis focuses upon factors and events that have induced or restricted the growth and structure of manufacturing. This is followed by an examination of the historically important factors of location and their significance with respect to principles of theory and evidence discussed in Chapter II.

Factors in the Development of Prairie Manufacturing

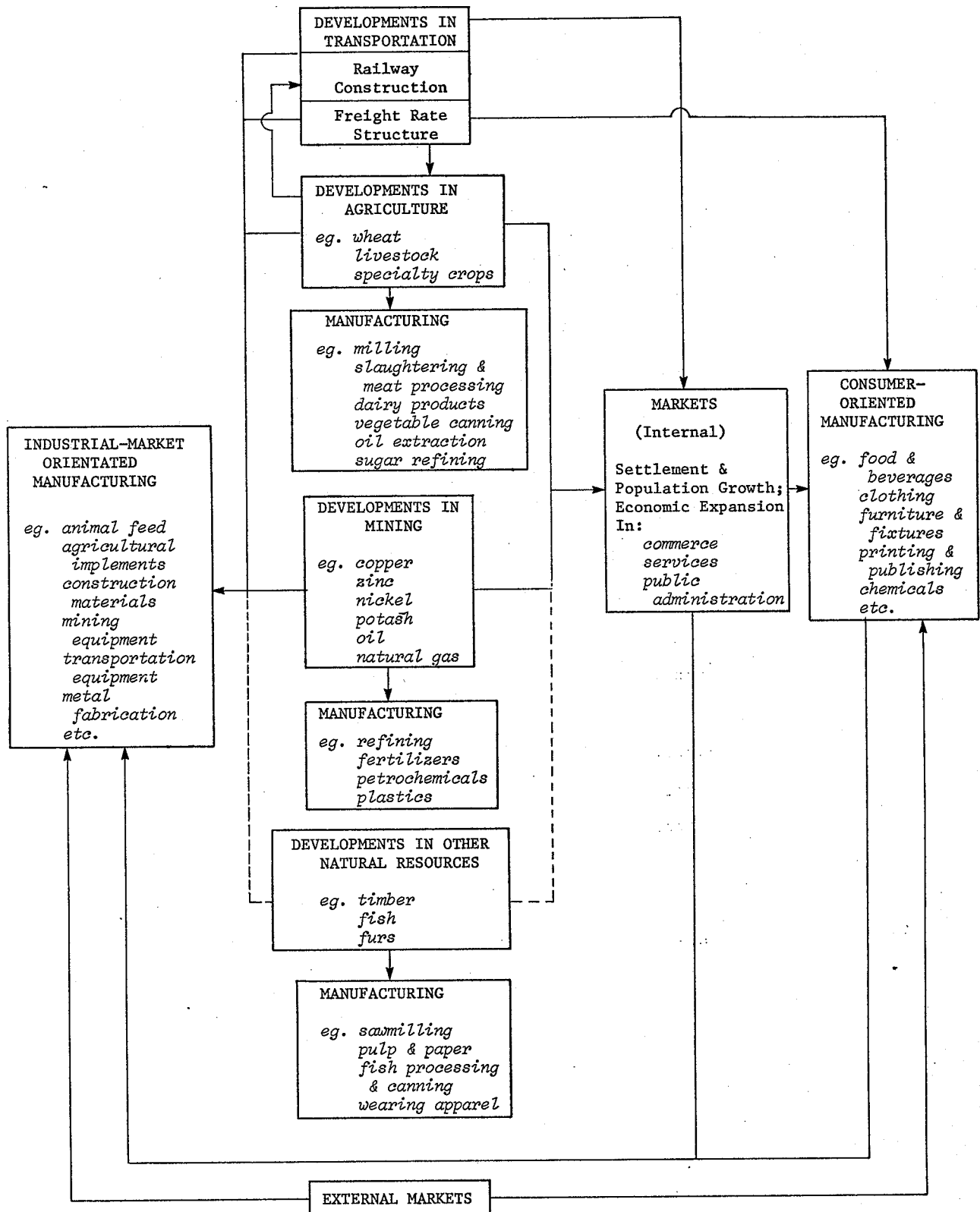
Growth and expansion of manufacturing industries in the Prairies are associated with developments in agriculture and transportation, the exploitation of natural resources and growth of markets.¹ A schematic representation of these factors contributing to the manufacturing development process is shown in Figure 2.

Developments in agriculture, mining, and other natural

¹ See Innis and Lower (1933); Currie (1942); Craick (1950); Grose (1953); Bellan (1958); Caves and Holton (1961); Stabler (1968); Wilson and Darby (1968); and Barr (1972).

Figure 2

THE MANUFACTURING DEVELOPMENT PROCESS



resources generated manufacturing industries associated with primary processing as well as more complex manufacturing. Such developments also encouraged Prairie settlement, population growth and economic expansion which in turn established an internal market for manufactures. Simultaneously, agriculture, mining and resource exploitation created the demand for a variety of industrial market-oriented goods which were eventually produced in the Prairies.

When railways were built across Western Canada, the demands arising from track construction and maintenance stimulated numerous supporting industries involving wood and metal fabrication and clothing. With the railways, came a system of freight charges which saw low costs for the outward movement of the Region's unprocessed resources and high charges on manufactured imports. Such discriminatory freight rates as well as rates based upon one specific centre encouraged industrialization within the Prairies and in particular Winnipeg.

In recent years, the growth of external market opportunities have further encouraged the development of manufacturing in consumer as well as industrial market-oriented goods.

A more detailed analysis of each factor and the impact on the development of manufacturing follows.

Developments in Agriculture and Implications for Manufacturing

Agricultural developments involving grains, especially wheat, livestock and specialty crops in the Prairies stimulated forward linkages in primary processing, and backward linkages in the

manufacture of capital inputs for farming activities. In addition, prospects for farming encouraged settlement which in turn created an internal market for consumer-oriented manufacturing.¹

The Impact of Wheat

Wheat in Prairie industrialization was significant on account of its unique importance in the Region's overall economic development. This grain was cultivated when the first agricultural settlement² in the Prairies was established in 1812. However, it was only in the mid-1890's that it became a major export commodity.³ An increase in external demand⁴ complemented by a sharp increase in the price of wheat⁵ and the greater competitiveness of Canada wheat in

¹ This point is examined in greater depth in a separate section dealing with markets.

² The Red River Settlement established by Lord Selkirk.

³ Prairie wheat was first exported to England from Winnipeg via St. Paul, Minnesota, in 1877. By 1884, regular shipments were being sent to England, but the great stimulus for wheat exports came later in the mid-1890's (Innis and Lower, 1933, 758-9).

⁴ The increase in external demand was attributed to the rapid industrialization of Great Britain, Germany, the United States and Eastern Canada. Industrialization accelerated the trend of urbanization and led to the conversion of agricultural lands from wheat to more specialized market-oriented agricultural products in Europe, Eastern Canada and the United States. The Prairies were able to fill the vacuum in wheat production in these nations and in other areas previously served by them (Mackintosh, et al., 1935; Stabler, 1968).

⁵ Beginning 1895, the price of Canadian wheat began to rise sharply. With intervening fluctuations, the trend was steeply upward for the period 1895 to 1920. Such trends helped to boost wheat exports (and subsequently its cultivation) which before this period was in a depressed state as a consequence of declining prices (see Mackintosh, et al., 1935).

world markets due to declining transportation costs¹ enhanced the export of wheat.

Favourable demand for wheat prompted its large-scale cultivation in the Prairies. One result of wheat cultivation was the establishment of grain processing industries such as flour milling. In Manitoba this was the first significant manufacturing activity to gain a firm foothold in the economy. The first plant built between 1882 and 1883 in Manitoba was the Ogilvie Milling Company which had a capacity of eight hundred barrels a day. It employed fifty workers and was one of the largest of its kind north and west of Minneapolis (Manitoba, Department of Industry and Commerce,² 1970, 34). Elsewhere in Manitoba, milling was established in the districts of Brandon, Lisgar and Macdonald. Milling operations in the Territories³ were primarily in Alberta and Assiniboine East.

By 1901, flour and grist mill products constituted the largest manufacturing industry after log products in Manitoba and the Territories (see Table 1). In Manitoba itself, there were thirty-seven establishments and 510 workers engaged in the manufacture of flour and grist mill products while in the Territories there were seventeen operations with a total of 141 employees.

¹ Between 1886 and 1906, combined rail, steamship and related transportation charges on wheat from Regina to Liverpool dropped from 35 to 21 cents per bushel. Since transportation constituted a significant portion of the delivered price, the declining rates made Prairie wheat a more competitive commodity in world markets (Richards, 1968; Stabler, 1968).

² Hereafter M.D.I.C.

³ The Territories consisted of Alberta, Assiniboia East, Assiniboia West and Saskatchewan.

TABLE 1 MANUFACTURING IN THE PRAIRIES 1901

INDUSTRY	MANITOBA		TERRITORIES*	
	No. of Establishments	No. Employed**	No. of Establishments	No. Employed**
<u>Agro-based Industries</u>				
Flour and grist mill products	37	510	17	141
Butter and cheese	69	141	23	45
<u>Consumer Goods</u>				
Bread, biscuit and confectionery	5	175		
Clothing (men's and women's)	20	303	4	31
Hats, caps, furs	3	52		
Liquors, malt	4	143	3	60
Furniture and upholstered goods	3	44		
Tobacco products	6	143		
<u>Transportation Equipment</u>				
Carriages and wagons	3	81		
Harness and saddlery	3	50		
<u>Wood Products</u>				
Log products	37	811	18	339
Lumber products	12	270	6	67
<u>Others</u>				
Foundry and machine shops	4	101	4	30
Brick, tile and pottery	19	354	15	190
Plumbing and tinsmithing	9	138		
Printing and publishing	19	433	6	40
Electric light and power	3	27		
Lime	32	94		
All other industries	36	1,371	9	225
TOTAL	324	5,241	105	1168

Source: Canada Bureau of Statistics, Fifth Census of Canada 1911, Volume 3 (Manufacturing).

*The Territories consist of Alberta, Assiniboia East, Assiniboia West and Saskatchewan.

**Excludes "outside piece workers".

Although milling constituted one of the leading industries, its size did not completely reflect the singular importance of wheat in the Prairie economy since wheat requires little processing (Phillips, 1973). The bulk of the production consisted of grains which enter into trade channels in an unprocessed form (Dunn and Gustafson¹). Wheat processing was confined largely to the milling operation and the secondary industries stimulated by wheat were quite limited. Further weight loss during milling is small and consequently there is no strong tendency for the activity to be raw material-oriented within the Prairies. Instead, milling was frequently located at transshipment points such as ports, thus avoiding one set of terminal charges. In addition, since flour is a more perishable product than grain, milling operations tend to be market-oriented rather than raw-material oriented. These factors worked against the more extensive development of milling in the Prairies (Stabler, 1968).

In a recent study, Dunn and Gustafson verified that agriculture in the Prairies have had only limited effectiveness in stimulating secondary industries in Alberta. During the period 1958-1964, only 16-28 per cent of the value of primary manufacturing in Alberta were allied to agricultural production (Table 2).

Excluding the high percentage year, 1961, figures for Saskatchewan were between 6 and 11 per cent. As for Manitoba, the percentages were relatively higher (i.e. 37-80, excluding 1961) as a result of a smaller agricultural base.

¹ This work is undated.

TABLE 2 VALUE OF PRIMARY MANUFACTURING ALLIED TO AGRICULTURE AS
A PERCENTAGE OF BASIC PRODUCTION IN AGRICULTURE,
PRAIRIE PROVINCES 1953, 1961-64

	1953	1961*	1962	1963	1964
Alberta	16	28	24	22	28
Saskatchewan	6	23	8	6	11
Manitoba	40	80	37	50	47

Source: Dunn and Gustafson, 12.

* Primary agricultural production was abnormally low throughout Canada in 1961, accounting for the high ratios for that year.

Apart from milling, wheat cultivation also contributed towards the growth of the metal fabrication, construction material, farming equipment and supply industries. Although the large scale nature of wheat cultivation meant a valuable market for agricultural machinery, this industry did not develop until recently. During the immediate postwar period the Canadian Co-operative Implements Limited was established by Prairie farmers to manufacture mechanical tillers. In 1952, Versatile Manufacturing Limited, an Eastern Canadian firm moved its operations to Winnipeg to combat increased freight rates as well as to be near its primary market area of Western Canada and the north-central United States.¹

The Impact of Livestock

As early as the 1880's, there were indications that the Prairie grain economy was gradually diversifying with livestock rearing

¹ See briefs submitted by the two named Companies in Kuz (1974, 103-111).

and dairying. By 1885, it was estimated that there were over 50,000 cattle and 10,000 sheep in the District of Alberta within the Territories (Richards, 1968, 410). The livestock industry grew eventually to proportions that enabled exports from the Region. In 1889, live cattle were being exported from Manitoba to Great Britain (Bellan, 1958, 83-84). This continued until 1912 when large numbers of cattle as well as sheep were exported to Britain. After 1912, exports were extended to the United States (Richards, 1968, 410).

The existence of a livestock industry in the Prairies and a local demand for meat products helped to launch the slaughtering and meat processing activities. Much of the early growth prior to 1874 took place in Manitoba where local butchers initially did most of the meat processing. These processing activities expanded rapidly and in 1913 a stockyard was opened in St. Boniface to permit the handling of livestock on a larger scale (M.D.I.C., 1970). Elsewhere, slaughtering and meat-packing plants were also established in Calgary and Edmonton to process meat for local markets and shipment to other parts of Canada (Putnam and Putnam, 1970, 280). During the last 25 years of the Nineteenth Century, two key factors, namely the development of refrigerated rail cars and completion of the transcontinental Canadian Pacific Railway, spurred the establishment of several slaughtering and meat packing plants (Parliament, 1974, 76).

Slaughtering and meat packing were among the five leading manufacturing industries in 1931 in the Prairies (Table 3). In Manitoba and Alberta, it was the top-ranking industry in terms of gross value of production. The industry grossed \$15.86 million and

TABLE 3 FIVE LEADING MANUFACTURING INDUSTRIES* IN THE PRAIRIE PROVINCES
1931 RANKED BY GROSS VALUE OF PRODUCTION

	<u>No.</u> <u>Employed</u>	<u>Gross Value of</u> <u>Production</u> (<u>\$ million</u>)
<u>MANITOBA</u>		
1) Slaughtering and meat packing	1,166	15.86
2) Railway rolling stock	5,345	13.73
3) Flour and feed mills	524	8.41
4) Butter and cheese	989	7.88
5) Printing and publishing	1,165	4.69
<u>SASKATCHEWAN</u>		
1) Flour and feed mills	506	10.08
2) Butter and cheese	701	6.57
3) Slaughtering and meat packing	392	2.86
4) Printing and publishing	816	2.77
5) Breweries	234	2.57
<u>ALBERTA</u>		
1) Slaughtering and meat packing	1,144	10.41
2) Flour and feed mills	692	9.35
3) Petroleum products	318	8.39
4) Butter and cheese	582	5.85
5) Railway rolling stock	1,719	3.91

Source: Dominion Bureau of Statistics, The Manufacturing Industries
 Canada 1931, Summary Report.

* Excludes "Central Electric Stations".

employed 1,166 workers in Manitoba; in Alberta the industry produced goods valued at \$10.41 million and provided jobs for 1,144 persons. Slaughtering and meat packing in Saskatchewan was the third largest industry after flour and feed milling and butter and cheese manufacturing. In 1931, the industry produced \$2.86 million worth of goods and employed 392 persons.

Slaughtering and meat packing remain an important manufacturing activity for the Prairie provinces. Its rapid expansion over the past two decades was a response to the trends in processing livestock within the region of origin and in shipping the finished products to the markets in Eastern Canada and British Columbia (Putnam and Putnam, 1970, 294).

Part of the livestock industry includes dairy farming. During the early period of settlement, dairy products such as butter and cheese were imported, largely from Ontario. However, by the 1880's both these products were being manufactured in Manitoba for export (Bellan, 1958, 85). At the present, dairy farming is most prevalent in Manitoba and Alberta where there are large cities to be supplied with fluid milk. The distribution of dairy farming and market areas have influenced the location of milk processing plants in Southern Manitoba and Central Alberta (Putnam and Putnam, 1970, 278; Weir and Matthews, 1971, 22).

The Impact of Specialty Crops

The gradual shift from wheat towards cultivation of specialty crops has also contributed to the growth of manufacturing. In Manitoba, for example, agriculture is increasingly known for the

production of crops such as sunflower seeds and sugar beets and vegetables. The cultivation of such crops have led directly to the establishment of local processing industries. Vegetable processing plants are located at Winkler, Carberry, Morden, Portage la Prairie and Winnipeg. At Altona, a plant manufacturing vegetable oil from sunflower seeds has been established (see Pattle, 1972), while sugar beet has been refined into sugar at Winnipeg since 1940.

Developments in Railway Transportation and Implications for Manufacturing

Railways have dominated transportation in the Prairies.¹ Its impact upon the development and location of Prairie manufacturing has been primarily the result of the construction process and the freight rate structure.

The Impact of Railway Construction

The building of the first railway line across Western Canada was motivated by political reasons. The fear of Western Canada developing a "north-south"² rather than "east-west"³ economic and

¹ In spite of the considerable efforts to nurture an adequate system of roads and pipelines, the railroads dominate most of the interprovincial traffic pertinent to the Prairies. From Regina to navigable waterways is a haul of 1,100 miles to the East and 800 miles to the West, and 800 miles to the Lakehead. According to estimates of the relative advantages of truck and rail, such distances prohibit motor carriages of substantial amounts of freight. Regarding Prairie exports to other provinces, the railways enjoy a veritable captive market. The same is true with respect to goods coming into the Prairies from Eastern Canada and to a lesser extent from British Columbia (see Wilson and Darby, 1968, 2-3).

² Canada-United States.

³ Eastern Canada and Western Canada.

political alignment induced the Dominion government to propose a transcontinental railway. The matter which ultimately forced its construction was the admission of British Columbia into the Confederation in 1871. Under the terms of union, such a railway was to be begun in two years and completed within ten. The transcontinental line was eventually completed in 1886 (see Currie, 1942; Glazebrook, 1964). Subsequent expansion of feeder lines throughout the Prairie ecumene was the result of rapid agricultural expansion and the need for efficient transportation in the movement of grain (Mackintosh, 1934).

The massive railway construction programme was a significant boost to Prairie manufacturing in general, and Manitoba's industries in particular. The coming of the railways to Winnipeg in 1886 helped to induce the growth and expansion of several industries. For example, the demands of railway construction and track maintenance led to the production of tents, construction materials of lumber and iron (Bellan, 1958, 100) and work clothes for railroad workers (Hastie, 1974, 133). Later, industries in Manitoba received a boost, when the Canadian National Railway adopted a policy of "regional buying", of railway equipment, which involved acquiring a greater portion of its requirements particularly in Winnipeg (Bellan, 1958, 309).

Apart from the stimulus to supporting industries, the railway rolling stock industry was also established at Winnipeg. Winnipeg's situation at the eastern extremity of the Prairie railway network was selected as the location to produce equipment and supplies for the railway companies (Craick, 1950, 52). The railway rolling stock

industry started with car repair work but eventually expanded into the manufacturing of refrigerator and box cars as well as rolling stock components such as wheels, brakes, holsters and springs (M.D.I.C., 1970).

The effect of railway construction on manufacturing was not confined to Manitoba alone. The railway rolling stock industry was also established in Alberta and in 1931, it was the fifth largest industry in terms of gross value of production (see Table 3). In Manitoba, the greater importance of this activity was underscored by the fact that it was the largest manufacturing industry after slaughtering and meat packing in 1931.

The Impact of Freight Rates

Railway freight rates in the Prairies had a dual effect on the development of Prairie secondary industries. They have induced the growth of industries, and also retarded manufacturing development.

When the transcontinental line was completed in 1886, a 15 per cent reduction in freight rates on goods¹ transported west of Winnipeg was instituted in recognition of its importance as a distributing centre. Such discrimination worked in favour of Winnipeg as a location for manufacturing (Bellan, 1958, 92-3).

In 1897, the Crow's Nest Pass Agreement was signed by the Dominion Government and the Canadian Pacific Railway Company. The Agreement granted the Railway a cash bonus of \$3.4 million for the construction of a railway from Lethbridge through Crow's Nest to Nelson,

¹ Including those manufactured in Winnipeg.

British Columbia. In return the Company undertook to reduce by three cents per hundred pounds the then existing rates on grain and flour from all points in the West to Fort William, Port Arthur and points East thereof by September 1, 1899. From Brandon, which was roughly the centre of wheat production at that time this reduction amounted to 19 per cent.

In addition, the rates were cut on various commodities from Eastern Canada westbound. Rates for fresh fruits were reduced $33\frac{1}{3}$ per cent, coal-oil (kerosene) 20 per cent, cordage, implements, pipe, horseshoes, wine, building materials, livestock, and furniture, 10 per cent (see Currie, 1967).

Even though rates on commodities were reduced, freight charges on manufactured goods were higher in comparison to those for raw materials. This system of charges favoured the establishment in Winnipeg of industries which fabricated heavy raw materials into products sold in Western Canada. For example, the lower freight charges on pig iron and steel billets compared to ironware and structural steel forms, contributed significantly to the establishment of foundaries and metal works which obtained basic materials from Eastern Canada or from the United States (Bellan, 1958, 101).

The general policy of low freight rates levied upon Prairie exports particularly wheat, and higher rates for goods imported into the Prairies have become a permanent feature of transportation in the Prairies. Wilson and Darby (1968) noted that as far as imports were concerned, the relatively high rates on Prairie imports from the East, served as a protective shield for old, new or potential Prairie

manufacturing. While on the one hand, the high freight charges on goods imported into the Prairies have encouraged industrialization, low freight rates on grain exports helped to preserve and strengthen the agrarian structure of the Prairie economy. Artificially low transport costs on wheat regulated by legislation have maintained the Region's comparative advantage in agriculture vis-a-vis the rest of Canada.

Apart from freight rates, high transportation costs as a consequence of great distance from input sources and small local markets were inhibiting factors in Prairie manufacturing development. Bellan (1958, 102) noted that the greater proximity of Eastern firms to raw materials, i.e. chemicals and textiles from overseas, coal and steel from the United States together with their location in the midst of Canada's largest concentrations of population, severely limited industrial expansion in Winnipeg. Firms in Winnipeg were incapable of manufacturing for Eastern markets. This was particularly true of products which utilized raw materials from the East. In comparison to products made in Eastern Canada, Winnipeg's products would have cost more because of the additional transport costs incurred in shipping raw materials.

By the same token, Winnipeg was an unfavourable location for any plant which produced such goods for nationwide distribution. Where the portion of total output marketed in Eastern Canada was large, the advantage of an Eastern location was overwhelming (Bellan, 1958, 102).

During the early years of industrialization in Winnipeg, such

problems of excessive distance from Eastern markets and high transportation costs have turned potential industries away from the city. For example, in 1894, McCormick Company, which made agricultural equipment announced their intention of building a branch plant in Canada. The Winnipeg city council immediately attempted to induce the firm to locate in the city by offering it special privileges. After considering the location, the Company issued the following statement:

"We do not think the city of Winnipeg is so situated as to permit the location of a factory being operated in our line of business. Its product would have to be shipped east as well as west and the raw material of which our machines are composed is largely steel and malleable castings. We cannot in consequence entertain any proposition your city could offer to us." The Commercial (Winnipeg), Vol.II, p.980, quoted in Bellan, (1958, 103).

Fortunately, this problem is gradually diminishing and is not affecting the growth of industries which manufacture products of high value in relation to transportation costs. Some of these industries will be examined in the section dealing with external markets.

Mining Developments and Implications for Manufacturing

Since the 1930's, developments in mining of oil, natural gas, metallic and non-metallic minerals have contributed increasingly to the growth and diversification of the Prairie manufacturing sector. This has occurred through forward linkages in processing and refining and backward linkages through the inducement of manufacturing to serve the mining industry.

The Impact of Oil and Natural Gas

Throughout the 1950's the oil and gas boom,¹ gave a strong impetus to Prairie manufacturing. The massive demand for steel pipes in the construction of oil and gas pipelines was an important boost to Alberta's metal fabrication industry. In Edmonton, existing steel-making facilities were expanded and in 1960, four pipe mills were constructed. The continued growth of the oil and gas industry led to the establishment of ancillary enterprises such as the manufacture of drilling equipment and supplies (see Bank of Nova Scotia, 1967).

Forward linkages in the oil and gas industry were associated with natural gas processing, and the manufacture of petrochemicals. The growth in natural gas output stimulated a substantial increase in gas processing. This has occurred because much of the recently discovered natural gas contains hydrogen sulphide which has to be removed before the gas is transmitted by pipelines (Bank of Nova Scotia, 1971). These sulphur recovery plants are distributed throughout the gas-producing areas with concentrations in the Hinton-Whitecourt region, the Red Deer-Calgary region and the area southwest of Lethbridge.

Petrochemicals manufactured in the Prairies are primarily a derivative of natural gas. Apart from elemental sulphur, derived from natural gas processing, Alberta produces a large proportion of

¹ For a brief discussion of the oil and natural gas industries in the Prairies, see Easterbrook and Aitken (1961); Canadian Imperial Bank of Commerce (1964) and Bank of Nova Scotia (1967; 1971).

Canada's propane, butane and pentanes plus. The remaining supplies come from Saskatchewan and British Columbia. In recent years, further developments in the industry involved the expansion of existing petrochemical facilities in Edmonton (vinyl chloride) as well as the establishment of new operations in Medicine Hat and Red Deer to produce methanol and ethylene respectively (Bank of Nova Scotia, 1971; 1975).

Despite the dynamic developments in petrochemical manufacture, the multiplier effects of oil and natural gas in inducing forward linkages in manufacturing has been limited. For example, crude oil has stimulated little by way of forward linkages and most of the commodity produced in the Prairies leaves in crude form (Dunn and Gustafson, 16-17). This has occurred because oil refining is market-, rather than raw-material oriented (see Caves and Holton, 1961, 214). In addition, petrochemicals manufactured in the Prairies consist mainly of feedstock and basic chemicals rather than intermediate or final chemicals, and these developments indicate a strengthening of the existing narrow structure of the industry. In contrast, later stages of petrochemical manufacture are being expanded in Eastern Canada, especially Montreal and Sarnia (Bank of Nova Scotia, 1975).

The Impact of Metallic Minerals

Metallic minerals were first mined in the Prairies early in the Nineteenth Century. However, large-scale developments in the industry took place only after the 1930's and particularly in the 1950's. During the early 1950's, uranium mining commenced at Beaverlodge Lake in Northern Saskatchewan while a new nickel-copper

mine was opened at Lynn Lake in Northern Manitoba. The ore from Lynn Lake was processed at a new nickel refinery near Edmonton. In the mid-Fifties, base metal mining was extended into the Snow Lake area east of Flin Flon. At Flin Flon itself, near the Manitoba-Saskatchewan border, the Hudson Bay Mining and Smelting Company was engaged in extracting copper. The late Fifties saw the initial development of a further major nickel discovery in Northern Manitoba at the new townsite of Thompson.

Almost all mining of metallic minerals are concentrated in Northern Manitoba and in Northern Saskatchewan in the Cambrian shield area of the Prairies.

The impact of metallic mineral mining on manufacturing is limited primarily to processing of the ore. For example, operations at Lynn Lake include a concentrator, while at Flin Flon there is a concentrator and zinc forming plant. The nickel mining operations at Thompson include a smelter and refinery.

Once again manufacturing as an outgrowth of the mining industry is limited largely to the processing activities which involve the separation of valueless and bulky bedrock from the minerals at the mining site. Thereafter, the pure metals obtained are so valuable in terms of their unit weight that shipping charges to distant manufacturing centres offer no locational constraint. Consequently, the manufacture of metal products beyond the refining stage has failed to develop within the Prairies (Stabler, 1968, 53-54).

The Impact of Non-Metallic Minerals

Non-metallic minerals produced in the Prairies include gypsum

salt, limestone, lime and sand and potash. The exploitation of non-metallic minerals has produced relatively little by way of forward linkages in comparison to other natural resource industries particularly oil and natural gas. Manufacturing associated with non-metallic minerals is mainly in the production of cement, bricks, tiles, salt and fertilizer.

Amongst the different non-metallic minerals, potash has had the most significant impact economically. Mining of potash is concentrated around Saskatoon, Esterhazy and the Manitoba-Saskatchewan border. The reserves are enormous and when the nine mines are in full operation, Saskatchewan is expected to become the world's largest producer of potash.

Most potash mined is used for fertilizer although approximately five per cent of total production is utilized in numerous industrial processes. Despite the importance of the potash production, the industry is not expected to induce linkages comparable to those in the petroleum and natural gas industries in Alberta. There are several reasons for this. Although potash has a very large number of end uses, it is a minor input in all of the industrial processes in which its derivatives are utilized. Thus it is unlikely that industrial users of potassium compounds will be attracted to locate in the Prairies. In its main use as a fertilizer, the end product is created by simply separating the potash from the salts with which it is found. Frequently, this step is performed at the mine itself, where the potash is mixed with other chemicals in the desired proportions to make various types of

fertilizers. Apart from primary processing there is only speculation that some opportunity will exist for the local manufacture of replacement parts and chemicals used in the mining and refining operations (Stabler, 1968, 63-64).

Other Resource Developments and Implications for Manufacturing

Other natural resources that have contributed to the development of Prairie manufacturing include timber, fish and to a limited degree, furs.

The Impact of Timber

During the settlement era in the Prairies (1896-1926), the availability of timber in the southern margins of the subarctic adjacent to the Great Plains and in the Saskatchewan River drainage basin, led to the establishment of local sawmilling industries. In 1927, a newsprint mill was established at Pine Falls, Manitoba. More recently, significant developments in pulp and paper manufacturing have occurred in all three Prairie provinces, at Whitecourt (Alberta), Prince Albert (Saskatchewan) and The Pas (Manitoba).

At The Pas, Northern Manitoba, four major operations forming an integrated forest complex has been completed. The largest operation is a pulp and sawmill complex. Two other operations using timber resources include a sawmill and paper mill. The fourth operation is a firm engaged in the manufacture of pulp and paper machinery and other allied industrial equipment to supply firms at The Pas complex as well as export markets (see M.D.I.C., 1970, 31-32).

The Impact of Fisheries

Commercial fishing in the Prairies has recently yielded an average catch of approximately 45 million pounds valued at between 5 and 7 million dollars annually.¹ Of the three provinces, Manitoba is by far the largest producer accounting for nearly 50 per cent of the Prairie total; Saskatchewan and Alberta each produce about 25 per cent. In Manitoba, where there are over 40,000 square miles of freshwater areas, commercial fishing is an important activity in Lakes Winnipeg, Manitoba and Winnipegosis, the smaller lakes in the north, and rivers. Lakes are also the main commercial fishing areas in both Saskatchewan and Alberta.

Secondary industries associated with the commercial fishing are of little importance. They are confined largely to processing and packing activities. The fish prepared for marketing or export is either frozen whole or filleted. Apart from one fish cannery in Winnipeg, no other ventures into the canning business have been undertaken although such manufacturing process have been considered feasible for Manitoba (Manitoba, 1969, 94). Virtually all present processing facilities for fish are located at the source areas (see Weir and William, 1971, 26).

The Impact of Furs

The fur industry in Canada has declined substantially over the past 150 years. This same trend has also afflicted the industry within the Prairies. The fur industry of the Prairies which includes ranched furs and wildlife pelts account for 32.3 per cent of total

¹ Statistics Canada; Canada Year Book, 1972, 680.

Canadian production value at \$11.53, in 1970 (Statistics Canada, 1972, 704).

Although the industry has had by far the longest history of existence on the Prairies, it has had little significant impact upon the three provincial economies. Unlike other resources, industries developing as a result of the fur trapping and farming are minimal. The only industries dependent on the fur industry for their existence are feed supply, fur dressing and dyeing industries.

Growth of Markets and Prairie Manufacturing

The single most important factor in the development of Prairie manufacturing industries has been internal and external markets.

Internal Markets and Manufacturing

During the late 1890's and early 1900's settlement of the Prairies generated huge increases in Prairie demand for manufactured goods. The significance of the local Prairie market for economic development was duly recognized by the local business community which agitated for local Prairie manufacturing industries. A Winnipeg news media carried the following statement:

"The market for manufactures in Western Canada is not only extensive but constantly growing. Goods manufactured in Manitoba have a distinct competitive advantage over those made in older countries. From the east, goods must overcome a freight haul of a thousand miles. From the west, they must cross the Rocky Mountains while from the south they have the disadvantage of custom duties. Manitoba manufacturers are able to place their wares on the markets of the Prairies without loss of time or excessive freight and custom tolls. They also secure the advantage of sentiment for the West favours home production". (Quoted in M.D.I.C., 1970, 33)

As western demand for manufactures increased, there was an

unprecedented growth in Winnipeg's manufacturing facilities. Most important industries were the flour mills and food packing plants, sawmills, sash and planing mills and brick factories (see Bellan, 1958; Innis and Lower, 1933, 765). Further, local metal firms produced machinery required in the country and terminal elevators, steel bridges and switches for use by railways. In 1906, the Dominion Bridge Company, which had previously shipped steel shapes from its Montreal plant, built a large machine shop in Winnipeg to handle its western business (Bellan, 1958, 152).

Apart from industrial market-oriented manufactures there were numerous small service-oriented industries which were geographically distributed with the Prairie population. These industries had little in common with specialist and durable manufacturing because of their small average size and integration into and dependence on, the local community (Phillips, 1973, 45).

The market has been, on the one hand, the prime inducement to new industries and expansion of manufacturing. On the other, the small size of the market has retarded further manufacturing development and restricted the industrial structure. This is evident in the nonexistence, or nominal representation of a number of industries. Industries producing farm implements, machinery and major appliances, business machines, radio, televisions, receivers, communication equipment, toys, pharmaceuticals and medicines, scientific and professional equipment, paint and varnishers, soap and cleaning compounds, toilet preparations, are examples (Dunn and Gustafson, 19-21).

Wilson and Darby (1968, 114) noted that since the structure of freight rates established a Prairie market for manufacturing to develop, the magnitude of secondary industries thereafter was directly dependent upon the size of the Prairie market. Accordingly, the size of the Prairie market has been an important factor explaining the relative dearth of manufacturing in the Prairies. Evidently, for certain manufacturing industries, the economies of scale are such that the size of the Prairie market effectively precludes their location outside the major manufacturing areas in Ontario and Quebec. Hence, manufacturing which exists in the Prairies is characterized by extreme market orientation and relatively small economies of scale.

Bellan (1958, 100) also observed that the narrow industrial structure in the Prairies was due to the limited possibilities for local industry. It was restricted to those fields where proximity to western markets or to western materials was crucially significant.

The Impact of External Markets

Manufacturing for exports is not entirely a recent phenomena in the Prairies. Flour milled in the Prairies were being exported early in the present Century (see Board of Grain Commission, 1921). In addition, food products such as butter, cheese and meat were processed in the Prairies and exported to Eastern Canada.

Currently, a wide variety of Prairie industries are producing for local consumption as well as export to other parts of Canada and the world. Three sets of information outline the nature of these developments.

Firstly, location quotients for individual manufacturing

activities provide inferences of Prairie industrial exports (Table 4). Location quotients are useful for identifying whether individual manufacturing industries are "export-oriented" (see Isard, 1960, 125; Wong, 1969). Regions containing industries with location quotients greater than unity can be regarded as "export-oriented". An examination of location quotients for manufacturing in 1961 and 1971 shows that Prairie "export" industries include food and beverages, clothing, wood products, furniture and fixtures, printing and publishing and allied products, metal fabricating, transportation equipment and non-metallic mineral products. Each province specializes in different "export" products. For example, Manitoba tends to dominate in clothing, furniture and fixtures and transportation equipment. Saskatchewan leads Prairie "exports" in the food and beverages and printing and publishing categories. Alberta's "exports" consist primarily of chemicals, petroleum, wood and metal products.

Secondly, there is direct evidence of Prairie industrial exports. For example, several Manitoba firms have successfully sold metal and machinery products throughout the Prairies and the mid-western United States (Kuz, 1974, 71). The emphasis on exports is especially pronounced in Manitoba's transportation equipment and clothing industries. Transportation products exported include intercity and school buses, transit vehicles and aircraft.¹

¹ See briefs submitted by Motor Coach Industries Limited and Flyer Industries Limited in Kuz (1974, 89-95); Thornhill (1974).

TABLE 4 LOCATION QUOTIENTS⁺ OF MANUFACTURING INDUSTRIES IN THE PRAIRIE PROVINCES, 1961 AND 1971

Industry Groups	Manitoba		Saskatchewan		Alberta		Prairie Provinces	
	1961	1971	1961	1971	1961	1971	1961	1971
Food and beverages	1.57	1.73	3.13	2.99	1.95	2.00	1.97	2.00
Tobacco products	-	*	-	-	-	*	-	*
Rubber and plastic products	*	0.30	-	*	*	0.74	*	*
Leather	0.54	0.78	*	*	0.08	0.22	*	*
Textiles	0.27	0.33	0.12	0.19	0.20	0.26	0.22	0.29
Knitting mills	0.19	0.43	-	-	0.06	*	0.06	*
Clothing	2.00	2.32	0.28	*	0.46	*	1.13	*
Wood	0.41	0.48	1.11	1.25	1.40	1.71	0.92	1.14
Furniture and fixtures	1.69	1.38	0.23	0.15	0.92	0.81	1.15	0.96
Paper and allied products	0.50	0.10	0.19	*	0.42	0.41	0.43	*
Printing, publishing and allied products	1.61	1.67	2.14	2.04	1.25	1.37	1.53	1.52
Primary metals	0.88	0.74	0.94	*	0.57	0.79	0.76	*
Metal fabricating	1.07	1.05	0.84	0.80	1.25	1.21	1.12	1.08
Machinery	0.79	1.21	0.36	0.93	0.33	0.79	0.51	0.98
Transportation equipment	1.47	1.02	0.12	0.26	0.92	0.74	1.05	0.80
Electrical products	0.31	0.47	-	*	*	0.28	-	*
Non-metallic mineral products	1.06	0.81	1.48	1.52	2.77	2.06	1.81	1.94
Petroleum and coal products	*	*	*	4.33	3.91	2.33	-	*
Chemical and chemical products	0.41	0.43	0.15	0.28	1.20	0.94	0.68	0.64
Miscellaneous manufacturing	0.61	*	0.28	0.57	0.39	0.63	0.47	*

Source: Dominion Bureau of Statistics, Manufacturing Industries of Canada: Prairie Provinces 1961; Statistics Canada, Manufacturing Industries of Canada: Prairie Provinces 1971.

⁺ Analysis based on total employment in manufacturing.

* Data confidential.

TABLE 4 Contd.

$$\text{Location quotient} = \frac{\frac{X_p}{E_p}}{\frac{X_n}{E_n}}$$

where X_p = employment in industry X in province (or region)
 X_n = employment in industry X in nation
 E_p = total manufacturing employment in province (or region)
 E_n = total manufacturing employment in nation.

Location quotient = 1: the province (or region) and the nation specialize to an equal degree in the industry concerned
 Location quotient > 1: the province (or region) is more specialized than the nation in the industry concerned
 Location quotient < 1: the province (or region) is less specialized than the nation in the industry concerned.

Furthermore, considerable export activity has also been generated in the manufacture of recreational vehicles and accessories ranging from fiberglass truck tops, mobile homes and all-terrain vehicles (see M.D.I.C., 1974, 35-37).

In the clothing industry, the production of fashion coats, jackets, sweaters and sportswear from Manitoba's garment factories account for approximately 20 per cent of Canada's apparel exports (M.D.I.C., 1970, 37-38).

Thirdly, evidence of growing external markets is apparent in the distribution of marketing offices maintained by Prairie manufacturers in other parts of Canada and the world. Private listings¹ of companies show that large Prairie firms operate sales offices or marketing outlets in British Columbia, Ontario, Quebec, the United States, and in some instances, other foreign nations as well.

External markets have had two broad implications for Prairie manufacturing. Firstly, such markets have enabled existing industries to expand. The clothing industry for example, was established initially on the basis of local Prairie demand, but significant expansion in the industry was stimulated by the opportunities for export. In addition, export potentiality has contributed towards the growth of specialized manufacturing, such as the aerospace, aircraft and aircraft components industries. It seems obvious that without export possibilities, such industries would not have been established in the Prairies.

¹ See for example the Canadian Trade Index.

The Status of Manufacturing

Prairie Manufacturing vis-a-vis Canada as a Whole

Manufacturing in the Prairies in comparison to Canada as a whole is relatively underdeveloped. In Table 5, location quotients computed for the different economic sectors during the years 1931, 1951, 1961 and 1971, provide evidence of this situation. The figures reveal that Prairie manufacturing for the years specified have values between 0.34 and 0.48. This indicates that the region is less than half as specialized as Canada in manufacturing. During the period under analysis, the location quotient for manufacturing has increased steadily. It signifies that the Prairies are slowly but gradually becoming more specialized in manufacturing. At the present, however, the economic strength of the Prairies remains in agriculture, mining, construction, transportation and communication and trade.

Structure of Manufacturing

Manufacturing activities in the Prairies are dominated by the production of food and beverages (Table 6). In 1971, 22.8 per cent of Manitoba's total manufacturing employment was in this group while Saskatchewan and Alberta had 40.1 and 26.9 per cent respectively. The main activities in this group consisted largely of meat and poultry industries, and slaughtering and meat processing.

In Manitoba, other important manufacturing activities included clothing industries, transportation equipment, metal fabricating and printing and publishing. These four industries employed 13.9, 9.5 and 8.8 and 8.6 per cent of the Province's manufacturing labour force

TABLE 5 LOCATION QUOTIENTS* FOR SECTORS OF THE PRAIRIE ECONOMY 1931-1971

SECTORS	PRAIRIES			
	1931	1951	1961	1971
AGRICULTURE	1.72	2.25	2.46	2.84
FORESTRY, FISHING, TRAPPING	0.44	0.24	0.30	0.25
MINING	0.85	1.15	1.25	1.75
MANUFACTURING	0.34	0.42	0.41	0.48
UTILITIES	0.64	0.77	1.00	0.90
CONSTRUCTION	0.66	0.86	0.98	1.02
TRANSPORT AND COMMUNICATION	0.94	1.11	1.10	1.09
TRADE	0.85	1.00	1.03	1.02
FINANCE AND INSURANCE	0.79	0.83	0.83	0.85
SERVICE (INCLUDES PUBLIC ADMINISTRATION)	0.87	0.95	0.95	1.00
UNSPECIFIED	0.73	0.53	0.93	0.91

Source: Dominion Bureau of Statistics, Censuses of Canada, 1931, 1951, 1961; Statistics Canada, Census of Canada, 1971.

* Analysis based upon the Distribution of Labour Force by Industries. Data for 1931 and 1951 based on labour force of 14 years and over; 1961 and 1971, 15 years and over.

$$\text{Location quotient} = \frac{\frac{x_p}{E_p}}{\frac{x_n}{E_n}}$$

where, x_p = employment in sector x in region,
 x_n = employment in sector x in nation,
 E_p = total employment in region,
 E_n = total employment in nation.

Location quotient = 1 : the region and the nation specialize to an equal degree in the sector concerned.

Location quotient > 1 : the region is more specialized than the nation in the sector concerned.

Location quotient < 1 : the region is less specialized than the nation in the industry concerned.

TABLE 6 PERCENTAGE DISTRIBUTION OF EMPLOYMENT IN PRAIRIEMANUFACTURING INDUSTRIES 1971

Industry Groups	Manitoba	Saskatchewan	Alberta	Prairie Provinces
Food and beverages	22.8	40.1	26.9	26.8
Tobacco products	*	-	*	*
Rubber and plastic products	0.9	*	2.0	*
Leather	1.4	*	0.5	*
Textiles	1.4	0.8	1.1	1.2
Knitting mills	0.7	-	*	*
Clothing	13.9	*	*	*
Wood	2.8	7.1	9.6	6.4
Furniture and fixtures	3.7	0.5	2.1	2.6
Paper and allied products	3.9	*	3.0	*
Printing, publishing and allied products	8.6	10.5	7.0	8.1
Primary metals	5.3	*	5.5	*
Metal fabricating	8.8	6.8	10.2	9.2
Machinery	5.2	4.1	3.4	4.3
Transportation equipment	9.5	2.5	6.9	7.4
Electrical products	3.5	*	2.1	*
Non-metallic mineral products	2.5	4.7	6.5	6.1
Petroleum and coal products	*	4.0	2.1	*
Chemical and chemical products	2.1	1.4	4.5	3.1
Miscellaneous manufacturing	*	2.1	2.3	*
Grouped data of confidential items	3.0	15.4	4.3	24.8
Total	100.0%	100.0%	100.0%	100.0%

Source: Statistics Canada, Manufacturing Industries of Canada: Prairie Provinces, 1971.

* Data confidential.

respectively. In clothing manufacture, employment was concentrated in producing men's and women's clothing. A large proportion of transport equipment employees was engaged in the fabrication of aircraft and aircraft parts, motor vehicle parts and trailers. Metal fabrication consisted of several individual activities, however, approximately 50 per cent of the labour force in this category was engaged in metal stamping. The printing and publishing industry employed over 4,000 persons; half of them were in printing and publishing, while the remainder were in activities allied to printing.¹

The rest of Manitoba's manufacturing consisted of industries which included leather, textiles to chemicals. Most of these industries had less than 4 per cent share of the industrial labour force.

With the exception of grouped data of confidential items, and food and beverages, other industries of significance in Saskatchewan were wood products, publishing and printing and metal fabricating, which employed 7.1, 10.5 and 6.8 per cent of the provincial industrial labour force respectively. The wood industries consisted mainly of sawmills, planning and shingle mills, and sash, door and millwork plants. Publishing and printing, dominated activities in the printing trade, while the manufacture of structural, ornamental and architectural metals and machining, accounted for the majority employed in metal fabrication.

Alberta had the largest manufacturing sector amongst all

¹ The discussion of specific manufacturing activities is based on Tables 15, 22 and 29, Statistics Canada, Manufacturing Industries of Canada: Prairie Provinces, 1971.

Prairie provinces. Like Manitoba and Saskatchewan, manufacturing is concentrated in a few important industries. Excluding food and beverages, wood products, printing and publishing and metal fabrication and transport equipment, accounted for almost $\frac{3}{4}$ per cent of the industrial labour force. The main activities within these broad categories were similar to those cited for Manitoba and Saskatchewan.¹ In addition to the industries mentioned, the manufacture of non-metallic mineral (concrete) products and chemicals (mainly for industrial use) were also important.

Provincial Specialization in Manufacturing

Diversity in natural resources and agricultural land and historical circumstances have resulted in economic differentiation between the three Prairie provinces. Location quotients for different sectors utilizing the aggregate Prairie economy as the base statistic magnifies the internal dissimilarity (Table 7).

This analysis identifies Manitoba as the province most specialized in manufacturing as well as most other economic sectors except agriculture. The location quotient for Manitoba's manufacturing sector in 1971 was 1.45. This represents a decline from the 1931 figure of 1.77 and an indication that Manitoba is becoming less specialized in manufacturing while Alberta and Saskatchewan are increasingly so.

The ratio of Alberta's labour force in manufacturing to total

¹ A minor exception is in transportation equipment manufacture. Aircraft and aircraft parts manufacture are small compared to Manitoba's. Instead there is a greater specialization in truck body and trailer manufacture.

TABLE 7 LOCATION QUOTIENTS* FOR ECONOMIC SECTORS OF THE PRAIRIE PROVINCES 1931-1971

SECTORS \ PROVINCE AND YEAR	MANITOBA				SASKATCHEWAN				ALBERTA			
	1931	1951	1961	1971	1931	1951	1961	1971	1931	1951	1961	1971
AGRICULTURE	0.70	0.70	0.71	0.72	1.22	1.39	1.50	1.70	1.03	0.92	0.87	0.79
FORESTRY, FISHING, TRAPPING	1.58	1.25	1.14	1.00	0.65	0.84	1.14	1.00	0.86	0.92	1.00	1.00
MINING	0.51	0.46	0.70	0.68	0.16	0.26	0.52	0.71	2.47	1.97	1.52	1.39
MANUFACTURING	1.77	1.52	1.51	1.45	0.49	0.57	0.52	0.57	0.88	0.92	0.96	0.96
UTILITIES	1.76	1.28	1.09	1.22	0.69	0.68	0.91	0.88	0.72	1.06	0.83	1.00
CONSTRUCTION	1.36	1.01	0.94	0.86	0.82	0.69	0.82	0.76	0.87	1.27	1.17	1.21
TRANSPORT AND COMMUNICATION	1.20	1.17	1.14	1.45	0.87	0.92	0.91	0.93	0.96	0.90	0.97	0.96
TRADE	1.38	1.18	1.06	1.05	0.77	0.84	0.89	0.93	0.91	0.98	1.04	1.01
FINANCE AND INSURANCE	1.37	1.32	1.24	1.09	0.79	0.69	0.76	0.83	0.90	1.00	1.03	1.06
SERVICE (INCLUDING PUBLIC ADMINISTRATION)	1.15	1.03	1.02	0.99	0.90	0.92	0.91	0.93	0.98	1.04	1.04	1.04
UNSPECIFIED	1.40	1.21	0.96	0.96	0.85	0.87	1.00	0.94	0.79	0.97	1.00	1.03

Source: Dominion Bureau of Statistics, Censuses of Canada, 1931, 1951, 1961: Statistics Canada, Census of Canada 1971.

*Analysis based upon the Distribution of Labour Force by Industries. Figures for 1931 and 1951 based on labour force of 14 years and over; 1961 and 1971, 15 years and over.

$$\text{Location quotient} = \frac{\frac{x_p}{E_p}}{\frac{x_n}{E_n}}$$

where, x_p = employment in sector x in province,
 x_n = employment in sector x in Prairies,
 E_p = total employment in province,
 E_n = total employment in Prairies.

Location quotient = 1 : the region and the nation specialize to an equal degree in the sector concerned.

Location quotient > 1 : the region is more specialized than the nation in the sector concerned.

Location quotient < 1 : the region is less specialized than the nation in the industry concerned.

economically employed is approximately similar to that of the Prairies as a whole. Hence, Alberta is specialized to an equal degree as the Prairies are in manufacturing. Saskatchewan is the least specialized province in manufacturing and almost all other economic sectors except agriculture.

The variations in the degree of specialization in manufacturing amongst Manitoba, Alberta and Saskatchewan is further underscored by the proportion of value added generated in secondary industries. In Manitoba, manufacturing contributed towards 37.7 per cent of total value added from all goods producing industries in 1970 (Table 8). This figure exceeds contributions from all other goods-producing industries. Alberta's and Saskatchewan's manufacturing sectors contributed 20.2 and 13.9 per cent respectively. In the case of Alberta, the proportion attributed to manufacturing was exceeded only by that of mining, whereas, in Saskatchewan manufacturing was the third largest contributor after agriculture and mining in terms of value added.

Growth of Manufacturing

Aggregate Growth

Manufacturing in the Prairies have undergone significant expansion since the beginning of this Century. The 1916 Postal Census of Manufactures showed that Manitoba had 2,427 employed in manufacturing, Alberta, 1,242 and Saskatchewan 755. In 1931, the Manufacturing Census recorded approximately 22,000, 10,300 and 5,000 employed in manufacturing for Manitoba, Alberta and Saskatchewan respectively.

TABLE 8 VALUE ADDED FOR GOODS-PRODUCING INDUSTRIES IN THE PRAIRIES 1970

Industry	Manitoba		Saskatchewan		Alberta	
	Thousand Dollars	Percentage	Thousand Dollars	Percentage	Thousand Dollars	Percentage
Agriculture	233,048	17.7	593,208	43.0	563,019	16.4
Forestry	2,949	0.2	7,106	0.5	8,695	0.3
Fisheries	2,142	0.2	1,931	0.1	826	*
Trapping	2,045	0.2	1,776	0.1	1,993	0.1
Mining	215,234	16.3	317,559	23.0	1,259,603	36.7
Electric Power	77,034	5.8	70,910	5.1	107,508	3.1
Manufacturing	497,221	37.7	191,983	13.9	692,885	20.2
Construction	289,392	21.9	197,250	14.3	795,589	23.2
Total	1,319,065	100.0	1,381,723	100.0	3,430,118	100.0

Source: Statistics Canada, Canada Year Book, 1973.

* Negligible.

Between 1931 and 1971, manufacturing employment in Alberta and Manitoba approximately doubled while that in Saskatchewan tripled (Figure 3). During the same period the value added from manufacturing for the whole region increased more than tenfold.

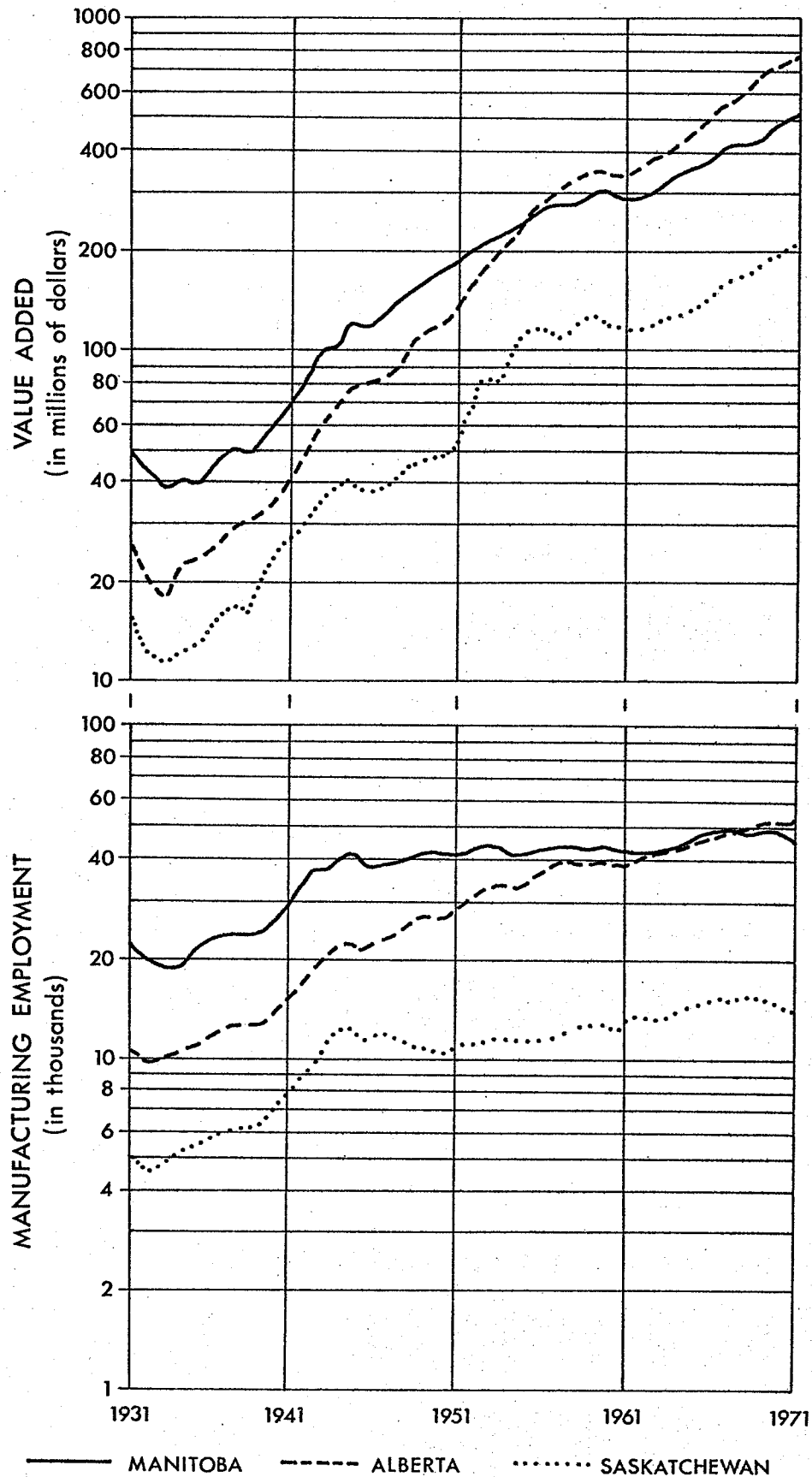
Alberta has had the most rapid growth of the three provinces. By 1955, value added for manufacturing in Alberta had exceeded that of Manitoba's. Around 1967, Alberta became the leading manufacturing province with respect to employment in the sector. Alberta's higher value added for manufacturing in the 1950's can probably be explained by the developments in the oil and natural gas industry. The stimulus to manufacturing as a result of the mining developments were primarily in production which involved cheap material inputs and valuable outputs such as petrochemicals. The lack of a significant labour growth can be attributed to the fact that manufacturing investments associated with mining developments were capital-, rather than labour-intensive (see Caves and Holton, 1961).

Although Manitoba was the leading manufacturing province for a significant length of time¹ later developments were less impressive than those in Alberta. Manitoba did not experience a significant economic boom similar to the oil and gas expansions. The discovery and exploitation of metallic minerals in the northern section of the province, induced limited manufacturing activity. Further, Manitoba did not experience a population growth in recent decades as in Alberta, which served to boost market-oriented manufactures. In spite

¹ From the beginning of this Century until the time when Alberta surpassed Manitoba's manufacturing in the 1950's and 1960's.

Figure 3

MANUFACTURING IN THE PRAIRIES 1931-1971 *



* DATA FOR 1960 TO 1971 BASED UPON REVISED (1960) STANDARD INDUSTRIAL CLASSIFICATION AND NEW ESTABLISHMENT CONCEPT
 SOURCE: STATISTICS CANADA (1974) MANUFACTURING INDUSTRIES OF CANADA: PRAIRIE PROVINCES 1971

of the lack of recent economic stimulus, Manitoba's manufacturing employment stands at approximately 48,000 and value added from production at \$534.5 million in 1971.

Saskatchewan has, throughout Prairie history, been the least industrialized province. In 1971, it had less than one third of the manufacturing employment of either Alberta or Manitoba. In the same year, the value added by manufacturing was only \$210 million or about one quarter of Alberta's and less than half of Manitoba's.

The overall growth of Prairie manufacturing has not shown unusual trends. World events have had a predictable effect upon the level of manufacturing. There was a distinct decline in manufacturing activity, during the Great Depression of the 1930's while during World War II, the expansion of federal government expenditures on the war effort helped to boost manufacturing. There was a slight decline in employment at the immediate postwar period. Subsequently, however, manufacturing generally maintained an upward trend in terms of employment and value added.

Growth of Individual Industries

The analysis of the growth of individual industries is confined to manufacturing data for the period 1961-1971. This limitation is necessitated by the incomparability of pre-1961 statistics with those of later years.¹

On the basis of the available statistics, there are definite patterns of growth or decline amongst different industries in the

¹ See Dominion Bureau of Statistics, General Review of Manufacturing Industries of Canada, 1961, 7-8.

three provinces (Table 9).

The Prairies registered growth in all manufacturing industries for which data are available. The most spectacular increase was a 198.0 per cent growth in the manufacture of machinery. Other industries with high growth included textiles, wood products, metal fabricating and chemicals.

Manitoba's high growth industries were knitting (152.3 per cent), machinery (132.4 per cent), electrical products (108.4 per cent) and chemicals (42.7 per cent). In the 1961-71 decade, there was also a decline in employment in furniture and fixtures, transportation equipment and non-metallic products. All other industries registered gains which varied between 1.9 and 30.8 per cent.

Transportation equipment in Saskatchewan which had a small base in 1961 grew by 1540.0 per cent. In machinery, chemicals and miscellaneous manufacture, growth over the 1961-1971 period was 308.2, 158.9 and 143.2 per cent respectively. Strong growth was also recorded in textiles, wood, metal fabricating and non-metallic products. As in Manitoba there was a decline in Saskatchewan's furniture and fixtures industry.

Nearly all of Alberta's industries showed strong growth. Especially significant were leather (163.9 per cent), machinery (332.0 per cent), miscellaneous manufacturing (113.3 per cent) and primary metals (89.4 per cent). Textiles, wood, metal fabricating, paper products, printing and publishing recorded increases of over 30 per cent, but petroleum and coal products registered a decline of 32.4 per cent. All other industries grew between 2.4 and 36.0 per

TABLE 9 GROWTH OF PRAIRIE MANUFACTURING INDUSTRIES 1961-1971

Industry Groups	Manitoba	Saskatchewan	Alberta	Prairies	Canada
	%	%	%	%	%
Food and beverages	14.3	3.1	26.0	14.4	15.6
Tobacco	*	*	*	*	2.5
Rubber and plastics	*	*	*	*	136.8
Leather	29.4	*	163.9	*	-11.1
Textiles	20.7	49.3	46.1	32.6	10.8
Knitting mills	152.3	*	*	*	11.5
Clothing	18.4	*	*	*	12.2
Wood	22.0	21.4	48.6	38.8	14.7
Furniture and fixtures	- 3.6	-21.4	19.6	4.0	29.8
Paper and allied products	22.5	*	30.6	*	26.2
Printing and publishing and allied products	8.8	3.3	35.9	16.8	15.6
Primary metals	1.9	*	89.4	*	31.0
Metal fabricating	30.8	29.5	48.1	38.8	44.8
Machinery	132.4	308.2	332.0	198.0	68.9
Transportation equipment	-12.6	1540.9 ⁺	20.0	4.1	39.4
Electrical products	108.4	*	*	*	54.9
Non-metallic mineral products	- 9.9	23.6	2.4	1.5	27.8
Petroleum, coal, etc.	*	*	-32.4	*	10.4
Chemical and chemical products	42.7	158.9	25.5	34.0	48.3
Miscellaneous manufacturing	*	143.2	113.3	*	24.2

Source: Dominion Bureau of Statistics, Manufacturing Industries of Canada: Prairie Provinces, 1961; Statistics Canada, Manufacturing Industries of Canada: Prairie Provinces, 1971.

* Percentage not available; data confidential.

⁺ 1961 base less than 30.

cent, and these included food and beverages, furniture and fixtures, printing and publishing, transport equipment and non-metallic products.

Historically Important Factors of Location

In the preceding sections, the historical, structural and spatial development of Prairie manufacturing industries were examined. It was apparent from the analysis that certain factors have appeared to be historically significant in influencing industrial location. These factors have been identified as proximity to raw materials, transportation costs, proximity to markets and other factors which have attracted export-oriented manufacturers.

Proximity to Raw Materials

The significance of proximity to raw material sources in Prairie manufacturing has surfaced frequently. It was noted that a number of manufacturing activities, particularly, metal refining, food and natural gas processing, petrochemicals, pulp and paper manufacturing have been established at the source of the major material inputs.

The reasons for this spatial pattern can be explained in terms of Weber's concept of industrial location (see Chapter II). In the case of metal refining, pure metal is recovered and the useless bedrock which forms a substantial percentage of the weight before processing is discarded. In food processing, the problem of perishability necessitates instant and quick processing usually at the points where inputs are produced.

The raw material orientation of petrochemicals and pulp and paper is frequently determined by the dominance of one type of material input which is expensive to transport compared to the finished product.

The significance of the source of raw materials in the case of manufacturing activities cited suggest that the proximity to raw material factor is location-specific. It means that proximity to raw materials tended to influence the location of Prairie manufacturing in specific communities or towns, rather than generally in a province or in the Prairies as a whole since the material inputs involved are not ubiquitous.

Transportation Costs

The effect of transportation costs upon the development of Prairie manufacturing was analysed earlier. The major element in this factor was the freight rate structure. High freight rates imposed upon manufactured goods imported into the Prairie created a protective shield for the growth of manufacturing within the region.

Theoretically, this case of high freight costs and monopolistic market conditions is described under locational interdependence theories (Hotelling, 1929). Freight rates on goods transported from Eastern producers are so high that Prairie manufacturers, even though producing at higher unit costs are able to sell within the region at competitive if not lower prices.

At the early stages of economic development, freight rates were applied in favour of Winnipeg. This early "basing-point" system effectively influenced industries manufacturing for the Prairie market

to locate in the city. However, the abrogation of such discriminatory rates, and the extension of the class rate system for the entire Prairies eliminated the locational advantage for a specific community. Industries manufacturing for the Prairie market were then free to locate anywhere within the Prairies.

Proximity to Markets

Internal markets were and still are the primary inducement to Prairie manufacturing. Since the bulk of Prairie industries are oriented to markets, consumer as well as industrial, in terms of production, it was not unusual to find that these industries are spatially related to markets.

Developments in agriculture, transportation and mining created a market for industrial inputs such as agricultural implements, animal feed, railway rolling stock and mining equipment. Some of these industries are clearly market-oriented. For example, animal feed manufacture is dispersed in the regions where livestock rearing is important especially in Southern Manitoba, Central Alberta and to a lesser degree in Saskatchewan. The manufacturing of oil exploration and drilling equipment is localized in Calgary and Edmonton. Similarly, the manufacturing of steel pipes for oil and gas pipelines is located in Edmonton.

Population growth, through settlement and economic expansion in trade, commerce, services and public administration in the Prairies created a significant market for consumer or non-capital manufactures. The concentration of population, trade, commerce, services and public administration also saw the growth of consumer industries in the

heavily populated centres.

Proximity to markets have influenced industries to locate in specific communities. However, there are industries which appear less location-specific. Many market-oriented industries are not geared primarily to specific communities in which they are located. Rather some serve the entire Prairies and province from one location. Excellent examples are agricultural equipment and clothing manufacturing.

Other Factors

The Prairies are becoming an important area for specialist industries that produce largely for export markets. Such industries have been described under the sections dealing with external markets and structure of manufacturing. The analysis of development trends in Prairie manufacturing does not reveal any specific advantage that attracts exporting industries.

However, on account of the growing significance of export, as well as potential export industries, there is reason to believe that the Prairies are locationally attractive for some industries. Historical advantage as in the case of the clothing industry could be one factor in the growth of these activities. A factor which cannot be ruled out is government influence and pressure to locate in the Prairies in return for monetary assistance or tax concessions. Other factors could include favourable political climate or corporate policy, or the availability of expertise of specific value to industries such as the aerospace industry in particular.

Summary

Manufacturing in the Prairies was stimulated by a number of factors. Developments in agriculture, oil, natural gas, minerals, timber and fishing led to the establishment of processing activities such as grain milling, slaughtering and meat packing, vegetable oil extraction, dairy products, petrochemicals, metal refining, pulp and paper and fish processing. As the different economic sectors, i.e. agriculture, mining, forestry and trade, began to develop, the demand in these sectors in turn created markets for manufacturing. Industrial market-oriented manufacturing such as animal feed, metal fabrication, agricultural implements and mining equipment were established.

The opening up of the Prairies helped to encourage settlement and expansion in trade, commerce, services and public administration. Such developments further stimulated the growth of consumer-oriented manufacturing. Initially, Prairie manufacturing developed to serve internal markets, but eventually, external markets also became important. The latter development contributed towards the expansion of existing industries such as clothing and also the growth of new ones, namely transportation equipment.

Since its modest beginnings in the Nineteenth Century, manufacturing in the Prairies has developed significantly. The status of manufacturing in the Prairies, in comparison to Canada as a whole is relatively underdeveloped. However, the sector is gradually gaining importance. The present structure of manufacturing is characterized

by a large food and beverage sector. This is particularly so in the case of Saskatchewan where two-fifths of manufacturing is accounted for by the food and beverage group. Amongst the three provinces, Manitoba is the most highly industrialized and Saskatchewan the least. However, Alberta has the largest manufacturing sector in terms of employment.

Overall growth of manufacturing in the past forty years indicate two basic trends. Value added has increased quite rapidly since the mid-1930's. Manufacturing employment on the other hand, has levelled off generally after the postwar era. In the case of individual manufacturing industries, the rate of growth varies significantly. Machinery industries have expanded significantly during the decade 1961-1971. Other industries have shown only moderate growth.

Analyses of the development and status of manufacturing suggests that certain factors have influenced industrial location in the Prairies. These historically important location factors have been identified as proximity to raw materials and markets, transportation costs, and other factors which tend to attract and encourage the establishment of export-oriented manufacturing enterprises.

In the chapter to follow, the factors influencing industrial location will be examined further with the use of shift-share and correlation analyses for the entire Prairies and population thresholds for manufacturing for selected urban centres.

CHAPTER IV

SPATIAL DYNAMICS AND ORGANIZATION OF MANUFACTURING IN THE PRAIRIES

The historical development of Prairie manufacturing indicates the significance of industrial location factors relating to markets, raw material resources, transportation developments and some regional advantages. This chapter proceeds to examine quantitatively the significance of these factors, using published statistics. The analysis pursued in this chapter will be structured into four sections. Firstly, the distribution of aggregate manufacturing and specific industries are reviewed. Secondly, spatial changes in the distribution of manufacturing are examined with the aid of shift-share analysis. Thirdly, broad spatial relationship between manufacturing and selected economic variables associated with the Region is studied through the use of correlation analysis. Fourthly, population thresholds for manufacturing in Prairie urban centres are analysed to facilitate a better understanding of industries at the micro-geographical level.

Distribution Patterns of Manufacturing

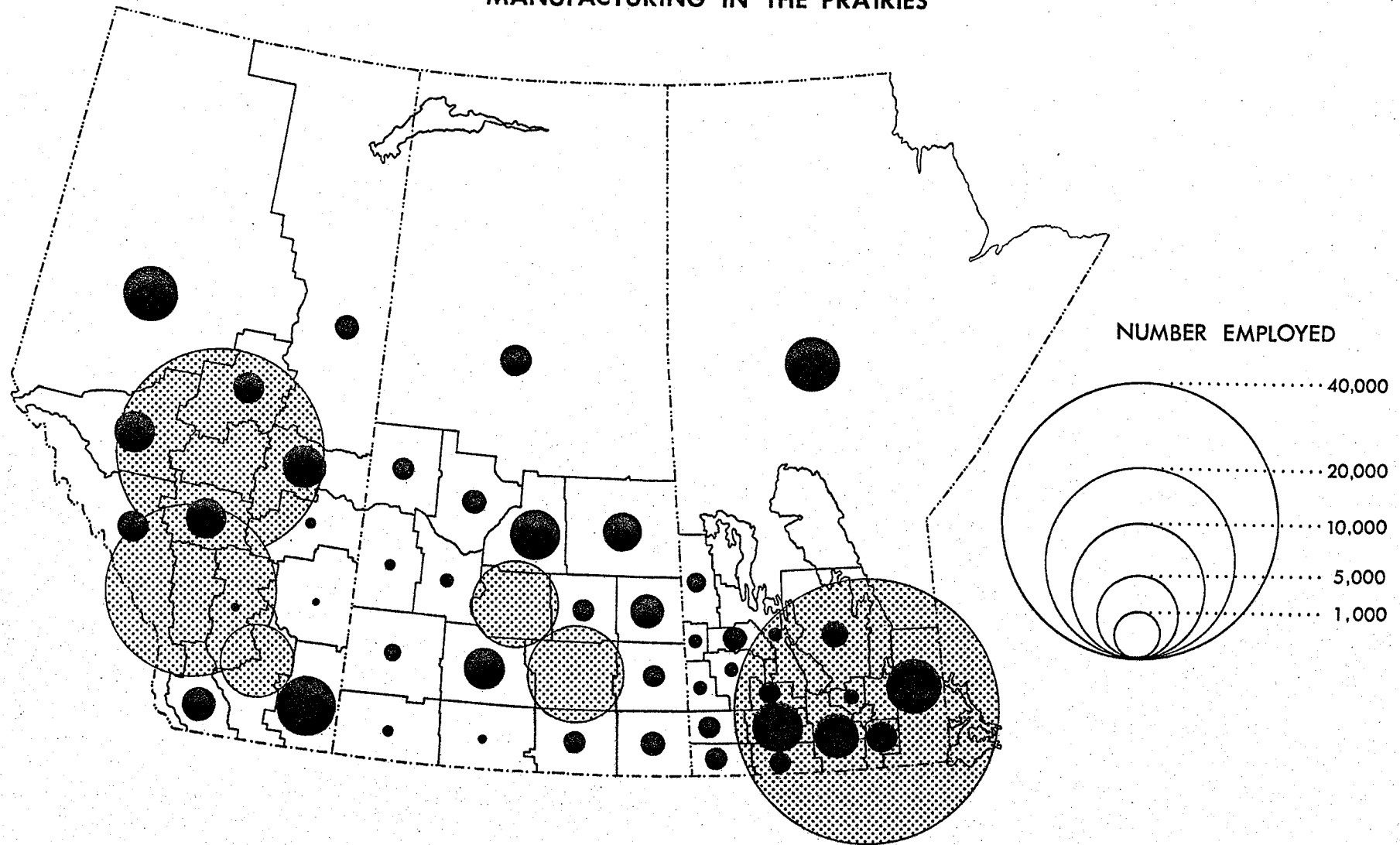
Aggregate Manufacturing

Manufacturing in the Prairies is highly localized (Figure 4). In 1970, 77.5 per cent of all the total manufacturing employment was concentrated in five Census Divisions.¹ These were division 20 in

¹ A transparent overlay at the end of the thesis is attached to facilitate the identification of Prairie Census Divisions.

Figure 4

MANUFACTURING IN THE PRAIRIES



SOURCE: STATISTICS CANADA (1974)
MANUFACTURING INDUSTRIES OF CANADA:
GEOGRAPHICAL DISTRIBUTION, 1970

Manitoba, and divisions 6 and 11 in Saskatchewan and Alberta.¹

Within these five "metropolitan" divisions, manufacturing employment was further concentrated in the metropolitan areas of Winnipeg, Edmonton, Calgary, Regina, and Saskatoon (Table 10). Winnipeg, the largest Prairie city, is the leading industrial centre with over 39,000 industrial employees representing 84 per cent of Manitoba's manufacturing labour force. Edmonton and Calgary together account for 71 per cent of Alberta's 49,000 employees in manufacturing. Manufacturing in Saskatchewan is less localized than in either Alberta or Manitoba. Only 53.6 per cent of the provincial industrial labour force is found in Regina and Saskatoon.

Outside of the five major metropolitan areas mentioned above, manufacturing is far less important. However, a significant proportion of the nonmetropolitan manufacturing employment is accounted for by a number of medium-sized centres with population between 15,000 and 50,000. These include Brandon, Portage La Prairie, Selkirk and Thompson in Manitoba, Moose Jaw and Prince Albert in Saskatchewan and Medicine Hat and Lethbridge in Alberta (see Weir and William, 1969). Industries in centres with populations less than 15,000 employ less than one per cent of the Region's manufacturing labour force.

Major Industry Groups

The analysis involving the distribution of specific manufacturing activities is restricted to Census divisions and the five

¹ These five divisions will also be referred to elsewhere as "metropolitan" Census divisions.

TABLE 10 DISTRIBUTION OF MANUFACTURING EMPLOYMENT IN THE PRAIRIES 1970

Province/City	Manufacturing Employment	Percentage
<u>Alberta</u>	48,988	100.0
Calgary	14,838	30.3
Edmonton	20,118	40.1
Rest of Province	14,032	29.6
<u>Saskatchewan</u>	14,136	100.0
Regina	3,496	24.7
Saskatoon	4,083	28.9
Rest of Province	6,557	46.4
<u>Manitoba</u>	46,899	100.0
Winnipeg	39,305	83.8
Rest of Province	7,594	16.2

Source: Statistics Canada, Manufacturing Industries of Canada:
Geographical Distribution, 1970.

major metropolitan areas. Recent government and statistical sources do not contain data disaggregated on a detailed geographical basis that includes smaller urban centres.

The geographical distribution of specific manufacturing industries for Manitoba, Saskatchewan and Alberta are shown in Figures 5, 6 and 7 respectively. The available information indicates that most, if not all the major manufacturing groups are represented in the five largest Prairie cities. The important industries are food and beverages, textile and clothing (especially Winnipeg and to a lesser extent Edmonton), printing and publishing, primary metals and metal fabrication. Within the five major cities, there was clear evidence that the three largest (Winnipeg, Edmonton and Calgary) had more identifiable industrial groups compared to Saskatoon and Regina.


In metropolitan Winnipeg important manufacturing industries, with the exception of "Others",¹ consisted of food and beverages, textile and clothing, printing and publishing, primary metals and metal fabrication.


Edmonton's manufacturing employment is concentrated mainly in food and beverages (about 25 per cent of all manufacturing) textile and clothing, and primary metals and metal fabricating. In Calgary, the structure of manufacturing is dominated by food and beverages and primary metals and metal fabrication industries which employed almost half the secondary labour force. Other large groups are wood, printing and publishing and "Others".

¹ "Others" include individual groups too small to be represented in the pie graphs.

KEY TO FIGURES 5, 6, AND 7

- | | |
|---|---|
| 1. Food and Beverage | 7. Machinery |
| 2. Textile and Clothing | 8. Transportation Equipment |
| 3. Wood | 9. Non-Metallic Mineral Products |
| 4. Furniture and Fixtures | 10. Petroleum and Coal Products |
| 5. Printing and Publishing | 11. Chemical and Chemical Products Industries |
| 6. Primary Metals and Metal Fabricating | 12. Others |

 Rest of Division

 All Manufacturing

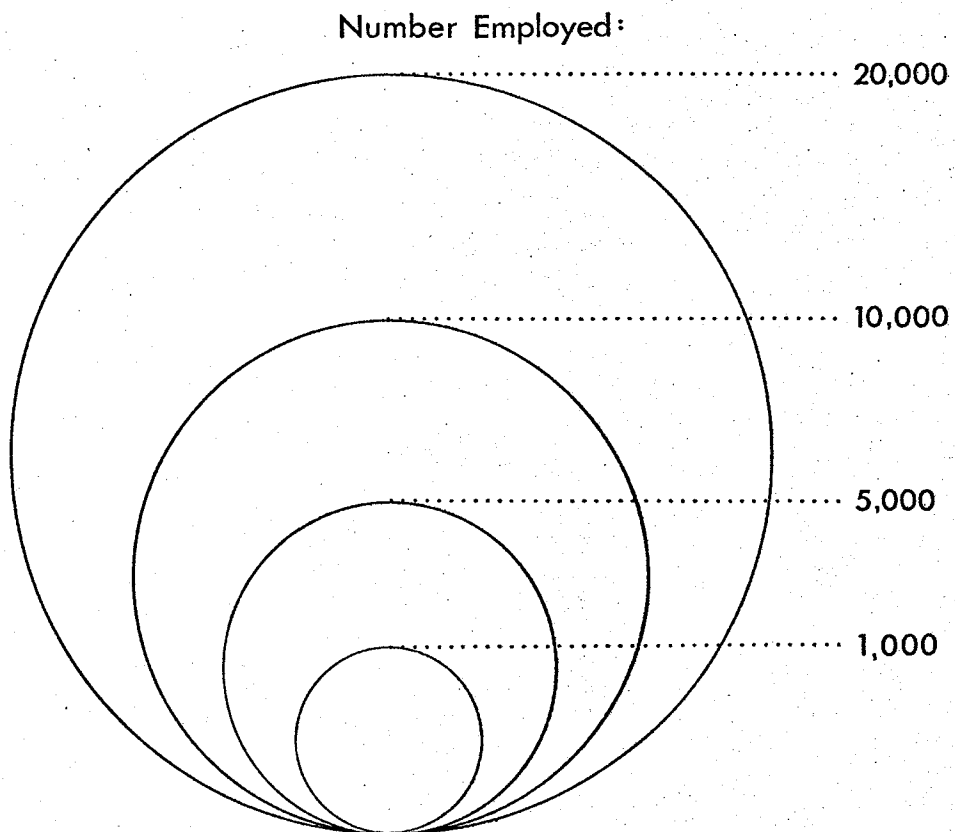


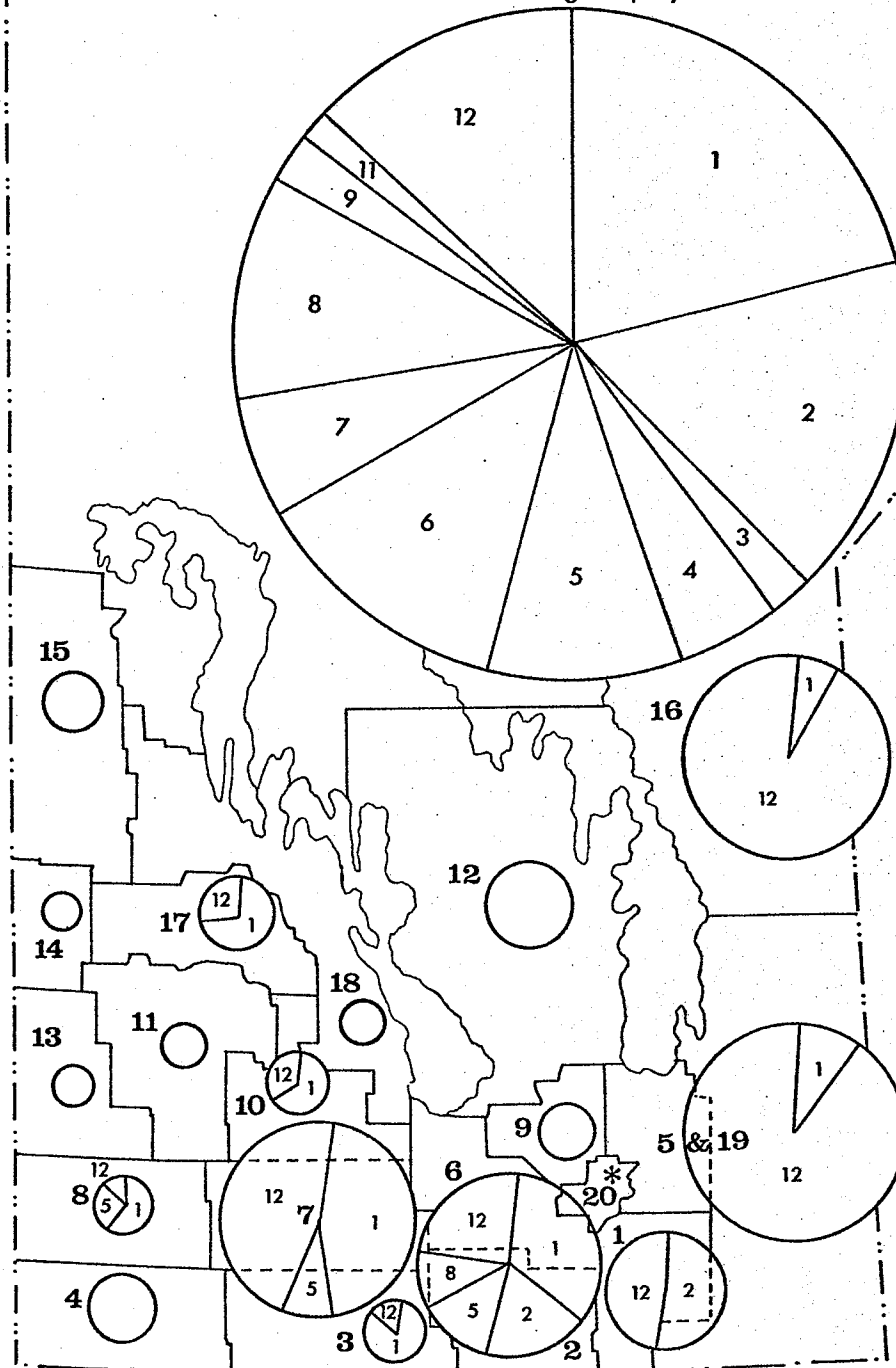
Figure 5

MANUFACTURING EMPLOYMENT BY INDUSTRY AND CENSUS DIVISIONS

M A N I T O B A

* Metro Winnipeg, Division 20

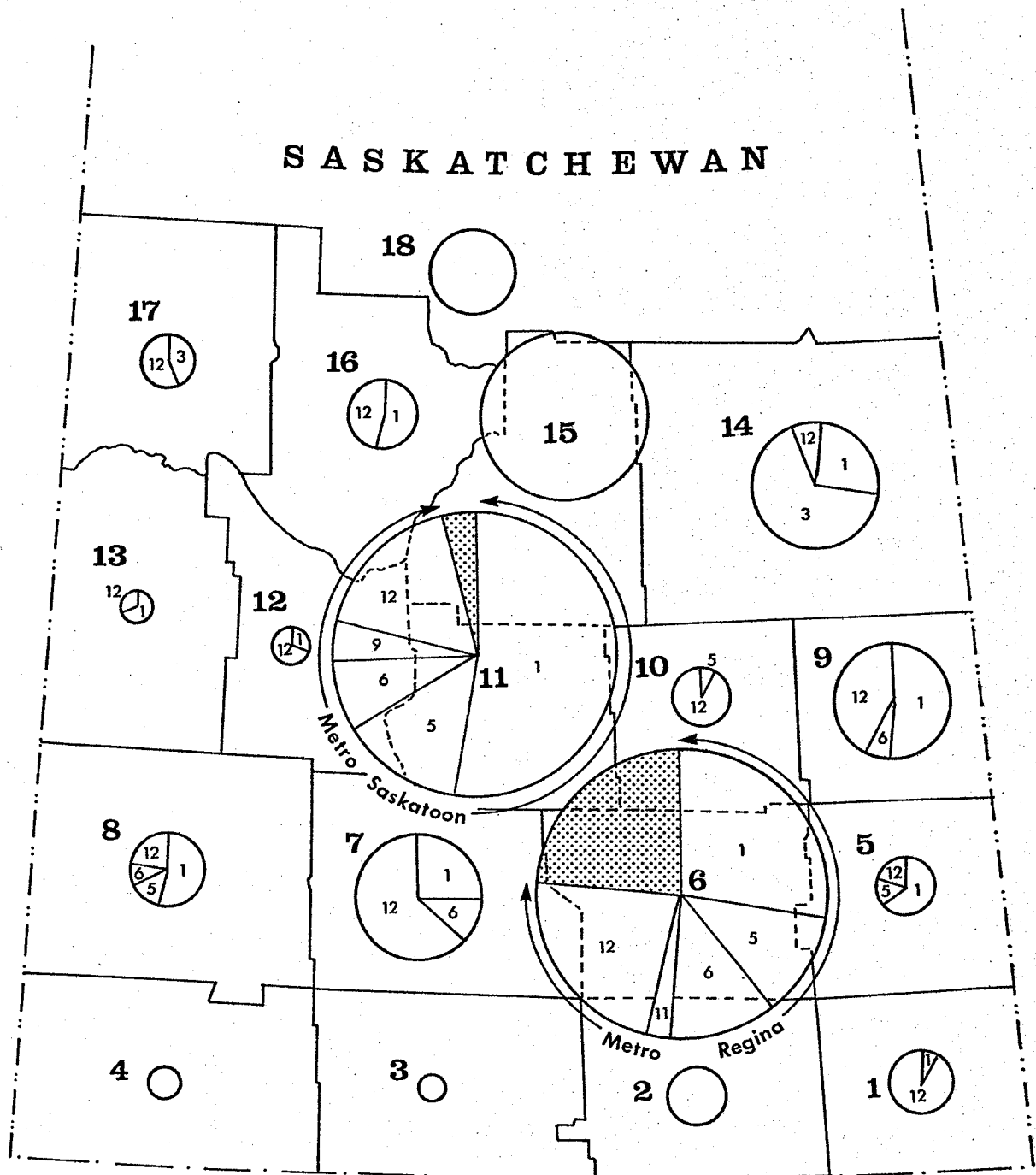
Total manufacturing employment - 39,305



Source: Statistics Canada (1974), Manufacturing Industries of Canada
Geographical Distribution 1970

Figure 6

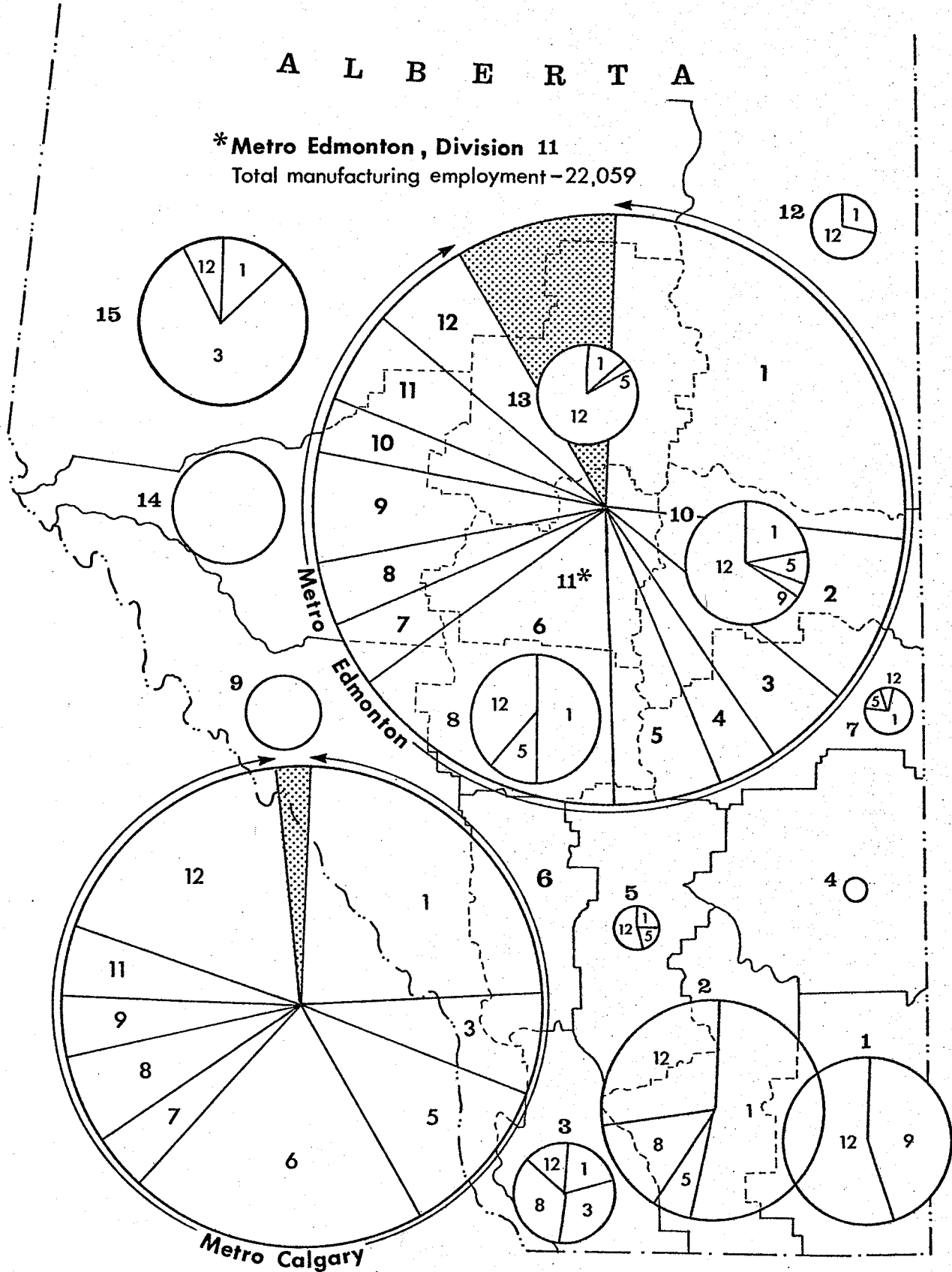
MANUFACTURING EMPLOYMENT BY INDUSTRY AND CENSUS DIVISIONS



Source: Statistics Canada (1974), Manufacturing Industries of Canada
Geographical Distribution 1970

Figure 7

MANUFACTURING EMPLOYMENT BY INDUSTRY AND CENSUS DIVISIONS



Amongst the five Prairie cities, the industrial composition of Saskatoon appears to be the most specialized. Food and beverage manufacturing is the leading industry and this activity provides jobs for approximately 50 per cent of the city's industrial labour force. Other important groups include printing and publishing, primary metals and metal fabrication and non-metallic mineral products.

Regina's industrial structure is rather similar to Saskatoon's, in that it is also specialized. Three leading industrial groups, namely food and beverages, printing and publishing, primary metals and metal fabrication comprise two thirds of the manufacturing labour force. The remaining portion of the labour force is distributed among chemicals and other industries.

In most of the non-metropolitan divisions the available data indicate that one or two industry groups dominate manufacturing. In Manitoba, food and beverage manufacturing is the largest group in all non-metropolitan divisions except 1, 5 and 19, and 16. Division 1, to the southeast of Winnipeg, has half the manufacturing labour force in textile and clothing. In divisions 16 and 5 and 19, food and beverages account for less than 10 per cent of manufacturing.

The industrial structure of Manitoba's other divisions is quite similar to that of Saskatchewan's. Manufacturing consists generally of food and beverage or other industries. However, in divisions 14 and 17, wood industries were also important industries. Approximately 70, and less than 50 per cent, of the secondary labour force in divisions 14 and 17 respectively, were engaged in wood

industries.

Non-metropolitan divisions in Alberta have somewhat diverse industrial structures. Excluding the general group "Others", the most important industry in division 1 was non-metallic mineral products. Over 50 per cent of manufacturing employment in division 2 were in food and beverages, while approximately 20 per cent were in printing and publishing and transportation equipment. Division 3 in southwest Alberta, specializes in food and beverages, wood and transportation equipment industries.

Other important divisions with data on the structure of manufacturing are 8, 10, 13 and 15. Division 8, which lies between Edmonton and Calgary is more oriented towards consumer manufactures such as food and beverages and printing and publishing. Divisions 10 and 13 both have a large "Others" group and only 15-30 per cent of the industrial labour force is in food and beverages and printing and publishing. Division 15, which encompasses northwestern and north-central Alberta has a large wood products industry which in itself employs approximately 80 per cent of the industrial labour force, while food and beverages form the second largest industrial group

Regional Shifts in Manufacturing

Intra-provincial Shifts

Although Prairie manufacturing is highly concentrated in five cities, the extreme geographical bias is gradually diminishing. Coefficients of localization for Manitoba, Saskatchewan and Alberta indicate a relative decline in the concentration of manufacturing in

comparison to population distribution over the 1961-1971 period (Table 11). The metropolitan Census divisions recorded increases in manufacturing employment of 30-50 per cent (Calgary), and 0-30 per cent (Edmonton and Winnipeg, Regina and Saskatoon) (Figure 8). However, there was also significant growth in manufacturing employment in non-metropolitan Census divisions. For example, Manitoba and Saskatchewan had four such divisions with high employment growth rates (over 30 per cent), and Alberta had six.

This trend is not a recent phenomena but ostensibly a continuation of the process that began as the Prairies developed. The development of few large urban areas with initial advantages in industrialization established a pattern of extreme geographic concentration for Prairie manufacturing.

Winnipeg, the gateway city to Western Canada, had an economic edge over other urban centres as a consequence of favourable freight rates, larger local markets and its role as the transportation centre for Western Canada (see Bellan, 1958). Such favourable circumstances enabled Winnipeg to become the leading industrial centre during the early settlement of the Prairies. However, in the last decade of the Nineteenth Century, and at the beginning of the Twentieth Century, Winnipeg's importance began to decline as centres such as Calgary, Edmonton, Saskatoon and Regina developed their own industries, partly in response to more favourable freight rates and growing local markets.

In the 1950's and 1960's economic decentralization was marked by the growth of manufacturing employment in smaller urban centres.

TABLE 11 COEFFICIENTS OF LOCALIZATION FOR MANUFACTURING IN
MANITOBA, SASKATCHEWAN AND ALBERTA 1961 AND 1970⁺

Province	Coefficients of Localization	
	1961	1971
Manitoba	0.3317	0.2912
Saskatchewan	0.3393	0.2754
Alberta	0.2297	0.1707

⁺ Analysis based on manufacturing labour force and population statistics 1961 and 1970. Source: Dominion Bureau of Statistics, Manufacturing Industries of Canada, Section G, Geographical Distribution, 1961; 1961 Census of Canada; Statistics Canada, Manufacturing Industries of Canada, Geographical Distribution, 1970; Advanced Bulletin, 1971 Census of Canada.

$$\text{Coefficient of Localization } C = \sum_{i=1}^m \left(\frac{E_i}{V} - \frac{A_i}{T} \right)$$

where E_i = Manufacturing employment in area i

V = Manufacturing employment in all areas

A_i = Population in area i

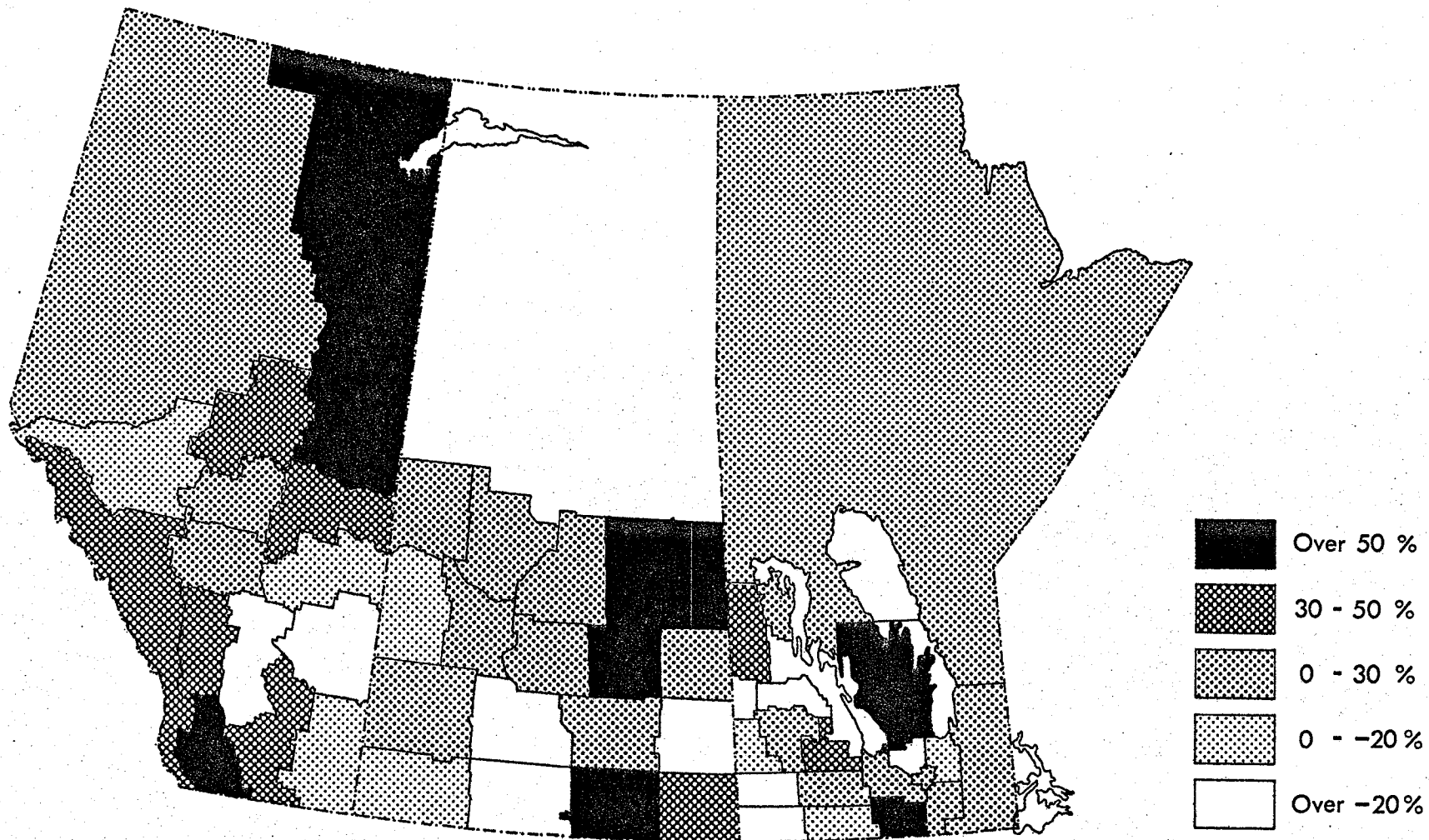
T = Population in all areas.

(Only positive differences are summed.)

The limits to the value of the coefficient of localization are 0 and 1. If manufacturing is distributed exactly the same as the population, the value will be 0. In contrast, if the entire industry is concentrated in one region away from the population regions, the value will approach unity.

Figure 8

PER CENT CHANGE IN MANUFACTURING EMPLOYMENT
1961 - 1970



This phenomena was largely the result of local developments in resource industries which established the basis for manufacturing, consisting of processing activities. For example, the discovery and mining of nickel at Thompson, Manitoba, made metal refining a reality. Similarly, potash mining led to the development of secondary industries at Ethernazy, southeast of Saskatoon, while the establishment of wood-based industries in The Pas is associated with the exploitation of Northern Manitoba's forest resources.

In addition, the trend towards industrial decentralization has been fostered by the policies of provincial and federal governments to encourage new industries in smaller communities.

Intra-regional Shifts

The changing geography of manufacturing employment in the Twentieth Century also indicates a growing concentration of activity in the Western portion of the Prairies. For example, between 1961-1970, two-thirds of the Census divisions in Alberta and Saskatchewan registered increases in manufacturing employment in contrast to approximately 43 per cent in Manitoba (Figure 8). This broad regional shift of industrial activity from Manitoba towards Alberta in particular was observed and described earlier (see Chapter III, page 72). A more detailed examination of the components influencing regional shifts with the aid of shift-share analysis follows.

Shift-share Analysis

The purpose of this section is to obtain a broad insight into the possible elements that contribute towards regional change in Prairie manufacturing employment, and a better understanding of the

forces affecting growth or decline of industries.

The factors contributing to the changing Prairie manufacturing geography can be examined by shift-share analysis (see Perloff, et al., 1960; Fuchs, 1962). This method measures the change in regional manufacturing employment relative to the change in the national manufacturing employment over a period of time, and disaggregates the components that contribute to that change (see Stabler, 1968).

If a region has a greater than average concentration of its industrial labour force in those manufacturing sectors that are declining, or growing slowly, the restraining influence of such a structure makes it likely that a relative decline in industrial employment will occur. On the other hand, regions that have a greater than average concentration of industrial employment in those industries experiencing above average national growth rates will be economically stimulated because of such a structure. Downward or upward shifts in a region's relative share of manufacturing employment that occur because of its industrial structure may be termed the "industry mix" effect.

An increase or decrease in the volume of industrial activity in any region may of course occur for reasons other than manufacturing simply responding to national patterns of productivity growth and/or demand shifts. As technology evolves and new discoveries are made, the relative locational attraction of particular regions for certain industries may be strengthened or weakened. The region whose locational attraction for some industry is improved may be expected to gain a larger share of the nation's employment in that industry,

regardless of whether that industry is growing or declining nationally. Change occurring because of increasing specialization in some activity may be termed the "regional share" effect.

Shift-share analysis is thus a useful method for investigating the forces which affect regional change in Prairie manufacturing. It can also contribute toward an understanding of the forces that may have influenced industrial location in different Prairie provinces. However, its application must take into account the inherent limitations. The most important deficiency is the fact that shift-share analysis differentiates two components on the basis of some mathematical computations. Yet the two components are assumed to reflect independent forces that affect regional changes (see Buck, 1970).

With due recognition to the usefulness and limitations of the method, it nevertheless remains an appropriate tool for the purpose of this present analysis.

Data for this analysis is based on a Statistics Canada study entitled, Growth Patterns in Manufacturing Employment by Counties and Census Divisions 1961-1970. This study identifies the "net relative change" index which is the difference between actual change in manufacturing employment for a region over a specified period and the "national" change. The "national" change refers to the change in manufacturing employment that would have occurred if the given region's industrial labour force changed at the rate equivalent to the nation's manufacturing increase or decline. The index represents the combined effect of the industry mix and regional share in an area.

The following equation was used in the study cited above:

$$(A) \sum_i \left\{ \left[E_{ij}^t - E_{ij}^1 \right] - \left[E_{ij}^1 \times r_{..} \right] \right\} = \sum_i \left[E_{ij}^1 \times (r_{i.} - r_{..}) \right] + \sum_i \left[E_{ij}^1 \times (r_{ij} - r_{i.}) \right]$$

Net Relative Change = Industry Mix + Regional Share

where, E_{ij}^1 = employment in industry i in region j for the base year

E_{ij}^t = employment in industry i in region j for subsequent year t

$r_{..}$ = national growth rate for all industries to year t

$r_{i.}$ = national growth rate for industry i to year t

r_{ij} = growth rate of industry i in region j to year t

The growth rates were computed as follows:

$$r_{..} = \frac{\sum_i \sum_j (E_{ij}^t - E_{ij}^1)}{\sum_i \sum_j (E_{ij}^1)}$$

$$r_{i.} = \frac{\sum_j (E_{ij}^t - E_{ij}^1)}{\sum_j (E_{ij}^1)}$$

$$r_{ij} = \frac{E_{ij}^t - E_{ij}^1}{E_{ij}^1}$$

Observations on the Prairies

Shift-share characteristics and components of regional change in Prairie manufacturing employment are shown in Figure 9.

In Manitoba, a majority of Census divisions registered negative net relative changes with respect to manufacturing employment between 1961 and 1970. In the five Census divisions (i.e. 2, 7, 10, 12 and 15) which had positive net relative changes, the component of change was attributed to the regional share. New industries were responsible for relatively higher shares of manufacturing employment in divisions 2, 7 and 12. Whereas in divisions 10 and 15, the same phenomenon is related to growth of the agricultural implement industry and sawmilling, planing and shingle mills respectively (Table 12).

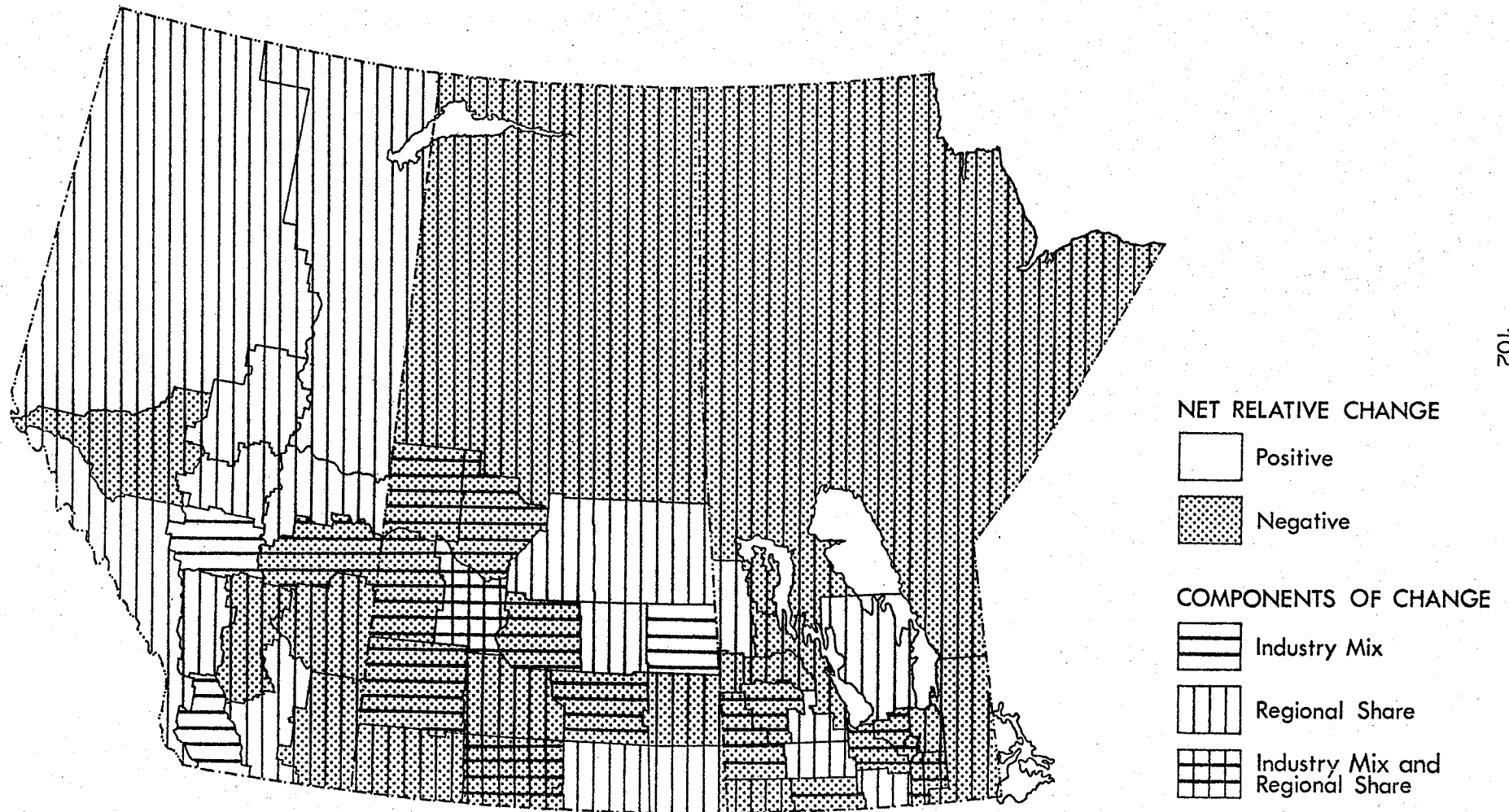
The regional share component has, in addition, contributed to negative net relative change in divisions 4, 5, 14, 16, 17, 18 and 19. Industries aggregated simply as "Others" were identified as the main industrial group influencing the net relative change in divisions 4, 14, 16, 17 and 18. In divisions 5, 16 and 19, it was the iron and steel mills, smelting and refining and pulp and paper mills respectively that contributed primarily to the net relative change (Table 12).

The industry mix was the primary component affecting negative net relative changes in divisions 3, 6, 8, 9, 11, 13 and 20 (Metro Winnipeg). As for division 1, the negative net relative change was attributable to both the industry mix and regional share.

Saskatchewan, like Manitoba, had more divisions (11 out of 18)

Figure 9

SHIFT-SHARE CHARACTERISTICS AND COMPONENTS OF REGIONAL CHANGE 1961 - 1970



SOURCE: STATISTICS CANADA (1973)
GROWTH PATTERNS IN
MANUFACTURING EMPLOYMENT 1961-1970

TABLE 12 IMPORTANT MANUFACTURING INDUSTRIES AFFECTING THE NET RELATIVE
CHANGE IN CENSUS DIVISIONS IN WHICH THE REGIONAL
SHARE COMPONENT IS SIGNIFICANT

Census Division	Net Relative Change	Manufacturing Industries
<u>Manitoba</u>		
2	positive	New industries
4	negative	'Other' industries
5	negative	Iron and steel mills
7	positive	New industries
10	positive	Agricultural implements
12	positive	New industries
14	negative	'Other' industries
15	positive	Sawmills, planning and shingle mills; New industries
16	negative	Smelting and refining
17	negative	'Other' industries
18	negative	'Other' industries
19	negative	Pulp and paper mills
<u>Saskatchewan</u>		
1	positive	New industries
2	positive	Electrical wire and cable; Plastics fabricators
4	negative	'Other' industries
5	negative	'Other' industries
7	negative	'Other' industries; Slaughtering and meat processing; Sash, door and other mill work; Printing and publishing
10	positive	Poultry processing
14	positive	New industries
15	positive	New industries
18	negative	Smelting and refining
<u>Alberta</u>		
1	negative	Clay products; Glass products; Industrial chemicals; 'Other' industries
2	positive	'Other' industries; New industries; Structural metals; Canvas products; Vegetable oil mills
4	negative	Not available
5	negative	'Other' industries
6	positive	New industries; Sash and door products; Truck body and trailers; Scientific and professional equipment; Iron and steel; Commercial printing; Miscellaneous machinery and equipment manufacturing

TABLE 12 Contd.

Census Division	Net Relative Change	Manufacturing Industries
9	positive	New industries
10	positive	Sash and door products; New industries
11	positive	Sash and door products; Men's clothing; Iron and steel mills; Smelting and refining; Miscellaneous machinery and equipment manufacturing; Truck body and trailer manufacture; Concrete products; Industrial chemicals; New industries
12	positive	Sawmills, planning and shingle mills
13	positive	New industries
14	negative	Sawmills, planning and shingle mills; Pulp and paper mills
15	positive	Sawmills, planning and shingle mills

Source: Statistics Canada, Growth Patterns in Manufacturing
Employment by Counties and Census Divisions 1961-1970.

in which manufacturing employment were growing slower than the national rate of increase. In six divisions (i.e. 6, 8, 11, 13, 16 and 17), the negative net relative change was a result of the industry mix while in division 3, both components were significant.

In all other "negative" divisions, the regional share was the significant component of change. The important industries identified with the change are "Other" (division 4, 5 and 7) and smelting and refining (division 18).

Both the industry mix and regional share components contributed to positive net regional change in seven Census divisions.

Industries associated with the regional share component were primarily new industries, electrical wire and cable manufacturing, plastics and poultry processing (Table 12).

Alberta, differs significantly from Manitoba and Saskatchewan with respect to net relative change characteristics. Two-thirds of Alberta's divisions had "positive" net relative shares compared to less than half in the other Prairie provinces.

The positive net relative changes in eight Census divisions were related to the regional share while two other divisions, the industry mix. Industries associated with the regional share component in the eight divisions are listed in Table 12. It is significant that apart from new industries, existing industries such as food, wood products, machinery, transport equipment, etc. also contributed toward growth in manufacturing employment. This is in contrast to the divisions in Manitoba and Saskatchewan where new industries rather than established manufacturing activities tended to generate positive net relative changes.

Two metropolitan divisions (6 and 11) in Alberta registered positive net relative changes in comparison to negative changes in the major manufacturing divisions of Saskatchewan and Manitoba. Furthermore, the regional share was the significant component of change in the two Albertan divisions in contrast to the industry mix for divisions 6 and 11 in Saskatchewan and 20 in Manitoba.

Negative net relative changes were recorded in divisions 1, 4, 5, 7 and 14. With the exception of 7, changes in all these divisions were linked with the regional share component. Geographi-

cally, four of the negative divisions are clustered in the Prairie lowland fringe in southeastern Alberta, while the fifth division (14) is located in the west-central region of the province.

Interpretation of Shift-share Characteristics
and Components of Regional Change

Definite shift patterns have occurred in the Prairies. Most Census divisions in Manitoba and Saskatchewan grew at a slower rate relative to the nation's increase in manufacturing employment. In contrast, most of Alberta's divisions showed relatively faster growth. Generally, Manitoba and Saskatchewan gained less than the average share of increases in manufacturing employment generated in Canada while Alberta gained more.¹

It appears that certain forces are influencing these shifts patterns. Within the limits of this analysis, the available data suggest that differences in regional share of manufacturing within the Prairies are caused largely by regional advantages or disadvantages and to a lesser degree by industrial structure. In Manitoba and Saskatchewan, certain favourable regional elements appear to have encourage the establishment of new industries and growth of existing manufacturing. New industries are not disaggregated into the component manufacturing activities. As such, the regional elements associated with such developments cannot be accurately inferred for meaningful discussion. However, the establishment of new industries in itself tends to indicate the possible existence of locational

¹ See also discussion on growth of Prairie manufacturing in Chapter III.

forces relating to markets, raw materials or lower cost of production factors. It may also imply a host of other factors, namely local entrepreneurship, contacts, linkages, local ties, community attractions or government influence.

As far as established industries are concerned, growth has occurred largely in agricultural implements, wood, electrical products, plastics and food processing. This suggests the significance of the market factor in the development of Manitoba's and Saskatchewan's manufacturing; the reason is with the likely exception of food processing and wood industries, most material inputs would have to be imported into the region. In this situation, proximity to materials is an unlikely stimulus for existing types of manufacturing activity.

In Alberta, a wide range of industries contributed to the growth of manufacturing industries in divisions with positive net relative changes (Table 12). Different types of manufacturing activities and their geographical occurrence imply the possible significance of location factors associated with resource developments and hence raw material sources, as well as internal markets. For example, the importance of raw material sources may be the regional factor stimulating expansion of sawmills, planing mills and pulp and paper, in divisions 12 and 14, vegetable oil extraction in division 2 and industrial chemicals in division 11 which includes Metro Edmonton. The significance of industries such as clothing, printing and publishing, sash and door products, truck body and trailers, scientific and professional equipment, iron and steel,

machinery and concrete products, suggest that probably a more important regional factor is the expansion of consumer and industrial markets, particularly in the metropolitan Census divisions of Edmonton and Calgary.

Depending upon the type of new industries there are likely other regional factors that have attracted manufacturing in Alberta. However, without detailed knowledge of the new industries, inferences on the nature of these other regional factors are not possible.

Selected Economic Variables and the Distribution of Prairie Manufacturing

Analysis of the industrialization process and components affecting shifts in secondary employment provide some evidence that the geography of Prairie manufacturing is related to markets, raw materials, transportation and some regional advantages that are attractive to export-oriented industries. The following analysis therefore attempts to quantify the association between manufacturing and selected economic variables which represent markets, raw materials, transportation, etc., through correlation analyses.

Correlation analysis involves the calculation of a coefficient (the Product Moment Correlation Coefficient, r), to describe the degree of association between two sets of paired values (Hammond and McCullagh, 1974, 192). The coefficient is then tested to determine the probability that the association might be due to chance variations (Gregory, 1968, 200-201).

The choice of correlation analysis rests primarily on the

scope and purpose of this particular exercise. It is meant to furnish some quantitative evidence to supplement the qualitative evidence concerning the association between manufacturing and locational aspects such as markets, raw materials and other factors. Since the strength of an association rather than a relationship per se is sought, correlation analysis is an appropriate method in this context. The method implies no functional relationship and considers only the co-variation of the variables analysed (King, 1969, 118).

Correlation Analysis

Thirteen economic variables selected to represent location factors were correlated against 1970 Prairie manufacturing employment. The aim was to establish the statistical association between certain factors of location and the distribution of industries in the Prairies. The economic variables are numbered 1 to 13 in Table 13. The first five variables are different measures of the market factor. Variable 6 is a measure of the availability of labour, while variables 7 and 8 measure the magnitude of mining activity and the availability of transport and utilities respectively. Agricultural resources are denoted by variable 9. Variable 11 is a measure of labour productivity while variables 10, 12 and 13 represent the cost of different factors of production, i.e. labour, capital inputs and power.

The raw data for the correlation analyses were compiled on the basis of Census divisions (see Appendix A). The first step in the analyses involved the use of all Census divisions in the Prairies to denote the spatial association between aggregate manufacturing and

TABLE 13 CORRELATION BETWEEN THE DISTRIBUTION OF 1970 MANUFACTURING
EMPLOYMENT AND 13 ECONOMIC VARIABLES IN THE PRAIRIES⁺

Variables	Correlation Coefficient r	Student's t Significance of t	Test for Correlation* t.05(49)
1 Population (1966)	0.9456	20.361	2.014
2 Average Density of Population (1966-71)	0.8519	11.391	2.014
3 Average Percentage of Population Residing in Urban Areas (1966-71)	0.6402	5.834	2.014
4 Value of Retail Sales (1966)	0.9343	18.356	2.014
5 Total Income of Tax Payers (1966)	0.5593	4.723	2.014
6 Average Percentage of Potentially Active Labour Force (1961-71)	0.4770	3.799	2.014
7 Percentage of Labour Force in Mining and Quarrying (1961)	0.0244	0.171	2.014
8 Percentage of Labour Force in Transport and Utilities (1961)	0.3151	2.324	0.014
9 Value of Agricultural Products (1966)	0.0707	0.496	2.014
10 Average Wages of Production Workers in Manufacturing (1965)	0.2240	1.609	2.014
11 Productivity of Labour in Manufacturing (1965)	0.1000	0.704	2.014
12 Per Capita Cost of Plant Materials in Manufacturing (1965)	0.1200	0.846	2.014
13 Per Capita Cost of Fuel and Electricity in Manufacturing (1965)	0.0173	0.121	2.014
Correlation without metropolitan census divisions i.e. Number 20 (Manitoba) and Numbers 6 and 11 (Alberta and Saskatchewan)			t.05(44)
7 Percentage of Labour Force in Mining and Quarrying (1961)	0.1766	1.190	2.016
9 Value of Agricultural Products (1966)	0.3277	2.196	2.016

⁺ Analysis based on data from various statistical publications. See Appendix A, Tables 1-14, raw data used and sources.

* For correlation significance tests, see Gregory (1968, 200-201). Critical values of Student's t-distribution computed as shown in Rohlf and Sokal (1969, 159-161).

the selected economic variables for the Region. The second step in the analysis involved the computation of correlation coefficients by omitting the metropolitan Census divisions, i.e. number 20 in Manitoba, and numbers 6 and 11 in Alberta and Saskatchewan. This procedure was undertaken to reexamine spatial association between manufacturing and economic variables which tend to be more important in the non-metropolitan Census divisions. This omissions of the metropolitan Census divisions were instituted to lessen the possible effect on the correlation coefficient r , as a consequence of the extreme concentration of manufacturing employment in those five divisions.

The third step involved the computation of a separate set of correlation coefficients for the three individual provinces. Once again, initially all Censes divisions were used to compute r . Later, to reexamine the strength of certain variables, the metropolitan Census divisions for the respective provinces were excluded from the computations.

In the fourth and final phase of the correlation analyses, two industry groups, food and beverages, and printing and publishing were studied separately.

The correlation coefficient were calculated with the aid of a desk-top computer using the following formula (see Mendenhall, 1971, 276):

$$r = \frac{n \sum_{i=1}^n x_i y_i - \left(\sum_{i=1}^n x_i \right) \left(\sum_{i=1}^n y_i \right)}{\sqrt{\left[n \sum_{i=1}^n x_i^2 - \left(\sum_{i=1}^n x_i \right)^2 \right] \left[n \sum_{i=1}^n y_i^2 - \left(\sum_{i=1}^n y_i \right)^2 \right]}}$$

where, x_i = manufacturing employment in census division i

y_i = an economic variable in census division i

n = total number of census divisions.

The significance of correlation coefficients were tested by the student's t distribution, using the following formula:

$$t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$$

where, r = correlation coefficient

n = number of pairs of entries

r^2 = coefficient of determination.

(see Gregory, 1968, 201)

All critical values of the student's t distribution were considered at the 5 per cent probability level ($t_{.05}$).

Correlation Coefficients for the Prairies

Table 13 summarizes the results of the correlation analysis for the Prairie Region. It shows that the correlation coefficients for 1970 manufacturing employment and variables 1, 2 and 4 to be highly significant and variables 2, 5, 6, 8 and 9¹ significant. However, the magnitude of the r 's indicates that Prairie manufacturing is strongly associated in space with population ($r = 0.9456$), value of retail sales ($r = 0.9343$) and the average density of population ($r = 0.8519$), and to a lesser degree the percentage of

¹ Excludes metropolitan Census divisions.

of population residing in urban areas ($r = 0.6402$) and income of tax payers ($r = 0.5593$). All other variables had r 's with less than 0.5.

The results tend generally to reinforce earlier findings in Chapter III as well as the shift-share analysis, that stress the role of market elements for the location and spatial organization of Prairie manufacturing.

Computations of r 's excluding metropolitan Census divisions were limited to variables 7 and 9, namely percentage of labour force in mining and quarrying, and value of agricultural products. It is worth noting that the correlation coefficients improved significantly, particularly in the case of variable 9, when manufacturing in the five major Census divisions with the largest Prairie cities were not considered.

Correlation Coefficients for Individual Provinces

Correlation coefficients for individual provinces were limited to variables 1, 2, 3, 4, 7 and 9 (Table 14). These variables include those that showed significant correlation in the preceding analysis and those which were important in non-urban areas, i.e. the variables relating to mining and agriculture.

In all three provinces, the t test revealed that the correlation coefficients corresponding to variables 1, 2, 3 and 4 were significant at the 5 per cent probability level. It also occurred that the 1970 manufacturing employment in each province was highly correlated with variables 1, 2, 3 and 4. An exception was $r = 0.4961$ for the percentage of population residing in urban areas in Manitoba. All the other significant r 's (all Census divisions included in the

TABLE 14 CORRELATION BETWEEN THE DISTRIBUTION OF 1970 MANUFACTURING
EMPLOYMENT AND SELECTED VARIABLES IN MANITOBA, SASKATCHEWAN
AND ALBERTA⁺

Province	Variables*	Correlation Coefficient	Student's t Test for Significance of Correlation#	
MANITOBA		r	t	t.05(16)
All Census Divisions in Province	1	0.9953	41.298	2.120
	2	0.9982	67.560	2.120
	3	0.4961	2.286	2.120
	4	0.9971	53.321	2.120
	7	0.0000	0	2.120
	9	0.1889	0.770	2.120
				t.05(15)
Division 20 omitted from analyses	4	0.8827	7.280	2.131
	7	0.5370	2.466	2.131
	9	0.3114	1.270	2.131
SASKATCHEWAN				t.05(16)
All Census Divisions in Province	1	0.9760	17.933	2.120
	2	0.9543	12.775	2.120
	3	0.8768	7.295	2.120
	4	0.9506	12.254	2.120
	7	0.0458	0.183	2.120
	9	0.4576	2.059	2.120
				t.05(14)
Divisions 6 and 11 omitted from analyses	4	0.6590	3.278	2.145
	7	0.0556	0.208	2.145
	9	0.3182	1.256	2.145
ALBERTA				t.05(13)
All Census Divisions in Province	1	0.9889	24.066	2.160
	2	0.9793	17.488	2.160
	3	0.7510	4.101	2.160
	4	0.9912	27.094	2.160
	7	0.1256	0.456	2.160
	9	0.3900	1.527	2.160
				t.05(11)
Divisions 6 and 11 omitted from analyses	4	0.7397	0.646	2.201
	7	0.2745	0.947	2.201
	9	0.3803	1.364	2.201

⁺ Analysis based on data from various statistical publications. See Appendix A, Tables 1-14 for raw data used and sources.

* Variables are numbered according to those presented in Table 13.

For correlation significance tests, see Gregory (1968, 200-201). Critical values of student's t distribution from Rohlf and Sokal (1969, 160-161).

computations) had values exceeding 0.7500. The r 's for population, population density and retail sales were consistently over 0.9500. Quite evidently, this analysis of individual Prairie provinces once again revealed the importance of market factors.

As for the analysis in which metropolitan Census divisions were excluded, certain changes in the r values were observed. The correlation coefficient corresponding to value of retail sales decreased and that for employment in mining and quarrying increased in all three provinces. The value of r for agricultural products showed an increase in Manitoba and a decline for both Alberta and Saskatchewan.

The results of the analysis suggest differences between the orientation of manufacturing in metropolitan and non-metropolitan Census divisions. Specifically, manufacturing outside the metropolitan Census areas appear to be more spatially related to activities such as mining, quarrying (all three provinces) and also agriculture (Manitoba), and less so with markets represented by retail sales.

Correlation Coefficients for Selected Industries

The correlation analyses for specific manufacturing industries were limited to the food and beverage and printing and publishing industries. The lack of available data disaggregated on the basis of industry groups and Census divisions precluded the study of other manufacturing activities. The food and beverage industry provides an interesting case study of a resource- and market-oriented manufacturing, while printing and publishing activity is an example of market-oriented manufacturing.

Correlation coefficients for employment in the two industries against the 13 economic variables are presented in Table 15. According to the student's *t* test the *r*'s for variables 1 to 6 were highly significant in both food and beverage and printing and publishing. Not unlike aggregate manufacturing, the distribution of these two industries also appear to be spatially associated with market variables. Resources such as agricultural products do not appear to be spatially significant for the food industry.

Population Thresholds for Manufacturing

Thus far the geography and locational aspects of manufacturing has been examined in terms of the Prairies and individual provinces. This present section deals with manufacturing at the city level. The purpose of this analysis is to investigate further the influence of population developments in manufacturing of which some comments were forwarded earlier in Chapter III. Specifically this exercise focusses upon the implications of population thresholds for manufacturing in Prairie urban centres.

It is generally inferred that industries "oriented" toward local or regional markets will not appear in cities until their local or regional thresholds are attained. This threshold is the minimum population volume of sales required to support a new factory or an addition to existing facilities, and until the city attains this demand level it must import the industry's products from a more complex centre (Pred, 1965, 177 and 180-181). However, when new manufacturing develops in a centre, the event evokes a circular chain

TABLE 15 CORRELATION BETWEEN THE DISTRIBUTION OF 1970 EMPLOYMENT IN
THE FOOD AND BEVERAGE AND PRINTING AND PUBLISHING
INDUSTRIES AND SELECTED VARIABLES IN THE PRAIRIES⁺

Variables*	Correlation Coefficient r	Student's t Test for Significance of Correlation# t	t.05(27)
<u>FOOD AND BEVERAGES</u>			
1	0.9682	20.115	2.052
2	0.7792	6.462	2.052
3	0.8060	7.077	2.052
4	0.9635	18.716	2.052
5	0.9681	20.081	2.052
6	0.6866	4.908	2.052
7	0.1867	0.988	2.052
8	0.2917	1.585	2.052
9	0.0192	0.100	2.052
10	0.1205	0.775	2.052
11	0.3111	1.701	2.052
12	0.1139	0.596	2.052
13	0.2406	1.288	2.052
<u>PRINTING AND PUBLISHING</u>			t.05(18)
1	0.9119	7.469	2.101
2	0.8903	8.294	2.101
3	0.7664	5.062	2.101
4	0.9016	8.844	2.101
5	0.9167	10.462	2.101
6	0.6191	3.345	2.101
7	0.1224	0.523	2.101
8	0.5195	2.580	2.101
9	0.2717	1.198	2.101
10	0.3468	1.569	2.101
11	0.2305	1.005	2.101
12	0.0063	0.027	2.101
13	0.3455	0.626	2.101

⁺ Analysis based on data from various statistical publications. See Appendix A, Tables 15 and 16, for raw data used and sources.

* Variables are numbered according to those presented in Table 8.

For correlation significance tests, see Gregory (1968, 200-201). Critical values of student's t distribution from Rohlf and Sokal (1969, 160-161).

of reaction. For example, new manufacturing whether or not they primarily serve local markets will have an initial multiplier effect. New local demand created both by the manufacturing activities themselves and by the purchasing power of their labour force will call into being a host of new business, service, trade, construction, transportation, professional and miscellaneous white collar jobs. The combined effect of new industrial employment and an initial multiplier effect will be an increase in population, or growth in urban size, and the probable attainment of one or more new local or regional industrial thresholds. These higher thresholds will support new manufacturing functions as well as established ones in existing industrial categories.

Once production facilities have been constructed in accordance with thresholds, a second round of growth is initiated and eventually still higher thresholds are achieved. Plant construction in response to these thresholds again generates a multiplier effect and higher thresholds, and the process continues in a circular and cumulative manner until interrupted or impeded (Pred, 1965, 179-180).

Computation of Linear Prediction Equations

Pred's model described earlier and evidence that he cites for American cities (Pred, 1965; 1966) indicates that there is a positive relationship between population and size of the manufacturing sector in a city. Also implicit within the model is the idea that, as population increases, the secondary labour force tends in the same general direction. Further, as the secondary sector expands, the economic multiplier effect eventually encourages overall population

TABLE 16 LINEAR PREDICTION EQUATIONS FOR POPULATION
THRESHOLDS FOR MANUFACTURING 1901-1961⁺

Year	Equation	Number of data blocks	Correlation Coefficient	F*
1901	$y = 5.4x + 6,434$	28	0.9700	840.65
1911	$y = 6.2x + 8,515$	33	0.9556	666.80
1921	$y = 8.0x + 14,608$	27	0.9501	476.98
1931	$y = 12.1x + 12,736$	33	0.9737	1,146.98
1941	$y = 6.3x + 14,646$	43	0.9591	962.49
1951	$y = 5.8x + 21,716$	44	0.9459	735.03
1961	$y = 7.6x + 24,613$	52	0.9205	578.76

⁺ Analysis based on data from the Censuses of Canada 1901-1961. See Appendix B, Tables 1-7 for data used and sources.

* Fisher's F statistic.

growth. This general relationship enables the computation of a series of linear regression models to determine population thresholds for manufacturing in urban centres.

For this particular analysis, total manufacturing employment in a random selection of Canadian urban centres were regressed against their respective populations for 1901, 1911, 1921, 1931, 1941, 1951 and 1961. The computations were repeated for selected industries, i.e. textiles, clothing, non-metallic minerals, food and beverages, chemicals and printing and publishing, for the census years 1921, 1931, 1941, 1951 and 1961. The linear prediction equations for populations thresholds for aggregate manufacturing and specific industries are presented in Tables 16 and 17 respectively. Since the aim was to determine population thresholds, manufacturing employment

TABLE 17 LINEAR PREDICTION EQUATIONS FOR POPULATION THRESHOLDS

FOR SELECTED MANUFACTURING INDUSTRIES, 1921-61*

Industry	Year	Equation	Sample	Correlation Coefficient	F*
Textile Manufacturing	1921	$y = 107.6x + 57,071$	15	0.6699	26.38
	1931	$y = 199.8x + 94,942$	8	0.6605	11.67
	1941	$y = 107.4x + 125,558$	8	0.8285	28.99
	1951	$y = 97.5x + 89,615$	16	0.7451	40.93
	1961	$y = 143.0x + 90,612$	25	0.7336	63.33
Clothing Manufacturing	1921	$y = 35.8x + 49,838$	15	0.9598	310.55
	1931	$y = 37.5x + 113.082$	8	0.9826	338.55
	1941	$y = 27.0x + 147,807$	8	0.9374	89.83
	1951	$y = 26.5x + 93,336$	16	0.8790	101.73
	1961	$y = 32.7x + 109,604$	25	0.8454	125.76
Non-Metallic Mineral Manufacturing	1921	$y = 268.2x + 21,519$	15	0.9073	127.22
	1931	$y = 528.0x + 63,254$	8	0.9209	69.82
	1941	$y = 230.4x + 115,190$	8	0.7219	15.57
	1951	$y = 263.9x + 60,523$	16	0.9119	114.95
	1961	$y = 252.5x + 55,643$	25	0.8486	128.96
Food and Beverage Manufacturing	1921	$y = 90.3x + 14,922$	15	0.8976	113.89
	1931	$y = 137.0x + 26,233$	8	0.9831	349.28
	1941	$y = 78.3x + 35,897$	8	0.9357	87.31
	1951	$y = 56.3x - 10,990$	16	0.8902	113.46
	1961	$y = 57.7x + 4,035$	25	0.9665	664.14
Chemical Manufacturing	1921	$y = 395.4x + 45,332$	15	0.8734	89.66
	1931	$y = 828.0x + 92,351$	8	0.6883	13.25
	1941	$y = 147.0x + 98,608$	8	0.8600	36.87
	1951	$y = 110.8x + 65,375$	16	0.8625	87.80
	1961	$y = 140.0x + 75,338$	25	0.9169	253.80

TABLE 17 Contd.

Industry	Year	Equation	Sample	Correlation Coefficient	F*
Printing and Publishing	1921	$y = 95.6x + 34,529$	15	0.8328	64.77
	1931	$y = 125.2x + 59,936$	8	0.8027	24.41
	1941	$y = 86.6x + 84,874$	8	0.8136	26.19
	1951	$y = 75.6x + 48,109$	16	0.8176	62.77
	1961	$y = 95.3x + 51,826$	25	0.8767	163.50

+ Analysis based on data from the Censuses of Canada 1921-1961. See Appendix B, Tables 8-12 for data used and sources.

* Fisher's F statistic.

was designated the independent variable x and population, the dependent variable y . This is consistent with Pred's model discussed earlier, because after the initial stage when a minimum threshold is attained, subsequent changes in the population (and hence the threshold) is also the effect of new infusions of industrial activity. This is borne out well by the Fisher's F statistic¹ which indicates that a high proportion of the variance for the population variable y , is explained by manufacturing employment (see Tables 16 and 17).

Population Thresholds and Different Levels of Manufacturing Employment

How do population thresholds for aggregate manufacturing vary at different levels of manufacturing employment over the past six decades? Manufacturing employment levels of 100, 500, 1,000, 5,000, 20,000 and 50,000 were applied to the seven equations in Table 16 and the respective values representing the populations thresholds obtained. The thresholds were then represented graphically (Figure 10).

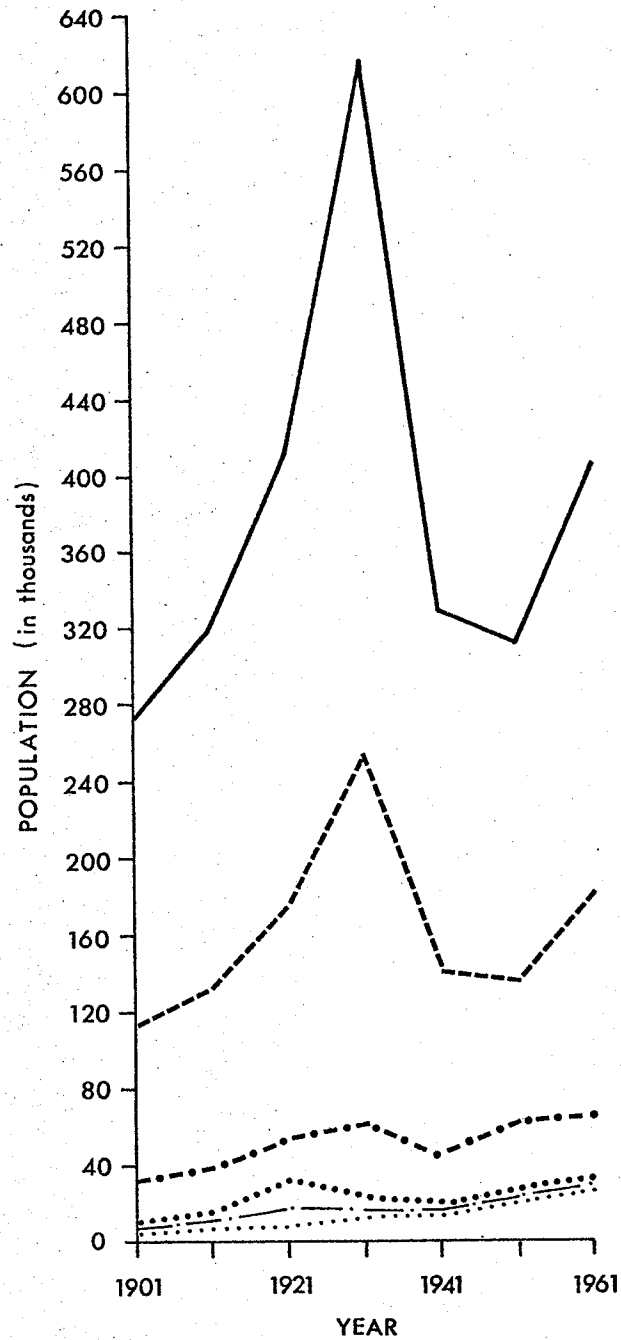
The population thresholds relating to 100, 500 and 1,000 manufacturing employees did not differ significantly except in 1921. However, at progressively higher levels of manufacturing employment, the thresholds particularly for 20,000 and 50,000 employees showed rather steep increases.

It was also significant that the threshold changed markedly from one decade to another at higher levels of manufacturing. For example, a population of approximately 270,000 was associated with

¹ For further discussion on the F test, see Mendenhall (1971, 332-341).

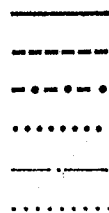
Figure 10

POPULATION THRESHOLDS FOR MANUFACTURING AT DIFFERENT MANUFACTURING EMPLOYMENT LEVELS 1901-1961



POPULATION THRESHOLD
FOR
MANUFACTURING

MANUFACTURING
EMPLOYMENT LEVELS
(persons)



50,000
20,000
5,000
1,000
500
100

50,000 manufacturing employees in 1901. This increased to 620,000 in 1931, and declined to 310,000 in 1951.

Reasons for the abrupt increase and decline in thresholds are not clear. The concurrence of such patterns with the Depression and Second World War years could not be mere coincidence but were probably related.

Profiles of Population Levels and Thresholds
for Manufacturing: Interpretation

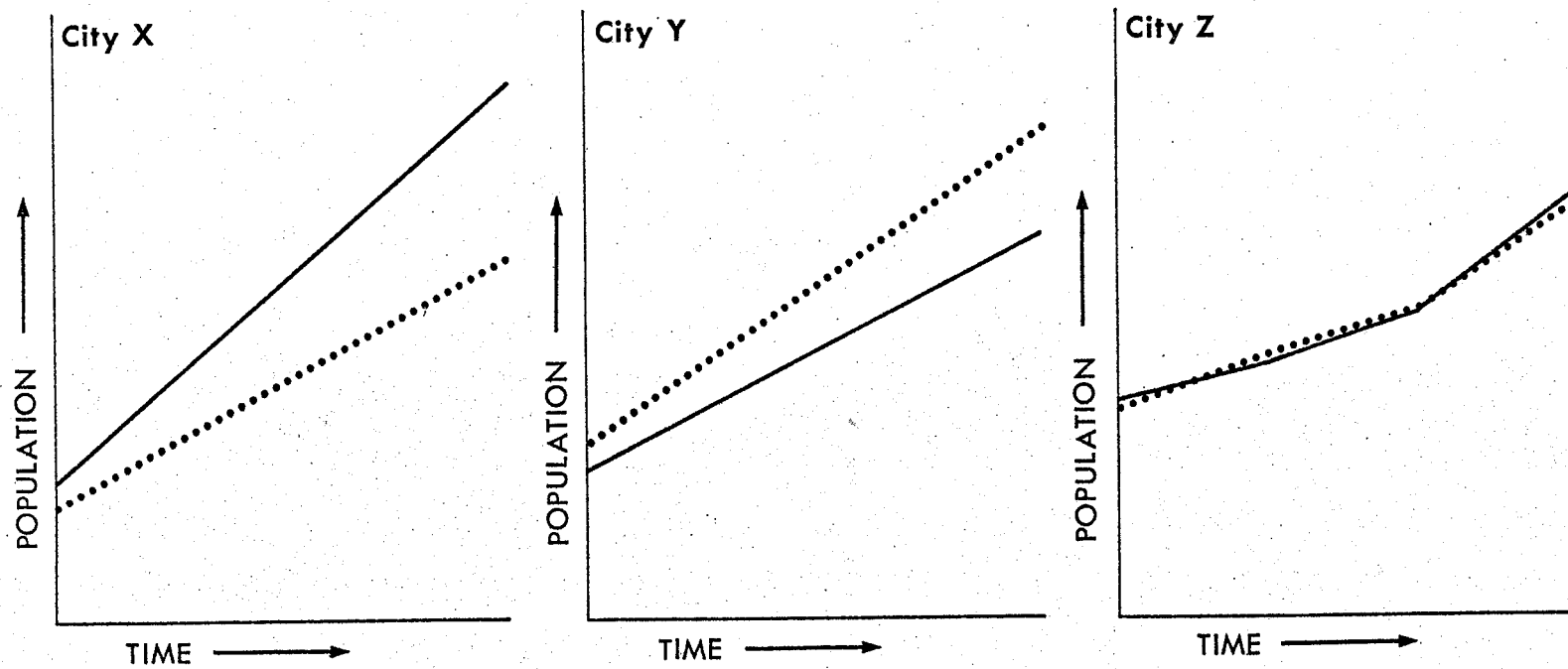
Corresponding population thresholds for different cities can be calculated from the linear prediction equations in Tables 16 and 17, when the manufacturing employment in aggregate or for specific industries are known. When the population thresholds are graphically compared to actual populations for different cities, three types of general profiles are likely to emerge (see Figure 11).

In the first type of profile, represented by City X, the threshold is at all times below the true population level. This profile suggests that basically manufacturing in City X is underdeveloped relative to the actual population. The industrial sector in City X is associated with a lower population level denoted by the population threshold line. In a very broad sense, this also suggests the City X's manufacturing will be generally "oriented" to the local or urban rather than regional or export demand, since the industrial sector is theoretically associated with a smaller population. Consequently, the market in itself is likely an important element in location of industries in cities with this kind of profile.

The second profile with reference to City Y represents a

Figure 11

POPULATION LEVELS AND POPULATION THRESHOLDS FOR MANUFACTURING: HYPOTHETICAL CASES



—— Population level Population threshold for manufacturing

reversal of the situation for City X. The threshold for manufacturing is always above the true population. This situation suggests that manufacturing is highly developed and is capable of being associated with a larger population than that of City Y itself. On account of this, manufacturing in City Y will appear to be "oriented" to the local as well as external markets, and may be indicative of the existence of wider trading hinterlands outside of the city limits. Thus for cities with this type of profile, it is plausible to suggest that industrial development and location are closely related to market sizes and distribution, and possibly other factors such as material resources or some unique geographical advantages that favour manufacturing for distribution over larger market areas.

The profile characterized by City Z, presents a situation where the threshold for manufacturing and actual population are, or are almost coincident. In this example, the level of manufacturing is associated with a threshold nearly similar to the population size. It would, amongst other things indicate a city "self-sufficient" in as much as manufacturing is concerned. Hence, there would be little external-market interaction for the industrial sector of the city with this particular threshold and population profiles. Instead manufacturing is likely to be serving the urban market for the most part. In this specific situation, the attraction of industries to such urban areas, would ostensibly centre on markets again.

The circumstances surrounding the profile patterns would be relevant provided the following condition is satisfied. The "minimum population threshold" should be significantly lower than

either the true population level or population threshold for manufacturing. The "minimum population threshold" is determined by substituting x (manufacturing employment) = 0, in the linear prediction equations. This indicates the lowest population level for manufacturing (or specific industries) to appear or exist. Cities with manufacturing employment tending toward zero will have population thresholds that coincide with the minimum population threshold.

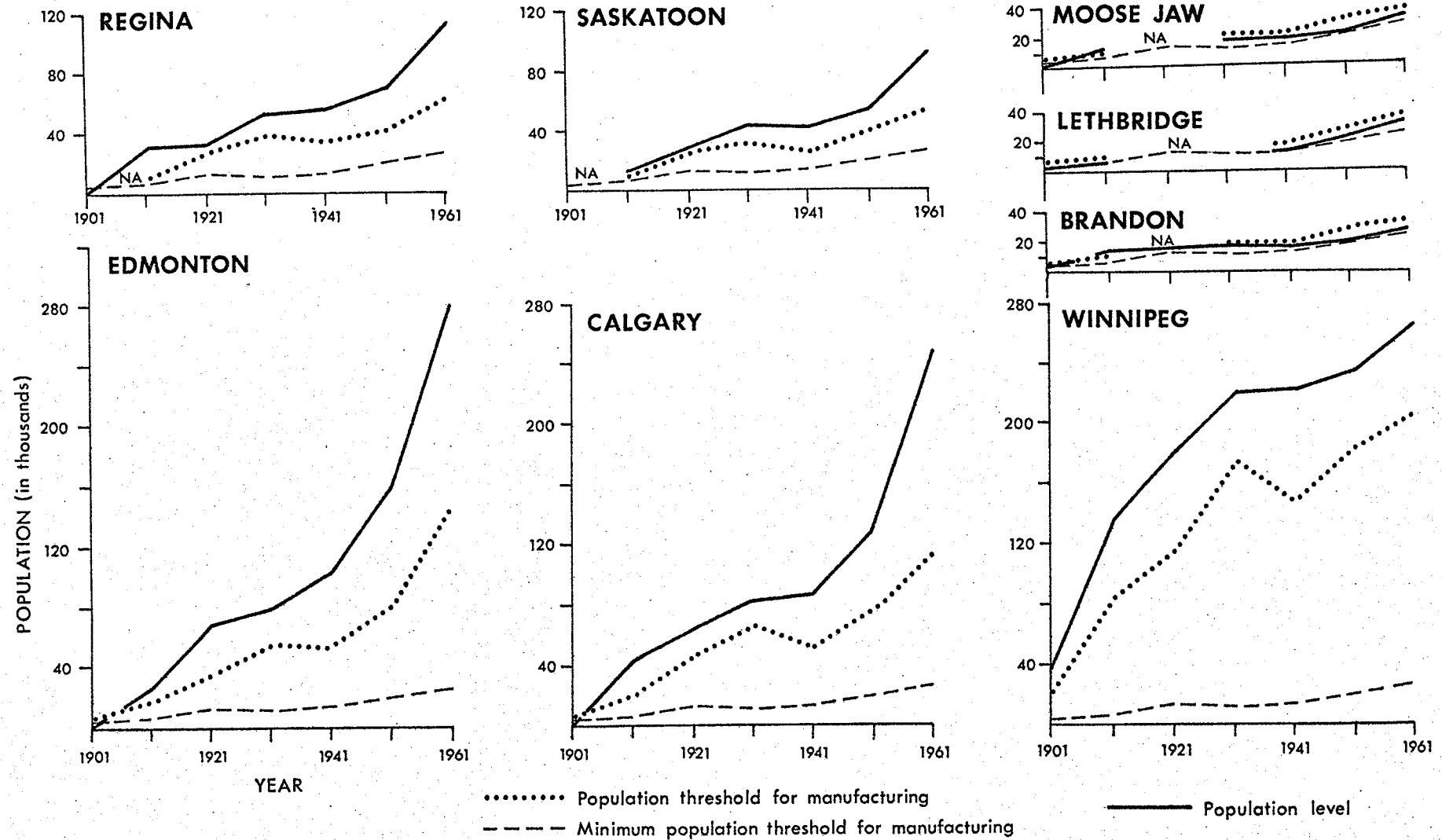
On the basis of these broad interpretations of the population and manufacturing thresholds for cities, it is possible to analyse general aspects pertaining to the location of Prairie manufacturing at the micro-geographical level.

Profiles of Selected Prairie Cities

Profiles of population levels and population thresholds for manufacturing for major Prairie cities are presented in Figure 12. Generally, there is a relationship between city size and type of profile. The larger cities, namely Winnipeg, Edmonton, Calgary, Regina and Saskatoon, have profiles peculiar to the example of City X in Figure 11. Except for some degree of coincidence early in the 1900's, the manufacturing thresholds have generally been below the true population. Smaller cities like Moose Jaw, Lethbridge, Brandon and Medicine Hat have profiles similar to those of City Y and City Z. It is significant that after 1941, thresholds for manufacturing were above the actual population levels. These basic differences in the profiles for Prairie cities suggest that the market basis for manufacturing in the five largest centres is

Figure 12

POPULATION LEVELS AND POPULATION THRESHOLDS FOR MANUFACTURING FOR SELECTED PRAIRIE CITIES



significant. As for the other centres, market considerations appear important at the early decade, covered in the analysis, but increasingly less so after the 1940's.

The implications emerging from this analysis seem to tie in with the historical development process of Prairie manufacturing and changes in the structure of urban activities as cities grow. In Chapter III, it was revealed that during the early period of Prairie economic development, manufacturing grew up in a few centres (i.e. Winnipeg and Calgary) to serve the urban as well as Prairie market. However, as time passed, more towns and cities grew up with their own industries. Their industrial structure were specialized and manufacturing was commonly based on the processing of local resources for export.

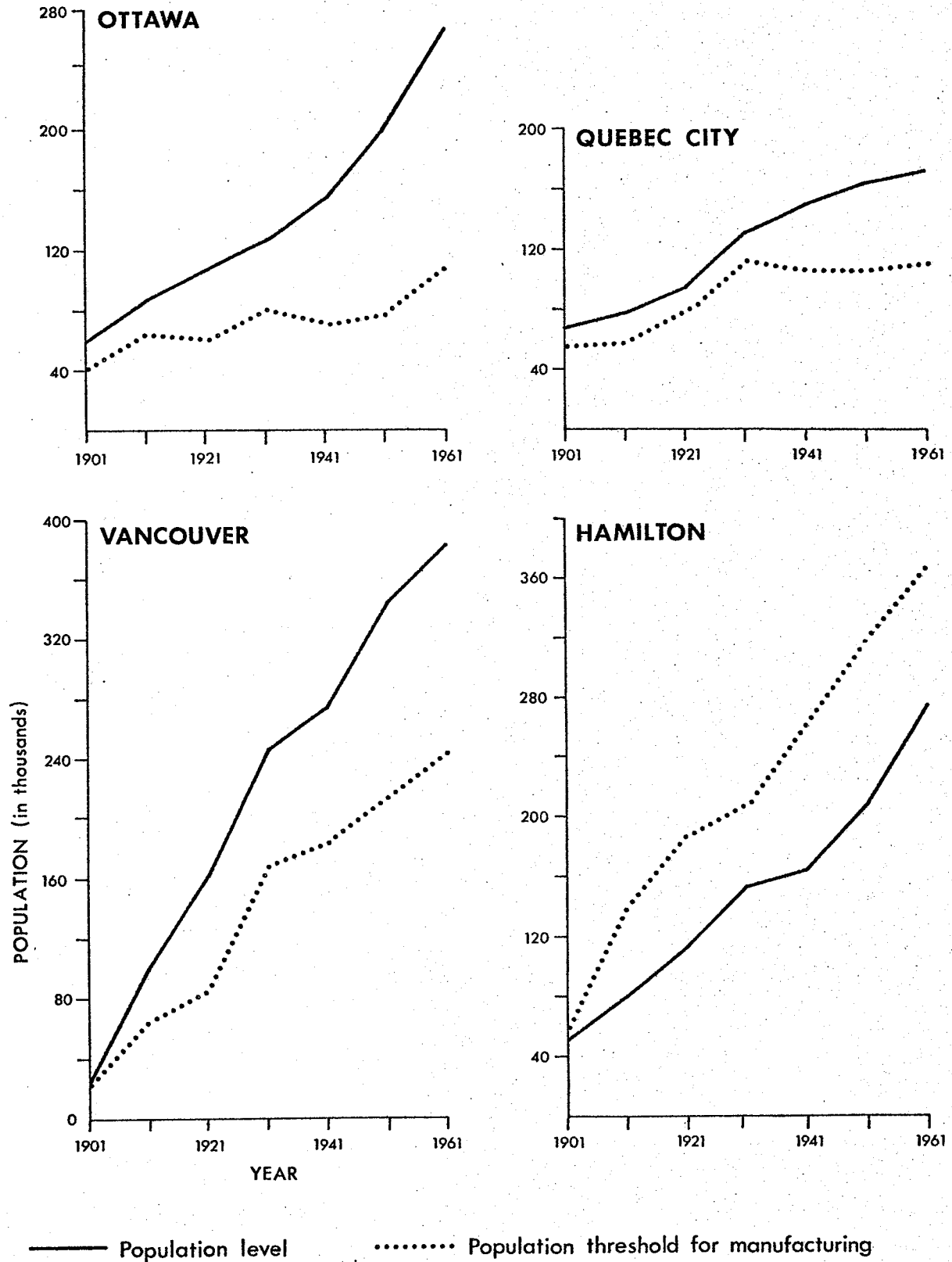
A verification of the conclusions drawn on manufacturing in Prairie cities is best illustrated by an analysis of profiles of other Canadian cities. Large centres such as Vancouver, Ottawa and Quebec City which are also important for their administrative functions have typical profiles depicted by City X (Figure 13). These cities are comparable to the major urban centres in the Prairies. A contrast to profiles depicted by large centres is the case of Hamilton which is noted for its important industrial base and which has a profile characteristic of City Y in Figure 11.

Profiles for Selected Industries and Cities

In Table 17, linear prediction equations were derived to predict population thresholds for textiles, clothing, non-metallic minerals, food and beverages, chemicals and printing and publishing

Figure 13

POPULATION LEVELS AND POPULATION THRESHOLDS FOR MANUFACTURING FOR SELECTED CANADIAN CITIES



industries. Profiles for each industry are presented graphically for six Prairie centres, i.e. Winnipeg, Brandon, Regina, Moose Jaw, Edmonton and Lethbridge.

The textile industry is almost non-existent or very poorly developed in the selected cities except Winnipeg (Figure 14). The coincidence of the "minimum population threshold" line and the population threshold for textile manufacturing is evidence of this situation. This is not unusual because for Lethbridge, Brandon, Moose Jaw, Regina and Edmonton (during the period 1921-1941) the actual population levels were below the minimum threshold for textile industries to develop. Although Edmonton's population exceeded the minimum threshold requirements, the activity is relatively undeveloped and appears to be associated with the urban market. In the case of Winnipeg, the population has always exceeded the minimum threshold. Except for a brief period in 1931, the textile sector appeared only large enough to "support" a population smaller than the city's true size. Once again the local market element emerged significant.

The profile for clothing manufacture suggested a similar situation described for textiles (Figure 15). With the exception of Winnipeg, employment in clothing industries for the other five cities were small. One reason is perhaps the high minimum threshold relative to the low population levels. Thus it was likely that clothing manufacture was more closely geared to the immediate demands of the respective cities. As far as Winnipeg is concerned, the clothing industry is relatively larger. The population threshold for the industry was below the actual population for a

Figure 14

POPULATION LEVELS AND POPULATION THRESHOLDS FOR TEXTILE MANUFACTURING IN PRAIRIE CENTRES

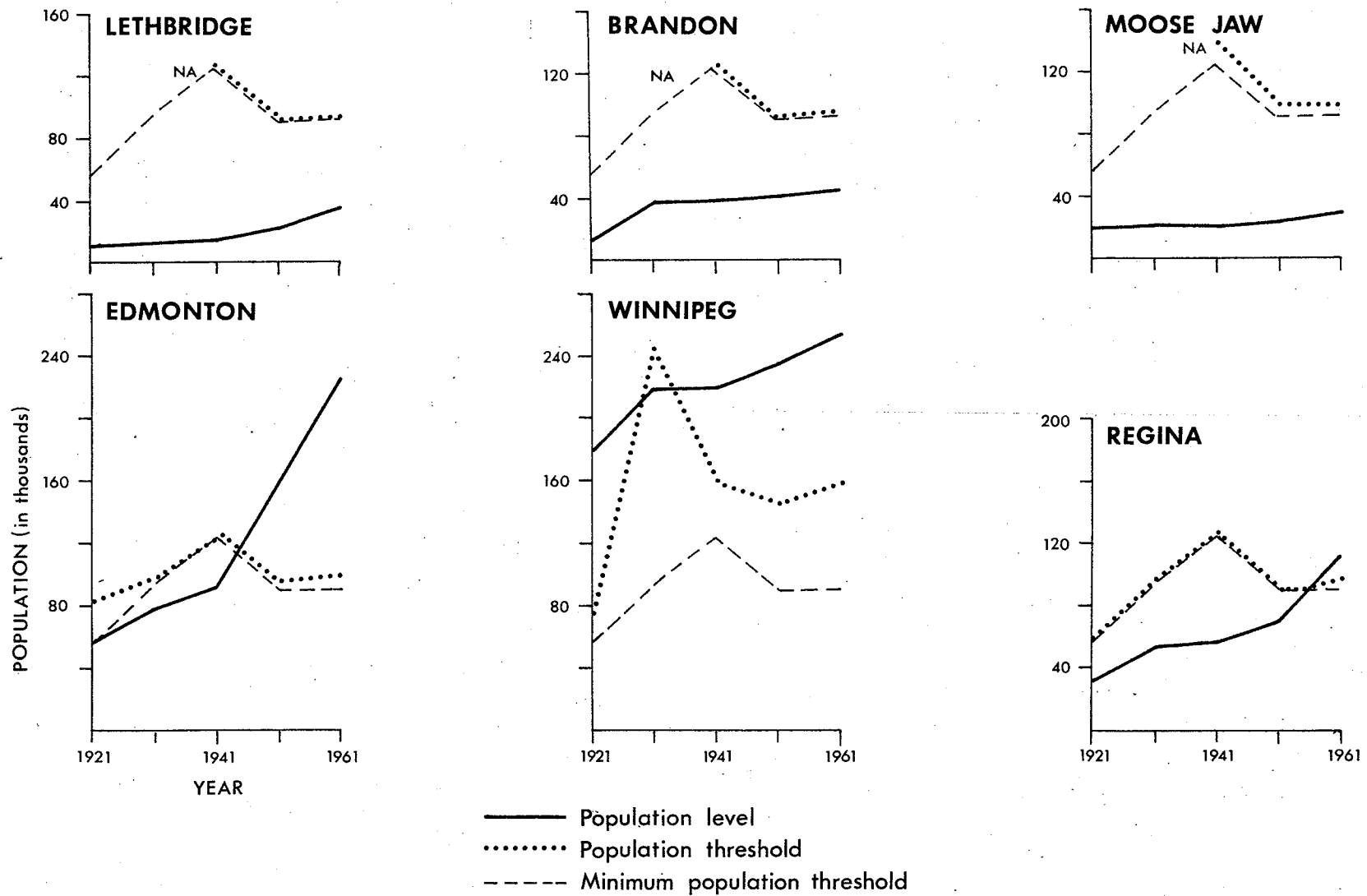
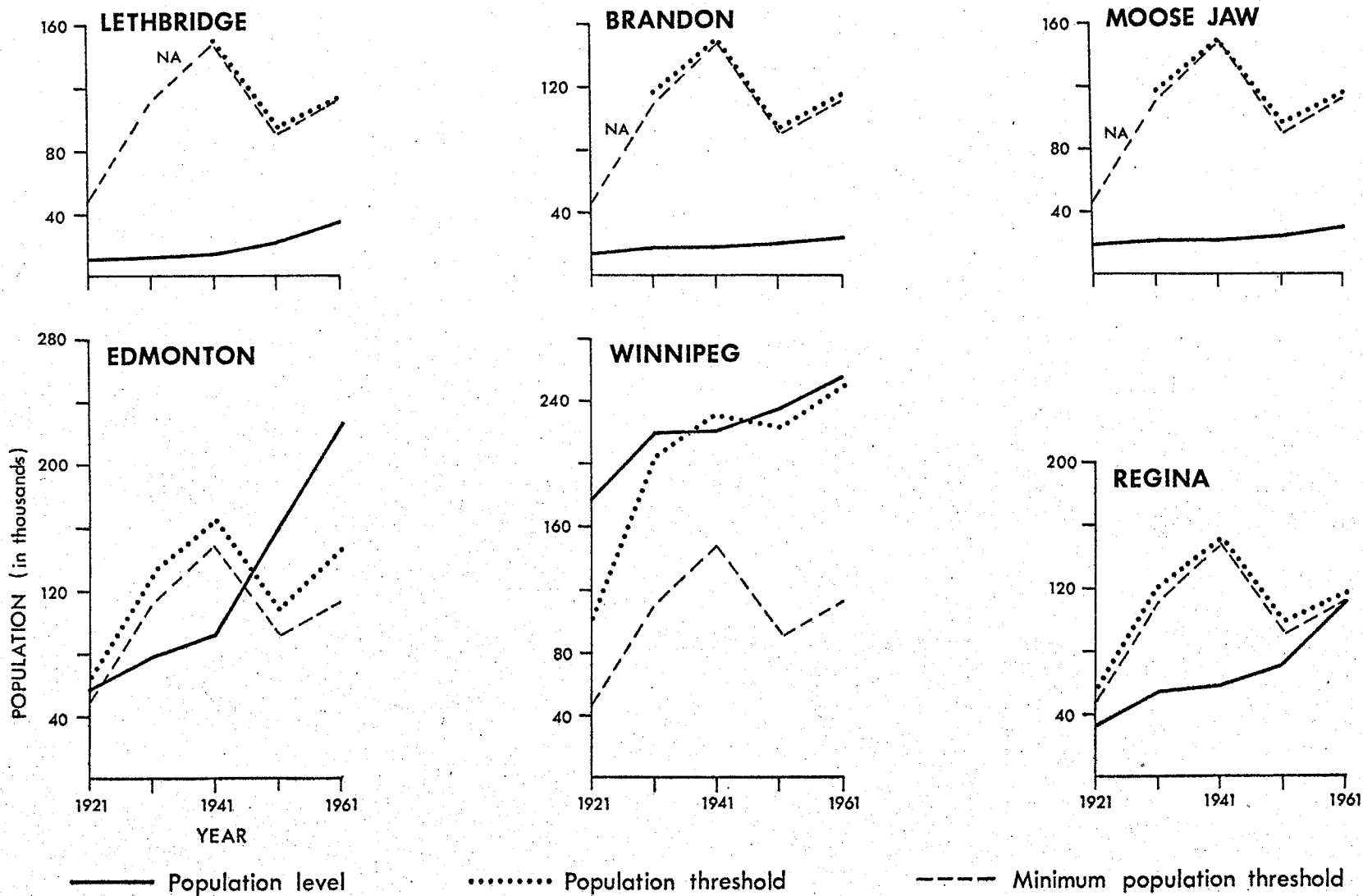


Figure 15

POPULATION LEVELS AND POPULATION THRESHOLDS FOR CLOTHING MANUFACTURING IN PRAIRIE CENTRES



substantial period under study except for a brief while in 1941. The trend between 1951 and 1961 indicated a convergence of the population threshold and the true population. Presently, the industry is known to cater prominently to export markets and the Winnipeg market which it also serves.

As far as the non-metallic mineral manufacturing is concerned, this industry is less closely related to the population or urban markets (Figure 16). For example, a high minimum threshold population combined with a low urban population did not prevent the growth of the industry. This was evident in high population threshold that the industry is associated with especially in Brandon and Regina. While non-metallic mineral industries are unrelated to markets in the smaller Prairie cities, the same industry in Edmonton and Winnipeg appear to be so.

Food and beverage manufacturing are commonly associated with markets or the population. However this was not explicitly true according to the threshold analysis (Figure 17). The population thresholds for manufacturing in Edmonton and Winnipeg and Moose Jaw were higher than the true population levels and considerably greater than the minimum threshold. In Brandon, Lethbridge and Regina, the thresholds for manufacturing were generally above the population except for the period 1951. Regina was the only centre with a threshold above the city's population prior to 1941 and significantly below after that year. Generally, these profile patterns indicate that as far as food and beverage manufacturing in Prairie cities are concerned, non-market elements are significant. The profile

Figure 16

POPULATION LEVELS AND POPULATION THRESHOLDS
FOR NON-METALLIC MINERAL MANUFACTURING IN PRAIRIE CENTRES

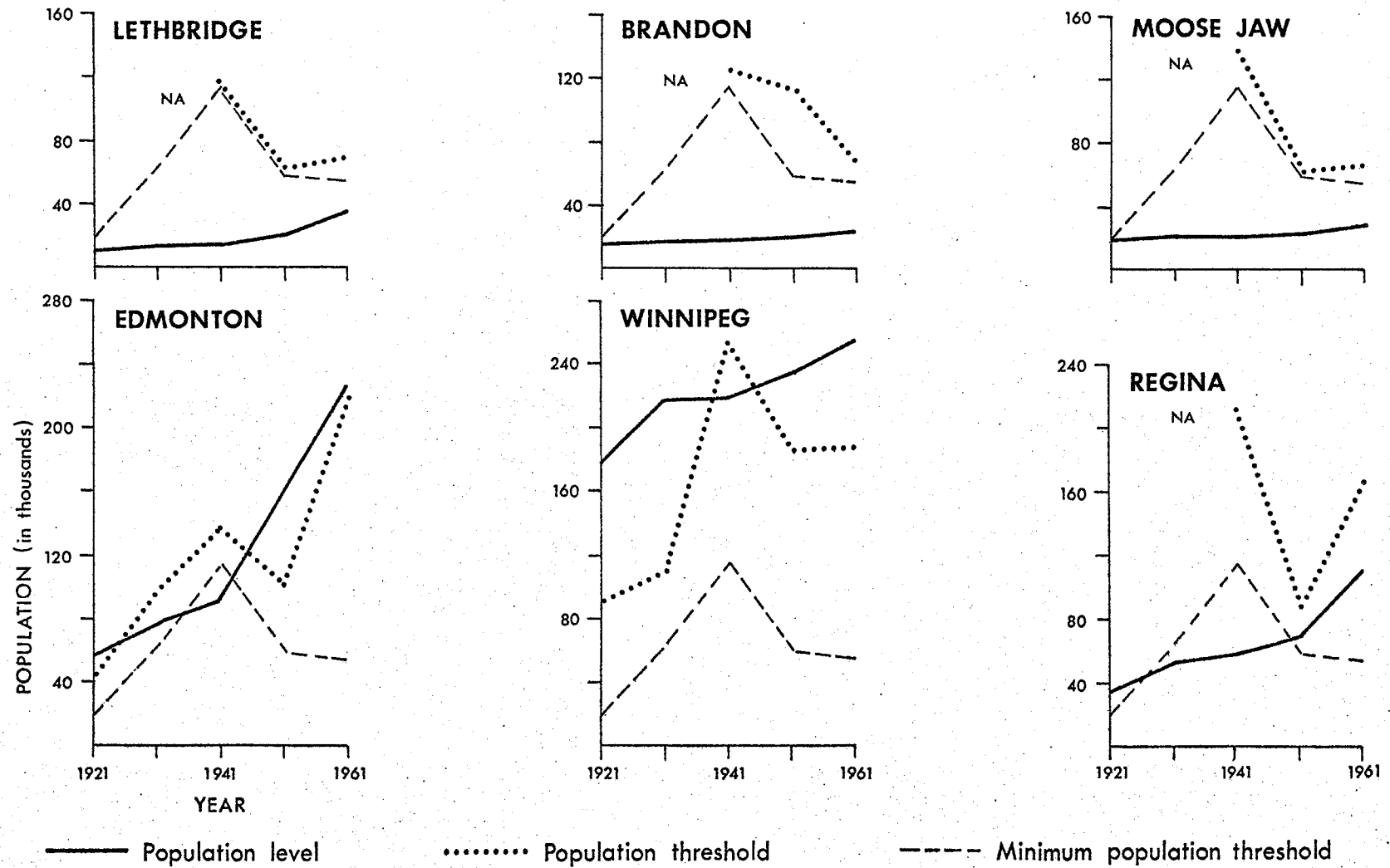
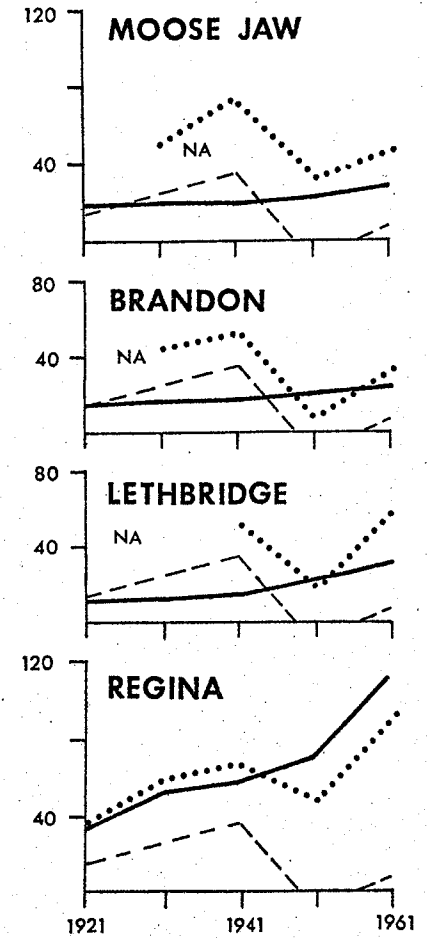
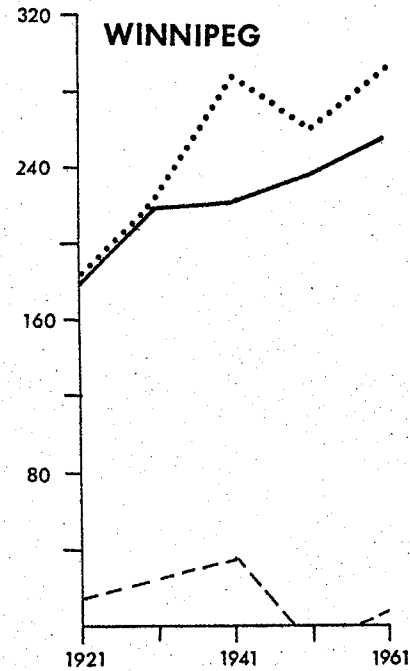
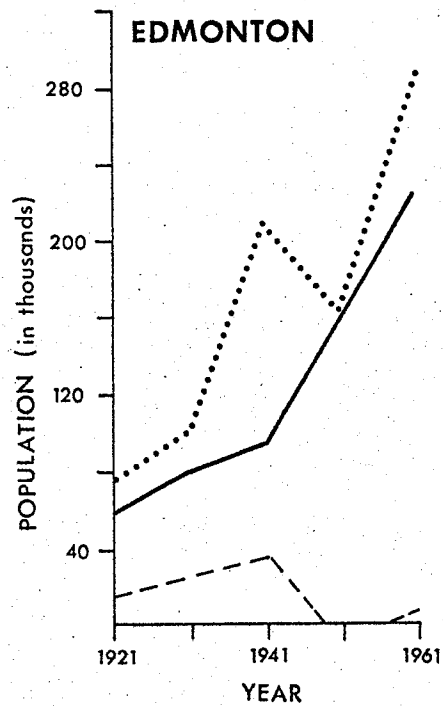


Figure 17

POPULATION LEVELS AND POPULATION THRESHOLDS FOR FOOD AND BEVERAGE MANUFACTURING IN PRAIRIE CENTRES



— Population level Population threshold - - - Minimum population threshold

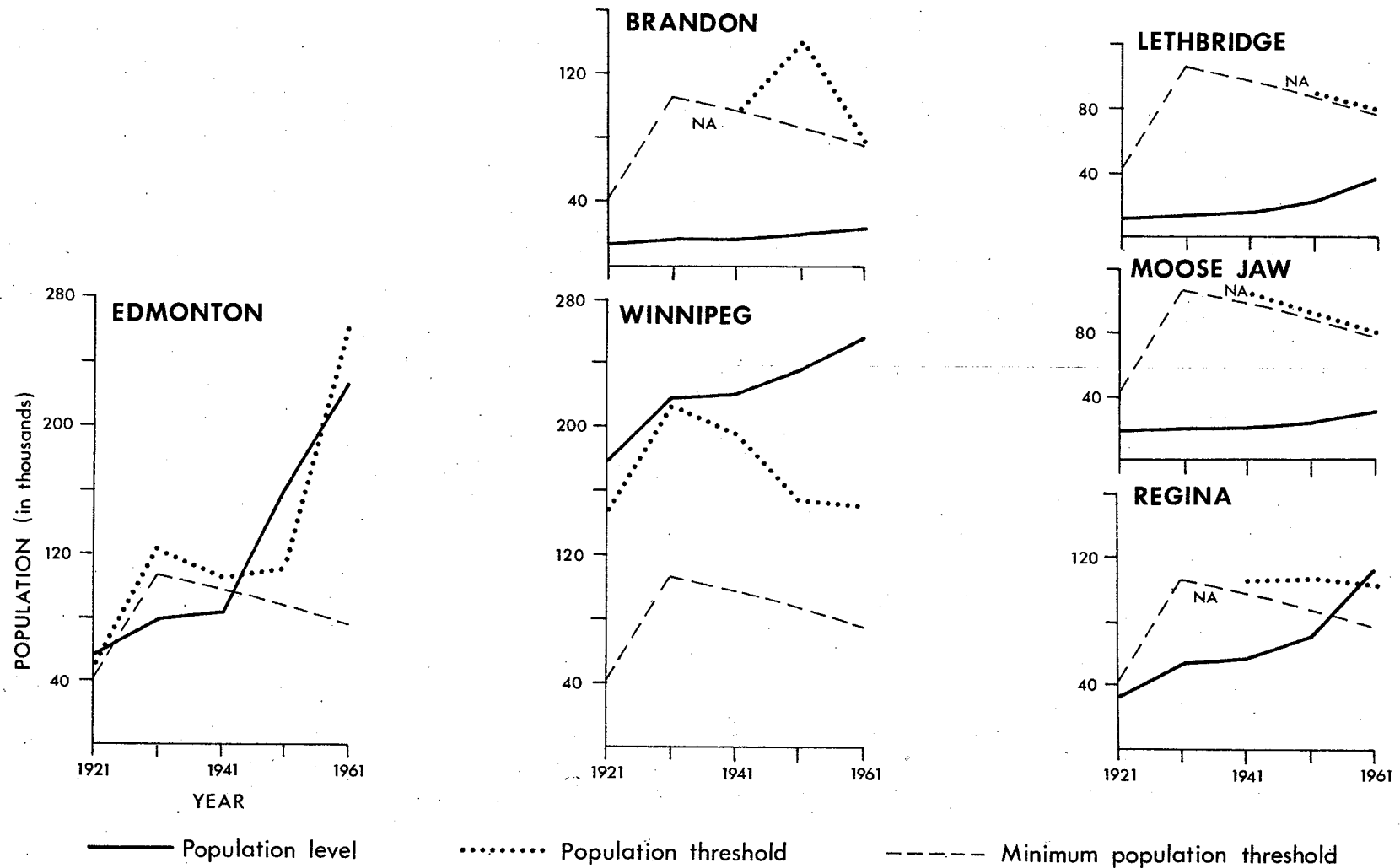
characteristics appear logical in view of the significance of these cities as food processing centres in the Region.

There are some significant variations amongst the profiles for chemical manufacturing (Figure 18). The minimum threshold was substantially higher than the populations of Brandon, Lethbridge and Regina prior to 1951. In Lethbridge and Moose Jaw, this industry is poorly developed as evident in the proximity of the minimum threshold and population threshold lines. In Regina, the industry is larger but its profile suggests an association with the urban market. The chemical manufacturing in Brandon was for the most part associated with the local markets, except for some unusual development in 1951. The size of the industry increased significantly and equalled one associated with a city of approximately 140,000 people. Winnipeg's chemical industry seemed increasingly associated with lower population thresholds and perhaps local market orientation. The profile for Edmonton is most complex of all the centres analysed. The industry, which prior to 1941 was relatively unimportant, was increasingly related to larger population thresholds. During the mid-Fifties, the population threshold exceeded the city's population. The departure from a market association apparently coincides with the postwar developments in oil and gas which are important inputs for chemicals.

Printing and publishing is generally regarded as a market-oriented industry, and this notion appears to be true in a general sense. Edmonton, Winnipeg and Regina had population thresholds higher than their respective populations at some period prior to

Figure 18

POPULATION LEVELS AND POPULATION THRESHOLDS FOR CHEMICAL MANUFACTURING IN PRAIRIE CENTRES



1951 (Figure 19). However, the tendency has been for the threshold to be below the true population level with the passage of time. Further, the population of Lethbridge, Brandon and Moose Jaw have been significantly below the minimum threshold. The size of the industry in these cities were associated with population sizes similar to the minimum thresholds.

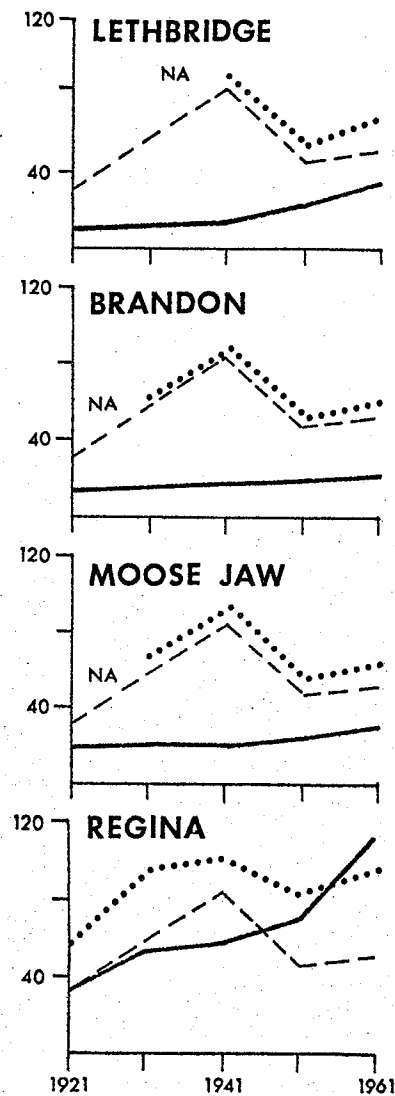
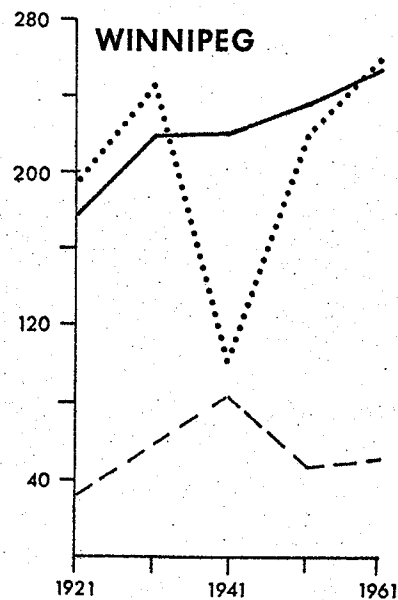
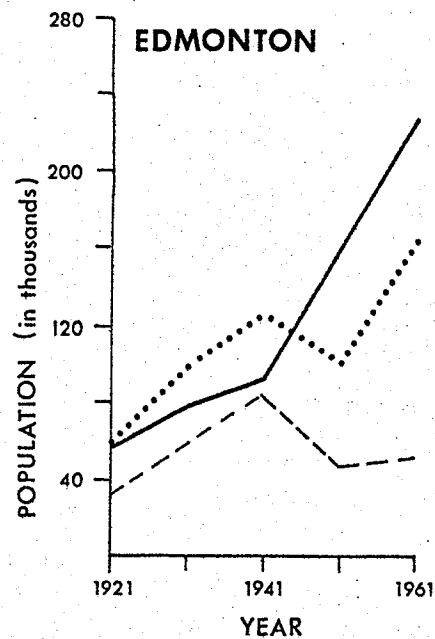
Summary and Conclusions

Manufacturing in the Prairies is highly concentrated in Winnipeg, Edmonton, Calgary, Saskatoon and Regina. Beyond these centres, industries are located primarily in the lower hierarchy cities. In the past decades, several types of spatial shifts are prominent. At the provincial level, manufacturing is decentralizing with respect to population distribution. Regionally, manufacturing is shifting towards Alberta where there are more areas with higher growth rates than in Manitoba and Saskatchewan. The causes of growth and decline leading to decentralization and regional shifts are largely the result of declining industries in established manufacturing areas. Regional shifts have arisen out of changing geographical advantages for new, as well as for some existing, industries within the Prairies as a whole.

Notwithstanding changes in spatial organization, manufacturing in the Prairies is strongly oriented towards markets, denoted by population and retail sales. Similar characteristics of spatial association have also been established at the provincial level through correlation analyses. At the micro-geographic scale,

Figure 19

POPULATION LEVELS AND POPULATION THRESHOLDS FOR PRINTING AND PUBLISHING IN PRAIRIE CENTRES



— Population level Population threshold - - - Minimum population threshold

population threshold analyses indicate that aggregate manufacturing in small urban centres do not appear to be associated with the local markets as in the case of the large cities. With reference to selected industries, various patterns of orientation emerge. Generally, market orientation was not overwhelming and there were indications that manufacturing in cities were also associated with some other factor(s) in addition to market considerations.

Broadly the analyses in this chapter has provided additional evidence in support of the conclusions regarding historically important location factors in Chapter III. In terms of the Prairies as a whole or a particular Prairie province, manufacturing industries are spatially related to markets. However, manufacturing in cities are only partly related to markets. Also significant are perhaps other factors which have not been identified largely as a result of the limitations of the threshold analysis. Nevertheless, these findings remain tentative and their validity will be subject to empirical verification in the following chapters.

CHAPTER V

PRAIRIE INDUSTRIAL LOCATION FACTORS: EMPIRICAL MEASUREMENT AND ANALYSIS

A preliminary insight into Prairie industrial location factors was obtained through the analysis of historical (Chapter III) and statistical data (Chapter IV). The significance of the factors discussed in the two chapters were then verified empirically. A survey of a significant sample of large manufacturing enterprises was conducted to obtain empirical evidence on considerations that influence the decision-making process with respect to location of manufacturing facilities. The techniques of data collection, related problems, survey design and field response are discussed in this present chapter. Particular attention is paid to the choice of technique, sample enterprises and questionnaire design, and their relevance for the explanation of Prairie industrial geography and location theories and concepts.

Techniques for the Analysis of Industrial Location Factors

Numerous techniques have been utilized for the analysis of industrial location factors. Examples of techniques used include correlation and regression (see Stafford, 1960; McCarty et al., 1956; Fuchs, 1962; Ray, 1965), input-output analysis (Karaska, 1966; Ghosh, 1973), industrial linkage (Richter, 1969; Striet, 1969; Wood, 1969), and gravity and potential models (Warntz, 1956; Harris, 1954). Such techniques serve to illustrate the importance of economic factors of

location. However, they tend to omit the universe of factors which may be described as "non-economic", i.e. personal prejudices and preferences, or those elements which are not easily measured on the nominal or ordinal scale for mathematical analysis. The significance of factors, other than purely economic, has been recognized in location theory (Greenhut, 1956; Pred, 1969), and their contribution to the location decision-making process cannot be overlooked.

Researchers have realized the necessity to take into account non-economic factors in the analysis of industrial location. The method that meets this requirement is an empirical analysis of industrial location decisions through interview and questionnaire surveys. Several researches, Greenhut (1956), Katona and Morgan (1952), Mueller and Morgan (1962), Griffin (1956) and Hunker and Wright (1963) have found the surveys a useful method of studying industrial location without the necessity of building a set of assumptions or constraints fundamental to the techniques identified earlier.

Though the survey technique has obvious merits, there are also certain drawbacks, like any other method of analysis. Essentially the technique assumes that the reasons a location was chosen are identical to the opinion of the particular representative of the firm at the time the questions were answered. It is probably then that answers to questions at the time of the survey are influenced by the personal opinions of respondents. It is also likely that answers are not entirely accurate as a consequence of disclosure or secrecy requirements on the part of the respondents (Moser, 1967).

Choice of Technique

Despite the limitations, there are certain merits of the survey technique that outweigh its disadvantages as a research technique. Consequently, it was selected for this particular study for several valid reasons. Firstly, industrial location is increasingly viewed within a decision-making framework (Pred, 1967; 1969; Townroe, 1969, Stafford, 1972). The locational analysis of human activity is largely the result of man's decision involving his personal choice and preference. Complete explanations of the locational behaviour of manufacturers therefore require a consideration of the motives and choice of the decision-maker. Surveys can be framed to provide a direct insight into the role of decision-making in locational behaviour.

Secondly, circumstances such as business expansion, establishment of new branches or subsidiaries and relocation can be examined. It is essential that a technique is sufficiently flexible to investigate such considerations because it involves aspects of enterprise organization which can affect industrial location in practice (see Chapter II).

Thirdly, and undoubtedly a very important reason is that no published information required for this study existed. It was thus essential that the technique selected also embodied the collection of basic data for analysis. The survey method was eminently valuable in this respect.

The survey was conducted by mail through the use of a

questionnaire designed for this study. Further details of the survey design follows.

The Sample Enterprises

The sample of manufacturing enterprises analysed in the survey were selected on the basis of the following characteristics:-

- (i) multiplant operations with head offices in the Prairies as well as enterprises with subsidiary companies, and,
- (ii) enterprises designated as regional or divisional head office organizations in the Prairies but with parent firms elsewhere.

Enterprises with the above characteristics were selected in order that the aims of this analysis as outlined in Chapter I could be investigated. Firstly, the enterprises specified account for a significant proportion of the Prairie manufacturing,¹ and they constitute a valid sample for investigating the location factors influencing industries in the Prairies.

Secondly, multiplant operations are frequently large and operate in different geographical areas. As such they tend to be particularly sensitive in space with respect to the industrial location decision. Such firms would be useful in the study of the impact of geographical scale on location decision-making process and factors of location.

Thirdly, multiplant enterprises with different forms of internal structure and management and operating policies, etc. can

¹ In terms of employment, see section on Survey Response in this Chapter.

be the source of useful information regarding the significance of enterprise organization in affecting industrial location of branch plants and subsidiaries.

Not all enterprises satisfying the criteria listed were included in the survey. Those associated with public utilities were omitted from the study because their location and spatial structure are likely to have been determined by government policy and their areal functional organization.

A list of enterprises with the desired characteristics were compiled from the 1974 Canadian Trade Index published by the Canadian Manufacturers' Association. The Index lists approximately 14,000 manufacturing companies and includes all major enterprises operating in Canada. This Index was the primary source from which the sample was drawn because it contained information on enterprise structure and organization. For example, it listed the location of parent companies, or head offices, various company divisions, branch plants, subsidiary companies, and operating units such as sales offices, service outlets, etc.

In addition to the Canadian Trade Index, the 1973 Manitoba Trade Index, the 1973 Fraser's Canadian Trade Directory and the 1973 Financial Post Survey of Industrials were used to check or supplement information obtained from the primary source.

Four hundred and one manufacturing enterprises were eventually selected for the survey. Each selected enterprise was mailed a letter, explaining the nature and purpose of the survey, a questionnaire and a prestamped, self-addressed reply envelope (see Appendix C).

Questionnaire Design

The questionnaire used in the survey consisted of five sections. Section A, was designed to obtain general information on the name and location of the participating enterprise, type of manufacturing activity, ownership organization, size of enterprise in terms of employment, and value of shipments, and details of the parent company. The aim was to secure an understanding of the legal and general characteristics of the enterprise surveyed. These characteristics enabled a meaningful classification of enterprises in the analysis conducted later. In this section, a distinction was also made of the operational status of the enterprises. Respondents were asked to note whether their enterprise constituted the principal operations, i.e. head office or secondary operations, namely the divisional or regional head offices organizations. This distinction is sought because operations related to different head office functions and administrative organization, could be affected by varying factors of location.¹

Section B was aimed at obtaining information on the organizational structure of the enterprise, specifically the number and geographical distribution of branch and subsidiary or other operations. In addition, the internal allocation of specific administrative functions among the different units of the enterprise were also sought. The aim was to recognize the operational

¹ See Chapter II, pages, 24-26.

complexity of the individual enterprise and the potential influence of internal organization for the location of the enterprise.

The study of relocation constitutes an important part of industrial geography because entrepreneurs are constantly reevaluating locational factors or locational advantages of the enterprises. Section C consisted of two questions dealing with relocation of the enterprise organization. The first question was designed to establish the occasions and the place of each relocation. The second attempts to identify the reason for relocation.

Section D investigates factors influencing the location and spatial organization of manufacturing enterprises. Theory indicates the significance of various factors that affect firm location. There are also some indications that factors tend to vary, depending upon the geographical scale at which location decisions are considered.¹ Question 6 in this section was designed to determine the factors that influence location decision making with respect to three geographical scales, i.e. the Prairies as a whole, a particular Prairie province and a particular Prairie city. It was further suggested in Chapter II that organizational structure and internal operating policies of large enterprises can affect the geographical distribution of branch or subsidiary operations. In order to verify this aspect of industrial location, Question 7 was framed to investigate the influence of the head office, and its functions of control and administration of an entire enterprise upon the location

¹ See Chapter II, pages 17, 22-23.

of branch plants and subsidiary firms.

Section E dealt with the question of the "ideal" location. It was framed to establish the attributes that entrepreneurs regarded as significant for the "ideal" location of their manufacturing enterprises. The purpose was to identify the locational attributes that influenced the decision-making process in an "ideal-case" situation for comparison with decision making under real-world conditions.

Survey Procedure

The letter and enclosures were sent to the 401 selected enterprises over a two week period between June 10-24, 1974. A reminder letter with questionnaire were mailed to non-respondents after a lapse of four weeks. The response thereafter improved significantly and no further reminders were required. No deadline for the return of questionnaires were set. However, by mid-August, the majority of the responses were received. All questionnaires returned after August were omitted in the final analysis and were considered non-responses.

Response to the Survey

The details of the response to the survey are shown in Table 18. One hundred and sixty four replies or 40.9 per cent of the sample were usable. The responding enterprises employed an estimated 25 per cent of the total manufacturing labour force in

TABLE 18 RESPONSE TO SURVEY

Nature of Survey Returns	Number	Percentage
Usable Returns	164	40.9
Incomplete, Rejected	18	4.5
Unable to participate	14	3.5
Unable to trace, inactive, etc.	14	3.5
Non-responses	191	47.6
Total	401	100.0

the Prairies.¹ A total of eighteen enterprises or 4.5 per cent of the returns were incomplete, and were not suitable for analysis. Fourteen firms (3.5 per cent) were unable to participate in the survey. Another 3.5 per cent of the enterprises could not be traced or were inactive. There were 191 non-responding enterprises (47.6 per cent) in the survey.

Significant differences between usable returns and the original sample was analysed through the application of the Kolmogorov-Smirnov (K-S) test.² The frequency distribution of the

¹ These estimates were obtained by multiplying the number of enterprises in each employment size category by the median employment of the corresponding category. The total employment derived from this simple calculation was then expressed as a percentage of the total Prairie manufacturing employment in 1971.

² The Kolmogorov-Smirnov test can be used to test a sample (i.e. usable returns) against some predetermined population (i.e. original sample of enterprises) of which the distribution characteristics are known (Gregory, 1968, 179; examples within parenthesis are the author's). The test is based on the principle that one expects the cumulative frequency distribution of the sample to be similar to that of the population when measured on the ordinal scale (see Siegel, 1956; Yeates, 1974, 205).

enterprises according to employment size was the basis of the test. Employment size distribution was used as the basis of classification because it was the only known characteristic for the sample enterprises on the ordinal scale. The results of the Kolmogorov-Smirnov test are shown in Table 19. There was no significant difference between the usable returns and the sample of selected enterprises at the 99 per cent confidence level.

Frequency Distribution and Characteristics of the Usable Returns

The distribution of the usable returns according to enterprise characteristics, namely type of head office organization, manufacturing activity, employment size, ownership organization and value of shipments are summarized in Appendix D, Tables 1-5.

Geographical Distribution of Usable Returns

The geographical distribution of the survey enterprises is presented in Figure 20. The enterprises are classified according to type of head office organization, i.e. head office, regional, divisional or "Canadian" head office organization. This last category refers to the principal Canadian operations of a foreign business.

Enterprise operations in this study were located in the principal Prairie cities as well as smaller urban centres. Head office organizations are noticeably concentrated in Winnipeg, Edmonton, Calgary, Regina, Saskatoon, Lethbridge and Brandon. However, there were 19 (out of 111) head offices that were located

TABLE 19 KOIMOGOROV-SMIRNOV TEST OF SIGNIFICANCE BETWEEN USABLE RETURNS AND SURVEY SAMPLE

Employment Size Groups	15 or less	15-49	50-99	100-199	200-499	500-1,499	1,500 and over
Usable Returns (total = 164)	16	41	26	32	29	16	4
Survey Sample (cumulative distribution)	72	162	239	305	366	393	401
Usable Returns (cumulative distribution)	16	57	83	115	144	160	164
(a) Survey Sample (percentage cumulative distribution)	0.18	0.40	0.60	0.76	0.91	0.98	1.00
(b) Usable Returns (percentage cumulative distribution)	0.10	0.35	0.51	0.70	0.88	0.98	1.00
(a) - (b)	0.08	0.05	0.09	0.06	0.03	0.00	0.00

Largest difference = 0.09

N = 164

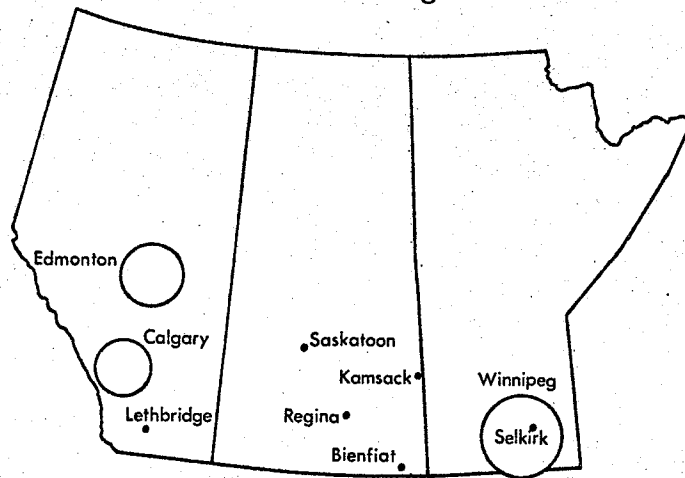
$\alpha = 0.01$

$$\begin{aligned} \text{K-S value} &= \frac{1.628}{\sqrt{164}} \\ &= 0.13 \end{aligned}$$

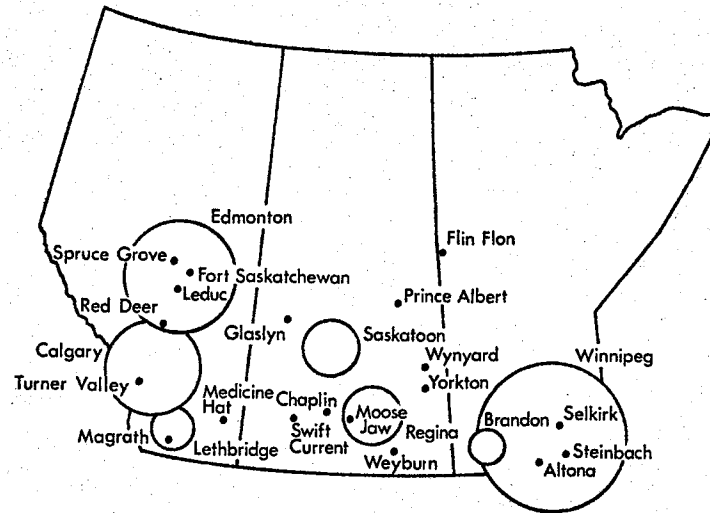
Figure 20

DISTRIBUTION OF SURVEY ENTERPRISES (USABLE RETURNS) DESIGNATED BY TYPE OF HEAD OFFICE ORGANIZATION

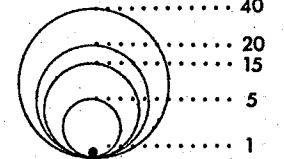
Divisional Head Office Organization



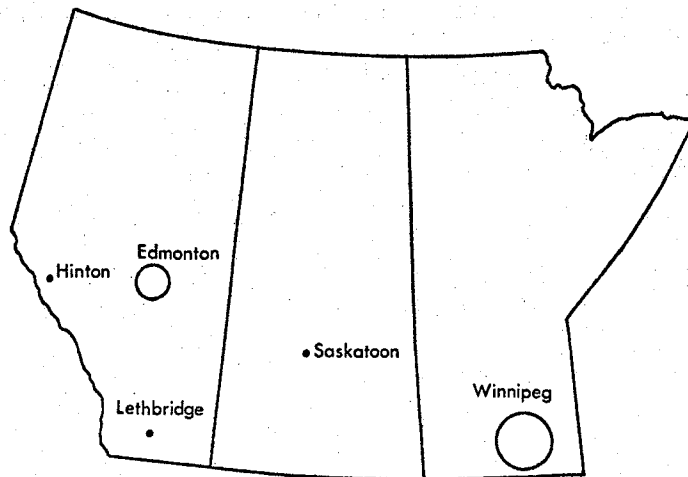
Head Office Organization



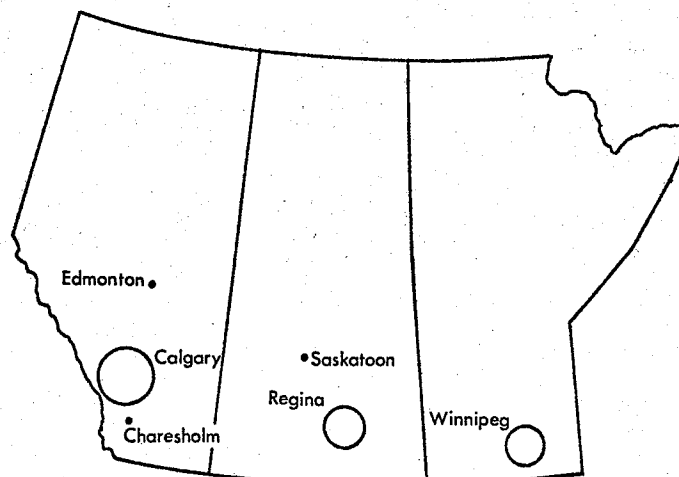
Number of enterprises:



'Canadian' Head Office Organization



Regional Head Office Organization



Source : Survey

in smaller centres such as Steinbach, Wynyard, Chaplin, Red Deer and Spruce Grove. Regional, divisional and "Canadian" head office organizations appear to concentrate in fewer locations, frequently the five major cities. There are also a small number which are located in smaller centres. For example, a regional head office organization is located in Claresholm. There were divisional organizations at Selkirk (Manitoba), Bienfiat and Kamsack (Saskatchewan) and Lethbridge (Alberta). Small centres with "Canadian" head office enterprises are Hinton and Lethbridge in Alberta.

Statistical Attributes of the Usable Returns

Part of the results of the survey are later analysed in terms of a spatial parameter (i.e. province or city) or some enterprise characteristic (i.e. size, manufacturing activity, organization, etc.). It was thus necessary to determine whether conclusions based upon the survey results were likely to be affected by the biased distribution of usable returns in some designated spatial parameter or enterprise characteristic. The Chi-square (χ^2) statistic¹ was

¹ Chi-square tests essentially whether the observed frequencies in a distribution differ significantly from the frequencies which might be expected according to some assumed hypothesis (Moroney, 1965, 249). The hypothesis under test is usually that the two groups do not differ with respect to some characteristic and therefore with respect to the relative frequency with which group members fall in several categories.

The null hypothesis is tested by:

$$\chi^2 = \sum_{i=1}^r \sum_{j=1}^k \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

(contd. p.155)

applied to test the null hypothesis (H_0) that there are no significant differences in the frequency distribution of usable returns by province and according to different enterprise characteristics.

Enterprises (usable returns) were classified by province and enterprise characteristics, i.e. type of head office organization, manufacturing activity, employment size, ownership organization and value of shipments. To satisfy a requirement of the test, several columns representing enterprise characteristics were regrouped.¹

Results of the χ^2 tests are presented in Table 20. With

where, O_{ij} = observed number of cases categorized in the i th row of j th column;

E_{ij} = number of cases expected under the null hypothesis to be categorized in the i th row of the j th column;

$\sum_{i=1}^r \sum_{j=1}^k$ directs one to sum over all (r) rows and all (k) columns, i.e. to sum over all cells. (Siegel, 1956, 104)

¹ When degrees of freedom is greater than 1, i.e. when the number of cells is more than 2, the χ^2 test for the one-sample case should not be used when over 20 per cent of expected frequencies are smaller than 5 or when any expected frequency is smaller than 1 (see Cochran, 1954). The expected frequencies can be increased by combining adjacent categories (rows or cells). This is desirable only if combinations can be meaningfully made. In this analysis, the rows were represented by Alberta, Saskatchewan and Manitoba. The following columns were used:

- (a) Type of head office operations: "Head Office"; "Others"
- (b) Manufacturing activity: "Consumer Goods Manufacturing";
"Producer Goods Manufacturing";
"Other Manufacturing"
- (c) Employment size: 0-49; 50-199; 200
- (d) Type of ownership organization: Private Incorporated Company;
Public Incorporated Company; Other
- (e) Value of shipment: 0-499,999; 500,000-999,999; 1 million-
4,999,999; 5 million.

The original classification of enterprise characteristics is shown in Appendix D, Tables 1-5.

TABLE 20 SUMMARY OF CHI-SQUARE TESTS

Enterprise Characteristics	Calculated χ^2	Critical Values of χ^2 Distribution*	Degrees of Freedom
Type of Head Office Organization	0.190	$\chi^2_{.9} = 0.211$	2
Ownership Organization	6.373	$\chi^2_{.1} = 7.779$	4
Employment Size	5.693	$\chi^2_{.1} = 7.779$	4
Value of Shipments	6.592	$\chi^2_{.1} = 10.645$	6
Manufacturing Activity	14.358	$\chi^2_{.01} = 13.277$	4

* Rohlf and Sokal (1969, 164-5).

respect to the type of head office organization, the test indicates that the null hypothesis is not rejected. In the case of ownership organization, employment size and value of shipments, the evidence also suggests that the null hypothesis cannot be rejected. The test for manufacturing activity called for a rejection of the null hypothesis at the 0.01 confidence level. However, the latter case must take into consideration the simple distinction of manufacturing in terms of "Consumer-Goods", "Producer-Goods", and other manufacturing, which may be a contributory factor to the test result.

In general terms, it is plausible to assume that analysis of the survey results with respect to geographical distribution or enterprise characteristics are unlikely to be influenced to any significant degree by the biased distribution of the usable returns.

CHAPTER VI

LOCATION FACTORS OF PRAIRIE MANUFACTURING: EMPIRICAL EVIDENCE

In Chapters III and IV, aspects of Prairie manufacturing geography were analysed with reference to the historical development process on the basis of historical evidence, and in terms of published statistics. The significance of the evidence presented for the Prairies with respect to industrial location, the issues of decision-making and geographical scale, and enterprise organization as a determinant of location, remained to be verified.

This chapter introduces empirical evidence that can elucidate the three specific issues emerging from the earlier chapters of this study. The discussion that follows examines the pertinent issues on the basis of data collected in the survey of Prairie enterprises.¹ Firstly, industrial location factors influencing the spatial decision-making at three geographical scales, namely the Prairies, a Prairie province, and, a Prairie city are analysed. The ramifications of this analysis include the study of location factors of usable returns classified according to different enterprise characteristics,² important attributes for what entrepreneurs consider the "ideal" location and the question of relocation. Secondly, the role of enterprise organization and industrial location is reviewed. Factors leading to the establishment and location of branches and subsidiaries in the Prairies are discussed. Further, aspects relating to

¹ See Chapter V.

² See Appendix D, Tables 1-5.

internal operating policies of enterprises and the implications for location are analysed. Lastly, the relationship between the geographical origin of parent companies and the location of enterprises designated as divisional, regional and "Canadian" head office organizations are considered.

Factors of Industrial Location and Geographical Scale

The Prairies

An initial step in the spatial decision-making process is frequently the demarcation of a broad region. When entrepreneurs consider the Prairies as a region in which to invest capital, they are motivated most strongly by proximity to markets. Over 50 per cent of the enterprises studied responded to this factor with respect to the Prairies as a whole (Table 21). Between 30 to 50 per cent considered the Prairies because their entrepreneurs believed that the major portion of their respective business was concentrated in the region.

The distinctive significance of markets or demand factors in this particular instance cannot be overstated. However, the evidence from the survey corroborates the views of Stafford (1972, 213) and Greenhut (1964) that "demand" factors are the basis of demarcating broad regions, or areas of location.

Apart from the two most important considerations, the Prairies were also selected on the basis of four other important reasons. Fifteen to thirty per cent of the enterprises also cited the importance of proximity to business clients for face-to-face

TABLE 21 LOCATION FACTORS OF PRAIRIE MANUFACTURING ENTERPRISES AT DIFFERENT GEOGRAPHICAL SCALES

Location Factors	Geographical Scale†		
	a	b	c
Major business of enterprise concentrated here			
Near to markets of enterprise			
Distinct and separated area for management and administrative purposes			
Proximity to branch and/or subsidiary operations			
Close contact and communication with branch and/or subsidiaries			
Close contact with other companies			
Proximity to business clients for face-to-face contact			
Proximity to insurance, banking, finance, etc.			
Proximity to advertising, public relations, accounting, computing, etc. services			
Proximity to other businesses for exchange of information			
Transport and communication linkages			
Proximity to qualified administrative and management staff			
Favourable business taxes			
Availability of office premises			
Established business connections			
Favourable political climate			
Pleasant living conditions			
Better educational facilities			
Better cultural and recreational facilities			
Owners lived here		-	
Better contacts with government departments	-	-	

TABLE 21 Contd.

Location Factors	Geographical Scale†		
	a	b	c
Raw materials			
Availability of labour			
Government aid			-
Enterprise organized specifically to serve region	-	-	
Number of enterprises responding to question*	116	73	74

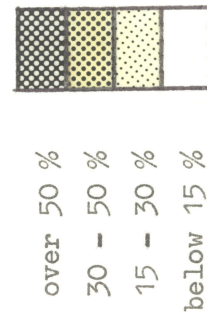
Source: Survey. For frequency of responses to individual factors, see Appendix D, Table 7.

+ a: The Prairies; b: Prairie Province; c: Prairie city.

* Not all 164 responding enterprises in the survey cited location factors at different geographical scales.

- No response to factor.

Number citing factor as percentage of enterprises responding to question:



contacts, transport and communication linkages, established business connections and pleasant living conditions. All other factors were not particularly significant and registered less than 15 per cent of the total responses individually.

The Prairie Provinces

When a more specific area is to be chosen within a larger region, the selection of a state or province is a rational second stage in the location decision-making process. Within the broad confines of the Prairies, industrialists tend to favour locations in specific provinces for two particularly important reasons. The first has to do with proximity to the business of the enterprises concerned. Over 50 per cent of 73 enterprises responding to the inquiry mentioned this factor (Table 21). The second significant reason (with 30-50 per cent responding) was proximity to markets.

The choice of an individual Prairie province by industrialists was also motivated by several factors of lesser importance (i.e. 15-30 per cent responses). Four factors in this range of responses which were cited for the Prairies as a whole, were also evident for decision making at the provincial level. In addition, the maintenance of close contacts with enterprise branches or subsidiaries, favourable taxes and political climate were also noted. With regards to taxes and political climate, it is significant that as entrepreneurs or decision makers were concerned with more specific locations, there was a corresponding focus upon factors that connoted a higher degree of certainty as far as the attributes of location were concerned.

The responses to different location factors at the provincial level were then disaggregated for Alberta, Saskatchewan and Manitoba (Table 22). The two most important factors influencing location in all three provinces were proximity to markets and business of enterprise. Differences that existed between the provinces were primarily amongst the factors of "secondary"¹ importance. For Alberta, secondary determinants of location were related to favourable political climate, established business connections, pleasant living conditions and favourable business taxes. In considering Saskatchewan, industrialists were concerned about proximity to branch or subsidiary operations, contacts with other firms, transport and communication linkages and availability of administrative personnel. Secondary influences cited for Manitoba centered upon transport and communication linkages, business taxes and established business connections.

The Prairie City

For most manufacturing industries, apart from those tied directly to raw material sources, an important stage of the location decision is the choice of an appropriate community or city in which to operate. Prairie entrepreneurs tended to base their location in specific communities or cities on account of several reasons. Four factors stood apart as being particularly significant. These were two "market" factors, proximity to business clients, and established connections (Table 21). Other factors that were also of concern to

¹ Other factors except for the two top-ranking factors mentioned.

TABLE 22 IMPORTANT LOCATION FACTORS OF MANUFACTURING
ENTERPRISES IN INDIVIDUAL PRAIRIE PROVINCES

Important Location Factors	Number of enterprises citing factors in:		
	Alberta	Saskatchewan	Manitoba
Major business of enterprise concentrated here	28	7	8
Near to markets of enterprise	23	9	4
Proximity to branch and/or subsidiary operations	*	3	-
Close contact with other companies	*	3	*
Transport and communication linkages	*	3	3
Proximity to qualified administrative and management staff	*	4	-
Favourable business taxes	8	*	3
Established business connections	13	*	3
Favourable political climate	16	*	*
Pleasant living conditions	11	*	*
Number of enterprises responding to question	39	16	18

Source: Survey. For frequency of responses to individual factors, see Appendix D, Table 8.

* Factor not significant.

- No response to factor.

entrepreneurs were associated with certain functional aspects of their enterprise, such as operational prerequisites in terms of proximity to other firms for the exchange of information. Also important were considerations such as business taxes and availability of premises and executive personnel. It was also significant that at the "city" level of decision making, entrepreneurs were more preoccupied with considerations of a personal nature, such as living conditions, educational, cultural and recreational facilities.

In general, entrepreneurs rely more upon "certainty" factors or very pragmatic considerations based upon business contacts, taxes, operating conveniences, and personal needs. The attention placed upon such factors and the prevalence of personal judgement and attitudes lend support to Stafford's (1972) comments on decision-making behaviour in the final stage of selecting a location.

Since responses to the survey were obtained from enterprises throughout the Prairies, an analysis of factors influencing location in specific cities was made possible. However, because of the small number of enterprises responding to the cities, only the largest, i.e. Winnipeg, Calgary, Edmonton, Regina and Saskatoon can be examined. Important factors influencing industrial location in the five major Prairie cities are summarised in Table 23. Approximately half the respondents in Winnipeg cited established business connections and proximity to administrative and management personnel as important locational influences. Other factors were not significant.

In Calgary, nine out of seventeen respondents were attracted

TABLE 23 IMPORTANT LOCATION FACTORS OF MANUFACTURING ENTERPRISES IN FIVE PRAIRIE CITIES

Important Location Factors	Number of enterprises citing factors in:				
	Winnipeg	Calgary	Edmonton	Regina	Saskatoon
Major business of enterprise concentrated here	*	7	9	3	*
Near to markets of enterprise	*	8	11	3	*
Distinct and separate area for management and administrative purposes	*	*	*	3	*
Close contact with other companies	*	9	*	-	*
Proximity to business clients for face-to-face contact	*	9	7	*	3
Proximity to qualified administrative and management staff	7	*	*	-	*
Established business connections	8	8	10	*	3
Pleasant living conditions	*	*	7	*	*
Number of enterprises responding to question	17	17	17	5	5

Source: Survey. For full details on the response to individual factors, see Appendix D, Table 9.

* Factor not significant.

- No response to factor

to the city by opportunities for closer contact with other companies as well as business clients. Other significant reasons were markets and business connections.

Location factors cited for Edmonton were rather similar to those for Calgary. Markets, business connections and proximity to clients were highly ranked. In addition, respondents also felt strongly about living conditions, a factor which did not emerge as being important in all the other four cities.

Regina and Saskatoon each had five respondents. Significant factors influencing location in Regina are proximity to markets, the business of enterprise, and area for management purposes. In the case of Saskatoon, the two most important factors were proximity to business clients and established business connections.

Location Factors and Enterprise Characteristics

Location decisions are not arbitrary, but must take into consideration the unique characteristics of the enterprise being located. This issue has become implicit throughout the discussion on theories and approaches to industrial location. For example, certain manufacturing activities may be market-, or raw material-oriented (Weber, 1929). Some enterprises, on account of the size of their operations are inclined to seek locations that can be best served by their production capacities (Pred, 1974). It is thus plausible that, enterprise characteristics are associated with location factors. In order to examine this particular question, the survey enterprises were classified according to a set of enterprise

characteristics, i.e. type of head office organization, type of ownership organization, employment size, value of shipments size and type of manufacturing activity. Location factors were then ranked according to the number of enterprises citing each factor. Whenever it was possible, the five top-ranking factors were shown.

Head Office Organization and Location Factors

The survey enterprises were classified into four types of head office organizations. These were head office, regional, divisional or "Canadian" head office organizations. This form of enterprise classification and a ranking system of location factors showed that entrepreneurs were especially concerned with proximity to markets, and business of enterprise (Table 24). Generally, there were no significant differences between the type of head office operation and the two top-ranked factors at the three geographical scales of analysis. There was clear acknowledgement of market elements as being most significant with the minor exception of "Canadian" head office organizations. Spatial decision making for this latter category of operations at the provincial level appears to hinge more upon proximity to, and close contacts with branch or subsidiary operations.

There was less evidence of clustering amongst the lower ranked (e.g. 3rd, 4th, 5th) factors. Evidence of differences between location factors and type of head office organization were amongst these lower ranked factors which included transport and communication linkages, proximity to business clients for personal contacts, established business connections and pleasant living conditions.

TABLE 24 TYPE OF HEAD OFFICE ORGANIZATION AND IMPORTANT LOCATION FACTORS RANKED ACCORDING TO NUMBER OF ENTERPRISES CITING FACTOR

Geographical Scale	The Prairies				Prairie Province				Prairie City			
Head Office Organization ⁺	H.O.	R.H.O.	D.H.O.	C.H.O.	H.O.	R.H.O.	D.H.O.	C.H.O.	H.O.	R.H.O.	D.H.O.	C.H.O.
<u>Location Factors</u>												
Major business of enterprise concentrated here	2	*	2	1	1	2	1	-	2	4	3	-
Near to markets of enterprise	1	1	1	1	2	1	1	-	3	1	1	-
Distinct area for management and administrative purposes	*	-	*	-	*	-	*	-	*	4	*	-
Proximity to branch and/or subsidiary operations	*	*	*	*	*	-	*	1	*	*	*	-
Close contact and communication with branch and/or subsidiaries	*	*	*	-	*	-	*	1	*	*	*	-
Close contact with other companies	*	*	4	-	*	*	*	-	*	1	*	*
Proximity to business clients for face-to-face contact	5	-	4	3	5	*	*	-	3	1	4	-
Transport and communication linkages	*	2	3	*	*	3	*	1	*	*	*	*
Proximity to qualified administrative and management staff	*	*	*	-	*	-	*	-	5	-	*	1
Favourable business taxes	*	*	-	-	*	*	*	-	*	-	4	*
Availability of office premises	*	3	*	-	*	-	-	-	*	-	*	*
Established business connections	5	*	*	1	4	3	3	-	1	4	2	*
Favourable political climate	*	*	*	-	3	*	*	-	*	-	*	*
Pleasant living conditions	3	3	*	-	5	-	*	-	5	*	4	*
Better educational facilities	*	3	-	-	*	-	-	-	*	*	-	*
Owners lived here	4	-	-	-	-	-	-	-	*	*	-	*

Source: Survey. For numerical response to individual factors, see Appendix D, Table 10.

+ H.O.: Head Office; R.H.O.: Regional Head Office; D.H.O.: Divisional Head Office; C.H.O.: "Canadian" Head Office.

* Factor not significant.

- No response to factor.

The lack of definite clustering precluded the identification of any relationship between specific factors and head office organizations.

Ownership Organization and Location Factors

Enterprises responding to the survey included those organized as Individual Ownerships or Sole Proprietorships, Partnerships, Private Incorporated Companies, Public Incorporated Companies, Incorporated Co-operatives or Crown Corporations. Over 80 per cent of the usable returns were either private or public incorporated companies (see Appendix D, Table 2).

The importance of market factors showed up once again in this particular inquiry (Table 25). First and second ranking for market factors were remarkably consistent for decision making at the Prairie and provincial levels. However, at the city level these same factors were ranked lower or were simply not significant. Once again the evidence suggests that the more significant location factors did not vary according to the type of ownership organization.

Less important location factors appear to differ amongst different types of ownership organization but the evidence is not conclusive.

Size of Enterprises and Location Factors

Size of survey enterprises were distinguished according to two criteria, namely total employment and value of shipments. The seven size groups for each criteria were adapted from Statistics Canada manufacturing questionnaires. Important factors of location disaggregated by size of employment and value of shipments are presented in Tables 26 and 27 respectively.

TABLE 25 OWNERSHIP ORGANIZATION AND IMPORTANT LOCATION FACTORS RANKED ACCORDING TO NUMBER OF ENTERPRISES CITING FACTOR

Geographical Scale	The Prairies						Prairie Province						Prairie City					
Ownership Organization ⁺	I.	P.	Pr.I.	Pu.I.	I.C.	C.C.	I.	P.	Pr.I.	Pu.I.	I.C.	C.C.	I.	P.	Pr.I.	Pu.I.	I.C.	C.C.
Location Factors																		
Major business of enterprises concentrated here	1	1	2	2	1	-	-	1	1	2	2	1	-	*	3	2	-	-
Near to markets of enterprise	2	1	1	1	1	-	-	*	2	1	1	*	-	*	4	1	*	-
Proximity to branch and/or subsidiary operations	*	-	*	*	*	1	-	*	*	*	*	-	-	*	*	*	*	-
Proximity to business clients for face-to-face contact	*	-	5	4	*	-	-	*	5	*	*	-	-	*	2	*	*	-
Transport and communication linkages	*	*	6	4	*	-	-	*	*	*	*	-	-	*	*	4	1	-
Favourable business taxes	-	-	*	*	-	-	-	*	*	5	-	-	-	1	*	*	-	-
Established business connections	2	*	*	3	-	-	-	*	3	4	-	-	-	*	1	3	*	-
Favourable political climate	*	1	*	4	-	-	-	*	4	3	-	-	-	*	*	*	-	-
Pleasant living conditions	*	*	3	*	-	-	-	*	*	5	-	-	-	*	5	*	*	-
Better educational facilities	*	*	*	*	-	-	-	*	-	*	-	-	-	1	*	*	*	-
Better cultural and recreational facilities	*	*	*	*	-	-	-	*	-	-	-	-	-	1	*	*	*	-
Owners lived here	-	-	3	*	-	-	-	-	-	-	-	-	-	-	*	-	-	-

Source: Survey. For numerical response to individual factors, see Appendix D, Table 11.

⁺ I.: Individual Ownership; P.: Partnership; Pr.I.: Private Incorporated Company; Pu.I.: Public Incorporated Company; I.C.: Incorporated Co-operative; C.C. Crown Corporation.

* Factor not significant.

- No response to factor.

TABLE 26 EMPLOYMENT SIZE AND IMPORTANT LOCATION FACTORS RANKED ACCORDING TO NUMBER OF ENTERPRISES CITING FACTOR

Geographical Scale	The Prairies							Prairie Province							Prairie City						
Employment Size ⁺	a	b	c	d	e	f	g	a	b	c	d	e	f	g [#]	a	b	c	d	e	f	g [#]
Location Factors																					
Major business of enterprise concentrated here	1	2	2	1	1	2	1	1	1	1	1	1	2		1	2	2	4	3	1	
Near to markets of enterprise	1	1	1	1	1	1	*	1	2	1	3	2	1		5	1	*	1	1	*	
Distinct and separate area for management and administrative purposes	-	*	*	*	-	*	-	-	*	*	-	*	4		*	5	*	*	*	-	
Proximity to branch and/or subsidiary operations	*	*	*	*	*	3	*	-	3	*	-	*	*		*	*	*	*	*	-	
Close contact and communication with branch/or subsidiaries	-	6	*	*	*	*	-	*	*	*	*	*	*		-	*	-	*	*	-	
Close contact with other companies	-	*	*	*	5	-	1	*	*	*	6	*	-		5	*	*	*	*	*	
Proximity to business clients for face-to-face contact	*	*	4	*	4	*	1	*	*	4	*	*	-		3	4	2	3	3	*	
Proximity to insurance, banking, finance etc.	-	-	4	*	*	*	*	-	*	*	-	-	*		*	*	*	*	*	*	
Transport and communication linkages	-	3	3	4	5	*	-	*	*	*	*	*	2		*	5	*	*	3	1	
Proximity to qualified administrative and management staff	-	-	*	*	*	-	-	-	*	*	-	*	*		*	*	1	*	1	*	
Favourable business taxes	-	*	-	*	*	-	-	*	*	3	3	*	*		-	*	*	*	*	*	
Availability of office premises	-	*	*	*	-	-	-	-	-	-	*	-	4		*	*	*	*	*	*	
Established business connections	-	3	*	3	*	*	*	3	3	*	2	*	*		1	2	*	1	3	*	
Favourable political climate	-	3	*	*	*	*	*	*	*	4	3	3	*		*	*	*	*	*	*	
Pleasant living conditions	*	*	*	4	3	*	-	*	*	4	*	*	4		3	*	*	*	*	1	
Owners lived here	*	*	4	4	*	*	-	-	-	-	-	-	-		-	-	-	*	-	-	

Source: Survey. For numerical response to individual factors, see Appendix D, Table 12.

⁺ Number of employees; a: <15; b: 15-49; c: 50-99; d: 100-199; e: 200-499; f: 500-1,499; g: > 1,500.

* Factor not significant.

- No response to factor.

Ranking omitted because only one enterprise responded.

TABLE 27 SIZE BY VALUE OF SHIPMENTS AND IMPORTANT LOCATION FACTORS RANKED ACCORDING TO NUMBER OF ENTERPRISES CITING FACTOR

Geographical Scale	The Prairies							Prairie Province							Prairie City						
Value of Shipments†	a	b	c#	d	e	f	g	a#	b#	c#	d	e	f	g	a#	b#	c#	d	e	f	g
Location Factors																					
Major business of enterprise concentrated here	1	*		1	2	2	1				1	1	1	1				1	1	4	1
Near to markets of enterprise	*	1		1	1	1	1				1	2	2	2				2	*	2	1
Proximity to business clients for face-to-face contact	-	*		*	-	*	3				*	3	*	*				2	*	2	*
Transport and communication linkages	*	-		-	3	4	5				*	*	*	5				*	2	*	*
Proximity to qualified administrative and management staff	-	-		-	-	*	*				-	*	*	*				*	*	*	3
Favourable business taxes	-	-		*	*	*	*				-	*	4	*				*	*	*	*
Established business connections	-	*		-	*	4	*				3	*	3	*				*	2	1	3
Favourable political climate	-	*		-	4	*	*				*	3	*	3				-	*	*	*
Owners lived here	*	-		*	*	3	*				-	-	-	-				-	-	-	*

Source: Survey. For numerical response to individual factors, see Appendix D, Table 13.

† Dollars; a: <25,000; b: 25-000-49,999; c: 50,000-99,999; d: 100,000-499,999; e: 500,000-999,999; f: 1,000,000-4,999,999; g: > 5 million.

* Factor not significant.

- No response to factor.

Ranking omitted because only one, or no enterprise responded.

The observations made with respect to the two preceding sections (head office and ownership organization) apply to the present analysis. Regardless of enterprise size, market factors were the most significant influences of location especially at the Prairie and provincial levels of decision making. At the micro-geographical or city scale of analysis, market factors were important, though to a lesser degree as shown by the 3rd, 4th, 5th ranks instead of 1st and 2nd ranks.

In Table 26, clustering of lower-ranking factors were evident. At the "Prairie" scale, a third significant factor was transport and communication linkages, while at the level of the city, it was proximity to business clients for face-to-face contact. No strong clustering was evident for the "provincial" scale.

An examination of lower-ranked factors in Table 27, failed to suggest other significant factors. This may be attributed to several columns in which rankings were not possible because of the lack of response.

Manufacturing Activity and Location Factors

Table 28 shows important location factors cited by enterprises engaged in different manufacturing activities. Considering spatial decision making at the level of the Prairies, all manufacturers, except those in the petroleum products industry were strongly influenced either by proximity to markets or business of their respective enterprises or both. These two factors shared the two top ranks consistently. It was also significant that a number of other factors shared top rankings with the market factors. In the

TABLE 28 MANUFACTURING ACTIVITY AND IMPORTANT LOCATION FACTORS RANKED ACCORDING TO NUMBER OF ENTERPRISES CITING FACTOR

Geographical Scale				The Prairies								Prairie Province												Prairie City												
Manufacturing Activity ⁺																																				
Location Factors				F/B	T/C	W	P/P	Me	Ma	T/E	N-Me	Pe	Ch	O	F/B	T/C	W	P/P	Me	Ma	T/E	N-Me	Pe	Ch	O	F/B	T/C [#]	W	P/P	Me	Ma	T/E	N-Me	Pe [#]	Ch [#]	O
Major business of enterprise concentrated here				2	1	*	1	2	1	1	1	*	1	2	2	1	1	1	2	1	1	1	*	1	1	*		*	*	1	1	*	1		*	
Near to markets of enterprise				1	*	1	*	1	1	1	2	*	1	1	1	*	*	1	1	2	*	*	1	2	2	1		*	2	2	1	*	2		1	
Distinct and separate area for management and administrative purposes				*	*	*	-	*	*	-	-	-	*	*	-	-	-	-	*	*	*	*	*	-	*	-	-	-	*	*	1	*	*		*	
Proximity to branch and/or subsidiary operations				*	*	*	-	*	*	-	*	1	*	*	-	-	-	*	*	*	*	2	*	-	*	*		-	-	*	*	*	*		*	
Close contact and communication with branch and/or subsidiaries				*	*	-	-	-	*	*	-	-	*	*	-	-	-	*	*	*	*	2	*	*	*	-		-	*	*	*	*	-		*	
Proximity to business clients for face-to-face contact				*	*	*	*	3	*	*	*	*	*	*	-	*	-	-	*	3	*	-	-	-	*	-		*	1	3	*	*	*		3	
Proximity to insurance, banking, finance, etc.				*	*	1	-	-	*	-	*	-	-	*	-	-	*	-	-	*	-	*	-	-	*	-		*	*	*	*	*	*		*	
Proximity to advertising, public relations, accounting, computing, etc. services				*	*	-	-	-	*	*	*	-	-	*	-	-	-	-	*	-	-	2	-	-	*	-		*	-	*	*	*	*		-	
Proximity to other businesses for exchange of information				*	*	*	-	-	-	*	*	*	-	*	-	-	-	-	*	*	-	*	-	-	*	1		*	-	*	*	*	-		*	
Transport and communication linkages				3	*	1	*	*	*	*	*	-	1	*	2	*	-	*	*	-	*	*	*	*	2	*		*	*	*	*	*	-		*	
Favourable business taxes				*	-	-	-	*	*	*	-	-	*	*	-	*	2	3	*	-	-	-	-	*	*	-		*	*	*	-	1	*		*	
Availability of office premises				*	-	-	-	*	*	-	-	-	*	*	-	-	*	-	*	-	*	-	-	-	-	1		*	*	*	*	*	*		*	
Established business connections				*	*	*	*	*	3	*	-	-	*	*	*	-	-	*	2	*	1	-	-	-	*	-		1	2	3	*	1	*		2	
Favourable political climate				*	*	*	*	*	*	*	*	-	*	*	-	-	*	3	*	*	1	-	*	*	*	-		*	*	*	-	*	-		*	
Pleasant living conditions				*	1	*	-	3	*	*	*	-	*	*	-	*	*	-	4	-	*	-	*	-	*	-		*	*	*	*	3	*		*	
Owners lived here				-	*	*	*	-	*	-	-	-	*	3	-	-	-	-	-	-	-	-	-	-	-	-		*	-	-	-	-	-		-	
Availability of labour				-	-	-	-	-	-	-	*	-	*	*	*	-	-	-	-	-	-	-	-	2	-	-		-	-	-	-	-	-		-	

Source: Survey. For numerical response to individual factors, see Appendix D, Table 14.

⁺ F/B: Food and Beverages; T/C: Textile and Clothing; W: Wood Industries; P/P: Printing and Publishing; Me: Metal Products; Ma: Machinery;

T/E: Transport Equipment; N-Me: Non-Metallic Minerals; Pe: Petroleum Products; Ch: Chemicals; O: Other Manufacturing.

* Factor not significant.

- No response to factor.

[#] Ranking omitted for T/C because only one enterprise responded. Ranking omitted for Pe and Ch because a meaningful ranking was not possible.

textile and clothing industry, pleasant living conditions shared first rank with proximity to business of enterprises. Top-ranked factors in the wood products industry included transport and communication linkages and proximity to financial institutions. In chemicals manufacture, transport and communications were also highly important while in petroleum products, proximity to branch and subsidiary operations was the most frequently cited factor.

Decision making to locate in a Prairie province was again based primarily upon market factors. However, other non-market factors were increasingly important. For example, in the transport equipment industry, factors such as established business connections and favourable political climate shared first rank with proximity to business of enterprise. In the non-metallic minerals industry, there were three second-ranked factors, i.e. proximity to, and close contact with branch and subsidiary operations, and proximity to services such as advertising, public relations, etc.

Although the analysis at the "city" scale was affected by non-responses in three activity categories, there appeared to be some differences between location factors and manufacturing activity. In food and beverages, metal, machinery and non-metallic mineral and "other" industries, market factors were significant. However, for the manufacture of wood products, established business connections seem more significant while in publishing and printing, proximity to business clients for face-to-face contact were top-ranked factors. As for transport equipment manufacturing, favourable business taxes and established business connections were especially important.

Important Attributes and the "Ideal" Location

Important location factors influencing spatial decision making under real-world conditions were examined in the preceding sections. The question is whether location factors are significantly different when decision makers contemplate an "ideal" location. In order to gain an insight into this question, respondents to the survey were requested to identify the locational attributes entrepreneurs would seek in an "ideal" location. Since the "ideal" location suggests a distinctive situation, the analysis was conducted only at the micro-geographical scale or the city level. For a more meaningful analysis, location factors for the "ideal" location were examined in terms of the aggregate response and enterprise characteristics.

Aggregate Response

The aggregate response to, and ranking of, important attributes for the "ideal" location are shown in Table 29. Two attributes, namely efficient transport and communication linkages, and proximity to markets of enterprise were most frequently cited and were particularly outstanding. The analysis also indicated three other attributes, i.e. favourable political climate for business, favourable business taxes and near to clients of enterprise, in order of importance. It was significant that, in assessing the "ideal" location, decision makers were concerned with economic factors first (attributes ranked 1 and 2) and what may be broadly termed non-economic attributes (attributes ranked 3, 4 and 5). Apart from the five top-ranked attributes, it was further evident that, much concern in the choice of location revolved around living, educational and cultural amenities

TABLE 29 NUMBER OF ENTERPRISES CITING IMPORTANT ATTRIBUTES
FOR THE 'IDEAL' LOCATION

Attributes for the 'Ideal' Location	Number Citing Attribute	Rank
1 Close to markets of enterprise	119	2
2 Near to clients of enterprise	74	5
3 Near to branch and/or subsidiary operations of enterprise for centralization of certain functions or services	28	14
4 Near to branch and/or subsidiary operations of enterprise for close personal contact and communication between executives	27	15
5 Geographically central for administrative purposes	42	11
6 Near to legal, financial, publicity, management, etc. services or functions	30	13
7 Near to sources of business and/or general information	45	9
8 Efficient transport and communication linkages	120	1
9 Qualified administrative and management personnel	53	7
10 Favourable business taxes	76	4
11 Favourable political climate for business	98	3
12 Office premises at reasonable costs	42	11
13 Pleasant living environment	64	6
14 Good educational facilities	52	8
15 Good cultural and recreational facilities	44	10
16 Skilled labour supply	8	16
17 Supply of material inputs	6	17
Number of enterprises responding to question	149	

Source: Survey.

TABLE 30 TYPE OF HEAD OFFICE ORGANIZATION AND IMPORTANT ATTRIBUTES
FOR THE 'IDEAL' LOCATION RANKED ACCORDING TO NUMBER
OF ENTERPRISES CITING ATTRIBUTE

Head Office Organization ⁺ Attributes	H.O.	R.H.O.	D.H.O.	C.H.O.
Close to markets of enterprise	2	1	2	1
Near to clients of enterprise	4	5	*	*
Efficient transport and communication linkages	1	2	1	2
Favourable business taxes	3	*	5	*
Favourable political climate for business	2	3	3	*
Office premises at reasonable costs	*	*	4	*
Pleasant living environment	5	4	*	*

Source: Survey. For numerical response to individual attributes, see Appendix D, Table 16.

⁺ H.O.: Head Office; R.H.O.: Regional Head Office; D.H.O. Divisional Head Office; C.H.O.: "Canadian" Head Office.

* Attribute not significant.

and contact linkages (attribtues ranked 6, 7, 8, 9 and 10).

Beyond markets and transportation, other economic factors failed to appear important. For example, obviously crucial factors, i.e. labour and material supplies, strongly emphasised in location theory had the least responses.

Important Attributes and Enterprise Characteristics.

An examination of Tables 30, 31, 32, 33 and 34 showed that with minor exceptions, there was no clear differences between the two most

TABLE 31 OWNERSHIP ORGANIZATION AND IMPORTANT ATTRIBUTES FOR THE

'IDEAL' LOCATION RANKED ACCORDING TO NUMBER OFENTERPRISES CITING ATTRIBUTE

Ownership Organization ⁺ Attributes	I.	P.	Pr.I.	Pu.I.	I.C.	C.C.#
Close to markets of enterprise	1	1	1	1	*	
Near to clients of enterprise	2	1	4	4	2	
Efficient transport and communication linkages	2	1	2	1	1	
Favourable political climate for business	2	1	3	3	*	
Pleasant living environment	*	*	4	5	*	

Source: Survey. For numerical response to individual attributes, see Appendix D, Table 17.

+ I.: Individual Ownership; P.: Partnership; Pr.I.: Private Incorporated Company; Pu.I.: Public Incorporated Company; I.C.: Incorporated Co-operative; C.C.: Crown Corporation.

* Attribute not significant.

Ranking omitted because of poor response.

important attributes for the ideal location and different enterprise characteristics. In the case of head office and ownership organizations, and size of enterprise, proximity to markets of enterprise and efficient transport and communication linkages were ranked 1st and 2nd consistently (Tables 30, 31, 32, 33). The exceptions are few and can be identified individually. For Incorporated Co-operatives, the first ranked attribute was efficient transport and communication linkages and the second was, near to clients of enterprise (Table 31). Enterprises with employment size of 500-1,499 and > 1,500, proximity to markets were ranked third, and were

TABLE 32 EMPLOYMENT SIZE AND IMPORTANT ATTRIBUTES FOR THE 'IDEAL'

LOCATION RANKED ACCORDING TO NUMBER OF ENTERPRISES

CITING ATTRIBUTE

Attributes	Employment Size ⁺	a	b	c	d	e	f	g
Close to markets of enterprise		2	2	2	1	1	3	*
Near to clients of enterprise		*	*	5	4	4	*	1
Near to sources of business and/or general information		*	*	*	*	*	*	1
Efficient transport and communication linkages		1	1	1	3	2	1	1
Favourable business taxes		4	4	4	5	4	*	-
Favourable political climate for business		4	3	3	2	3	2	4
Pleasant living environment		3	*	*	*	*	*	*

Source: Survey. For numerical response to individual attributes, see Appendix D, Table 18.

⁺ Number of employees; a: <15; b: 15-49; c: 50-99; d: 100-199; e: 200-499; f: 500-1,499; g: > 1,500.

* Attribute not significant.

- No response to attribute.

not significant, but four other attributes, namely proximity to clients, and sources of business information, transport linkages and cultural and recreational facilities shared first ranking. As for enterprises with shipments over 5 million, proximity to sources of information was ranked first and while transport and communication linkages fifth.

In the case of other attributes, definite patterns that highlight the presence or absence of significant differences were difficult to detect. Nevertheless, an important feature of this analysis was the most remarkable coincidence of the five top-ranked attributes cited by enterprise, though the rankings were not necessarily in a similar order.

TABLE 33 VALUE OF SHIPMENTS SIZE AND IMPORTANT ATTRIBUTES FOR THE
'IDEAL' LOCATION RANKED ACCORDING TO NUMBER OF
ENTERPRISES CITING ATTRIBUTE

<u>Value of Shipments⁺</u> <u>Attributes</u>	a	b	c [#]	d	e	f	g
Close to markets of enterprise	1	*		2	1	1	2
Near to clients of enterprise	3	1		*	*	4	*
Near to sources of business and/or general information	-	1		*	*	*	1
Efficient transport and communication linkages	2	1		1	2	2	5
Qualified administrative and management personnel	*	*		*	*	*	4
Favourable business taxes	*	*		4	3	4	3
Favourable political climate for business	3	*		*	3	3	*
Office premises at reasonable costs	3	*		*	*	*	*
Pleasant living environment	*	*		4	*	*	*
Good cultural and recreational facilities	*	1		*	*	*	*

Source: Survey. For numerical response to individual attributes,
see Appendix D, Table 19.

+ Dollars, a: < 25,000; b: 25,000-49,999; c: 50,000-99,999;
d: 100,000-499,999; e: 500,000-999,999; f: 1,000,000-4,999,999;
g: > 5 million.

* Attribute not significant.

- No response to attribute.

Ranking omitted because no response recorded.

TABLE 34 MANUFACTURING ACTIVITY AND IMPORTANT ATTRIBUTES FOR THE 'IDEAL' LOCATION

RANKED ACCORDING TO NUMBER OF ENTERPRISES CITING ATTRIBUTE

Manufacturing Activity ⁺ Attributes	F/B	T/C	W	P/P	Me	Ma	T/E	N-Me	Pe	Ch	O
Close to markets of enterprise	1	2	3	1	2	1	1	3	3	2	1
Near to clients of enterprise	3	*	*	4	*	4	2	*	*	*	3
Geographically central for administrative purposes	*	*	4	*	*	*	*	*	*	*	*
Efficient transport and communication linkages	2	1	1	2	1	3	2	1	1	1	1
Favourable business taxes	3	3	4	*	4	5	*	*	*	*	*
Favourable political climate for business	3	3	2	2	3	2	4	1	2	3	3
Office premises at reasonable costs	*	*	*	*	*	*	*	-	*	5	*
Pleasant living environment	*	*	*	*	5	*	*	*	*	4	*
Good educational facilities	*	*	*	*	*	*	*	4	3	*	*

Source: Survey. For numerical response to individual attributes, see Appendix D, Table 20.

+ F/B: Food and Beverages; T/C: Textile and Clothing; W: Wood Industries; P/P: Printing and Publishing; Me: Metal Products; Ma: Machinery; T/E: Transport Equipment; N-Me: Non-Metallic Minerals; Pe: Petroleum Products; Ch: Chemicals; O: Other Manufacturing.

* Attribute not significant.

- No response to attribute.

Evidence of some departure from the pattern described above were apparent when enterprises were disaggregated on the basis of manufacturing activity (Table 34). For example, favourable political climate appeared more important than markets in wood, non-metallic minerals and petroleum products while this attribute out-ranked efficient transport and communication linkages in the machinery industry. Unlike other enterprise characteristic, all manufacturing activities had a third important attribute for the ideal location, namely favourable political climate.

Relocation

The location for a manufacturing enterprise selected at an earlier time may not remain suitable or economically viable at a later period. When this occurs, enterprises can either adapt to the location or relocate. In the course of the survey, it was found that thirty-eight or approximately 25 per cent of the responding enterprise had relocated on at least once during their history of operations (Table 35). Eleven of these thirty-eight enterprises had actually relocated twice and three for a third occasion.

Physical distance appeared to impose spatial constraints upon decisions to relocate. The majority of relocations involved relatively short distances, within the same city or community of the original location. Less than 20 per cent relocated outside of their city or community but within their original province while a smaller proportion moved to another Prairie, or Canadian province.

Numerous reasons were cited for relocation. Insufficient

TABLE 35 RECORD OF RELOCATION OF SURVEYED ENTERPRISES

Nature of Relocation	First Relocation	Second Relocation	Third Relocation
a Within the city	28	10	3
b Within the province	7	1	-
c To another Prairie province	2	-	-
d To another Canadian province	1	-	-
Total Responding	38	11	3

Source: Survey.

room for expansion was the most common cause of relocation regardless of whether it was the first, second or third relocation (Table 36). Twenty-two of a total of twenty-eight respondents relocating for the first time cited insufficient room for expansion for causing the move while four out of seven relocating within the province also cited this reason. For those relocating for the second time, seven were on account of the same reason. Other reasons for relocation within the province were termination of leases and the availability of new premises.

Apart from physical expansion, relocation elsewhere in a province was influenced by several important reasons. In particular, the availability of premises, markets and living conditions, were mentioned by entrepreneurs. Unlike moves within the city, relocations which involved longer distances were influenced by the need for personal contacts, and functions provided by other firms. Further, there were conscious attempts to minimize spatial separation in order to preserve functional links and business contacts with pre-existing suppliers and marketing outlets.

TABLE 36 REASONS FOR RELOCATION AND GEOGRAPHICAL CHARACTERISTICS OF THE MOVEMENT

Nature of Relocation ⁺ Reasons for Relocation	First Relocation				Second Relocation		Third Relocation
	a	b	c	d	a	b	a
High rents at previous location		1					
High city taxes at previous location	1						
Termination of lease on previous premises	5				1		
Insufficient room for expansion	22	4			7		2
Availability of existing premises	7	3					
Shortage of staff		1					
Proximity to markets of enterprise	1	3					
Proximity to enterprise's branch and/or subsidiary operations	1		1			1	
Proximity to specialist functions provided by other firms	1	2					
Efficient communications possible with other business firms		1					
Closer personal contacts with people from other offices and firms	1	2			1		
Availability of good transport and communication facilities		1					
Pleasant living conditions in new location	2	3					
Better educational facilities in new location		3					
Better cultural and recreational facilities in new location		2					
Reorganization of enterprise	1		1				1
Change of ownership			1		1		
Rezoning of urban land	2						
More favourable property values		1					
Corporate decision				1			
Total responding to question	28	7	2	1	10	1	3

185

Source: Survey.

⁺ a: Within the city; b: Within the province; c: To another Prairie Province; d: To another Canadian province.

Enterprise Organization and Industrial Location

The analyses in the previous sections of this chapter have focussed exclusively upon the factors that influence the location of main production operations of large enterprises. The analyses served to explain partly the forces that have affected the location of industries in the Prairies. It was noted that in Chapter II (page 23) that the modern industrial economy consists of large enterprises which control and operate branch and subsidiary plants, divisional, regional and foreign manufacturing enterprises identified in this study as various "head office organizations". The comment was that, unlike the main production operations, the location of branches and subsidiaries, were influenced by aspects relating to the spatial organization and internal operating policies adopted by the enterprise to which they belong.

The industrial economy of the Prairies consists of independent manufacturers as well as large enterprises which operate main production plants, branches and subsidiaries.¹ In order to have a better understanding of the forces of industrial location in the Prairies, the elements affecting the spatial organization of branches and subsidiaries and the various head office organizations in the Prairies must also be examined. This present section examines marketing policies, diversification and production linkages, internal operating policies, the geographical distribution of parent companies

¹ See for example, Department of Consumer Corporate Affairs (1971).

and their impact on the location of industrial enterprises.

Expansion, Markets and Industrial Location

An important reason for establishing branch and subsidiary operations was expansion to serve markets not covered by the major plant or parent facilities. The great distances that manufacturers have to overcome by rail and road in order to reach outside markets resulted in Prairie-made goods being uncompetitive.¹ This was particularly true of manufacturers selling products in Eastern or Central Canada or British Columbia. To a lesser degree though, this same problem afflicted enterprises selling within the Prairies. The establishment of branch or subsidiary operations in the distant markets helped to overcome the distance factor and also enabled Prairie manufacturers to operate in otherwise "closed" areas where sales were concerned. Locationally, the impact of enterprise decisions to sell in other markets with physically separate plants has motivated enterprises to build facilities in other Prairie and Canadian provinces as well as in the United States. In Table 37, a significant proportion of the enterprises responding to the survey reported control of branch plants and subsidiaries in Prairie provinces other than the one their main enterprise facilities are located in, other Canadian provinces, particularly British Columbia and Ontario, and also the United States.

Diversification, Production Linkages and Location

It is not uncommon that large multiestablishment enterprises

¹ See also discussion in Chapter II, page 26.

TABLE 37 NUMBER OF ENTERPRISES REPORTING BRANCH OR SUBSIDIARY
OPERATIONS IN DIFFERENT GEOGRAPHICAL AREAS

Enterprise Classified According to Type of Head Office Organization	Own Province	Other Prairie Province	Other Canadian Province	USA
<u>Head Office Organization</u>				
Branch Plant	31	14	20	3
Subsidiary	19	5	8	4
<u>Regional Head Office Organization</u>				
Branch Plant	3	1	-	-
Subsidiary	1	-	-	-
<u>Divisional Head Office Organization</u>				
Branch Plant	2	2	2	-
Subsidiary	1	1	1	-
<u>"Canadian" Head Office Organization</u>				
Branch Plant	1	-	1	-
Subsidiary	1	-	-	-
<u>All Head Office Organizations</u>				
Branch Plant	37	17	23	3
Subsidiary	22	6	9	4

Source: Survey.

are engaged in several manufacturing activities simultaneously. Frequently, the type of manufacturing activities engaged in by firms are related in terms of materials utilized or complementary production processes. In the survey, firms reported that the manufacture of different products necessitated the establishment of separate plants which were commonly constructed close to the parent facilities. This locational decision centered around the use of common products and separate factories in different phases of production. For example, the products manufactured within one plant were used as inputs at another. Since the function of one component complemented that of another, or several others, in the total production activities of large enterprises, branches or subsidiaries were located to achieve some form of grouping in space. Thus, it was not unusual to find that more enterprises reported having branch plants and subsidiaries located under the column "Own Province" compared to other geographical areas (see Table 37).

Internal Operating Policies and Effects on Location

In Chapter II (pages 28-30), it was suggested that internal operating policies of large enterprises, particularly the practice of providing certain administrative services through the main facilities or head office operations of enterprises tended to influence the location of branch plants and subsidiaries. In the course of the survey, this specific issue was investigated and it was found to be generally true. Branch plants, in particular, were frequently located near the main enterprise operations. The primary reason behind this practice was related to the dependence of branch

plants upon accounting, advertising, computer, legal, marketing, market research, maintenance, storage and transportation services. These so-called administrative functions are frequently performed at, or purchased through, the head offices of the enterprise. Consequently, proximity between branch plants and the head office or main enterprise operations were cited as significant.

The data in Table 38 indicates that over 56 per cent of the enterprises surveyed cited that accounting, advertising, marketing, market research, public relations, general maintenance and storage and warehousing were performed at the main enterprise operations or head offices. About one third of the enterprises were also quoted as being directly responsible for computer, legal and transportation services. However, not all the services were performed directly at the head offices. Some services were purchased from specialist companies through the enterprises' head offices and these frequently included computer, legal and transportation services.

A varying percentage (3.9-46.8) of enterprises indicated that branch or subsidiary operations were also directly involved in providing some of the administrative services and functions mentioned. However, these percentages were lower compared to the number performed by the parent companies, except in general maintenance, storage and warehousing. Over 40 per cent of the enterprises reported that their branches and subsidiaries handled these two functions independently. The direct purchase of services from external agencies by branches and subsidiary operations were comparatively rare for all services listed except for computer.

TABLE 38 THE PROVISION OF SERVICES WITHIN ENTERPRISES

Services	Enterprises ⁺ reporting:							
	Service Performed at Branch or Subsidiary		Service Provided by Enterprise Head Office		Service Purchased through Enterprise Head Office		Service Purchased directly from External Agencies	
	No.	%	No.	%	No.	%	No.	%
Accounting	32	20.7	122	79.3	4	2.6	3	1.9
Advertising	30	19.5	103	67.0	18	11.7	3	1.9
Computer	6	3.9	45	29.9	36	23.4	26	16.9
Legal	15	9.7	56	36.4	65	42.3	5	3.3
Marketing	43	27.9	109	70.9	5	3.3	4	2.6
Market Research	30	19.5	94	61.1	17	11.0	3	1.9
Public Relations	45	29.9	107	69.6	7	4.6	2	1.3
General Maintenance	72	46.8	92	59.8	7	4.6	-	-
Storage/Warehousing	67	43.5	87	56.6	10	6.5	-	-
Transportation	33	21.4	60	39.0	47	30.6	1	0.7

Source: Survey.

⁺ A total of 154 enterprises responded to this question.

Undoubtedly, the internal concentration of services at the main enterprise operations or head offices has affected the spatial organization of branches and subsidiaries. Since this internal allocation of services within enterprises involve largely the flow of information, the importance of contact linkages and proximity between the head office and branch or subsidiary operations are significant locational considerations.

The Geographical Origin of Parent Companies and the Location of Divisional, Regional or "Canadian" Head Office Organizations

The tendency for branch plants and subsidiaries to be established close to the parent facilities has been examined in the previous sections. The reasons for such locational patterns was connected to the complementary production processes and internal operating policies adopted by large manufacturing enterprises. A remaining query that requires analysis is whether there exists a similar spatial relationship between the location of parent companies and the geographical distribution of enterprise operations as divisional, regional or "Canadian" head office organizations.

Enterprises designated divisional, regional or "Canadian" head office organizations have certain functional similarities with branch or subsidiary operations. For example, divisional head office organizations are not unlike branches or subsidiaries specializing in certain product lines within an enterprise. Similarly, there is a parallelism between regional head office organizations and ancillary units established to serve particular market areas or regions.

"Canadian" head office organizations are comparable to both branches

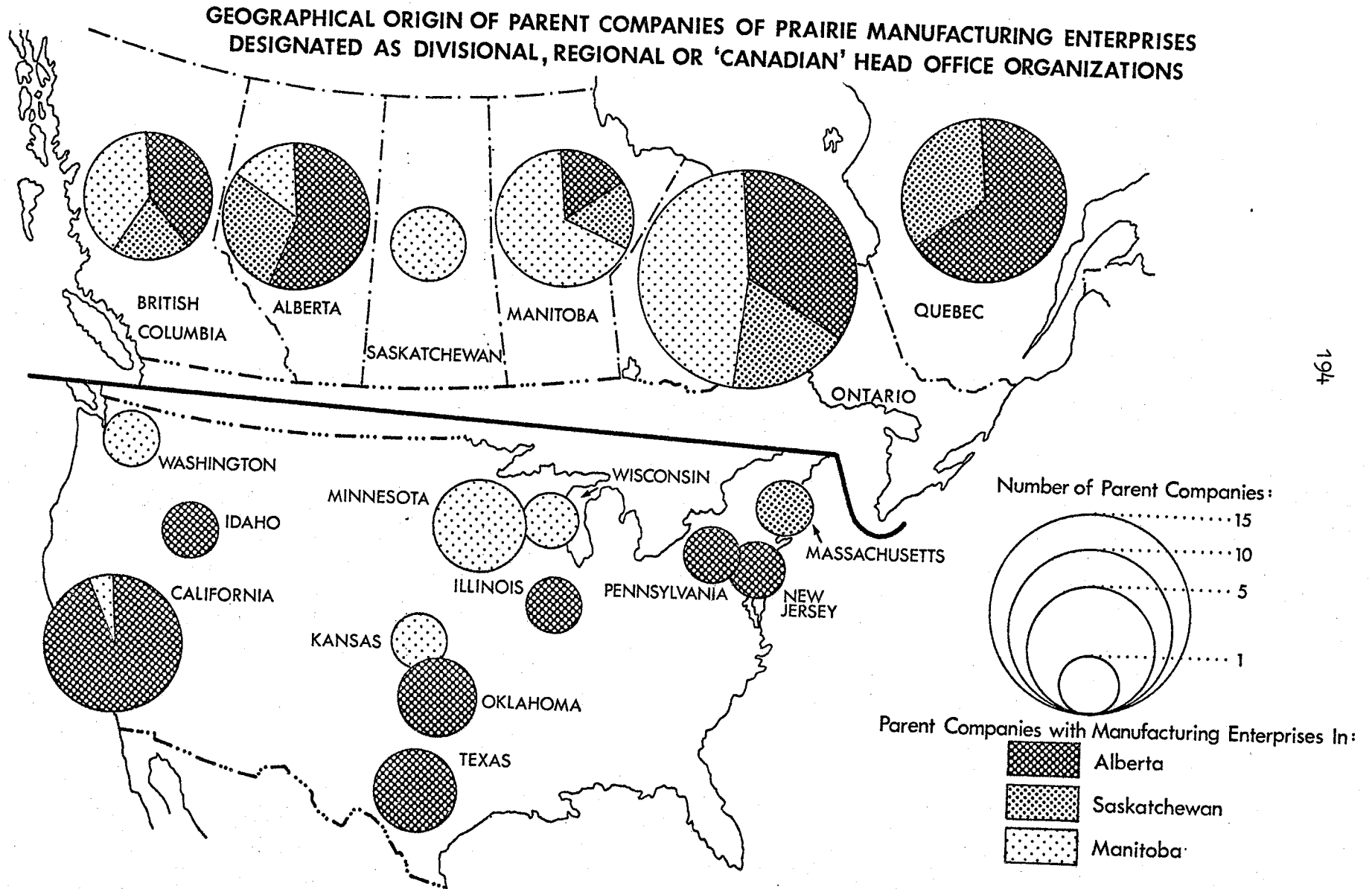
and subsidiaries that specialize in designated product lines or regional markets. Perhaps the most significant difference between enterprise designated as head office organizations on the one hand and branches and subsidiaries on the other, is the higher degree of functional autonomy, characteristic of the former compared to the latter.

In Figure 21, the geographical origin of parent companies of Prairie manufacturing enterprises designated as divisional, regional or "Canadian" head office organizations is shown. In addition, information relating to the number of parent companies that have enterprises in the individual Prairie provinces is also presented.

The evidence in Figure 21, lends only limited support to the notion that divisional, regional and "Canadian" head office organizations are established and located close to their parent companies. In Manitoba and Alberta, most of the parent companies originating there have tended to set up enterprises firstly within their own province, and secondly, in another Prairie province. Additional evidence to this effect also lies in the fact that nearly half of the parent companies originating in Ontario had their enterprises in Manitoba. As far as American parent companies were concerned all those in Minnesota and Wisconsin had enterprises in Manitoba, which is the Prairie province nearest to the two states mentioned.

Other evidence in Figure 21, not only fails to support but apparently contradicts the proximity notion between parent companies

Figure 21



and their enterprises. For example, parent companies in Quebec had enterprises in Alberta and Saskatchewan and not in Manitoba which is, of course, the closest Prairie province. Also a third of Ontario's parent companies reported enterprises in Alberta compared to less than a quarter in Saskatchewan. Further, British Columbia had approximately the same number of parent companies with enterprises in Manitoba as in Alberta and less in Saskatchewan. The evidence cited thus suggests that the plausible reason for parent companies establishing divisional, regional or "Canadian" operations in Prairie provinces which are further away, is probably that associated with markets. It will be recalled that this same factor caused several Prairie enterprises to establish branches and subsidiaries in other Canadian provinces, namely Ontario and British Columbia. Further, there is a distinct concentration of parent companies in Pennsylvania, New Jersey, Oklahoma, Texas and California reporting enterprises in Alberta. Since these American states mentioned are known for their involvement in oil, the establishment of enterprises in Alberta by companies originating in these states can only logically be linked to oil and natural gas exploitation and allied manufacturing and not likely other factors.

Summary

The survey of Prairie manufacturing enterprises indicates that factors influencing industrial location depends upon the geographical scale at which decisions are formed. At the macro-scale, industrialists were especially concerned with the desire to be near their

markets or the major business of their enterprises. Market factors were also significant for decision making at the provincial scale. In addition to markets, industrialists were influenced by matters such as taxes and political climate. When industrialists were locating in a particular city or community, decisions were generally based on a wider range of factors. Apart from markets, the importance of contact linkages, taxes, premises, personal considerations became increasingly evident.

Regardless of the type of head office or ownership organization or size of enterprise, the location factors were similar to those cited for aggregate manufacturing at the three geographical scales of investigation. However, differences did emerge when enterprises were disaggregated according to type of manufacturing activity. Living conditions, transport and communication linkages and proximity to branch and subsidiary operations were more important factors for textile and clothing, chemical and petroleum products industries respectively. At the provincial and city levels further variations in location factors for different industries were also observed.

The two most important attributes for the "ideal" location were considered by industrialists to be markets and transport and communication linkages. Other significant factors included political climate, business taxes and proximity to clients. The two top-ranked factors remained consistently significant, regardless of different enterprise characteristics, except in the case of manufacturing activity. Political climate outranked markets or the transportation factor in the wood, non-metallic minerals, petroleum products and

machinery industries.

Approximately one quarter of enterprises surveyed had relocated at least once. The majority of the moves involved short distances and reasons for relocations were due largely to insufficient space for expansion.

The internal organization and operating policies of large enterprises played a positive role in Prairie industrial location. Expansion and marketing policies caused Prairie entrepreneurs to establish branch plants or subsidiaries in Prairie sub-regional markets too distant to be served by their main enterprise operations. In addition, policies relating to product diversification and complementary production processes in separate facilities have caused the location of branch plants and subsidiaries close to the main enterprise operations. Another factor which contributed to such spatial patterns was the fact that important administrative functions were performed by, or purchased through the head offices or main enterprise facilities on behalf of the branch plants and subsidiaries. Finally, the location of Prairie enterprises designated as divisional, regional or "Canadian" head office organizations appeared only partially influenced by the geographical origin and proximity of their parent companies.

CHAPTER VII

CONCLUSION

This study investigated the factors influencing the location of Prairie manufacturing enterprises with special reference to decision making at different geographical scales and the impact of enterprise organization on the location of industries. Three approaches were adopted for the study of location factors.

The historical analysis of Prairie manufacturing indicated that industrial location was influenced by proximity to raw materials, railway transportation, proximity to markets and some additional factors (see Chapter III). Agriculture¹ and the exploitation of mineral² and organic resources³ led to a variety of processing industries associated with these resources. Particularly in the case of minerals and wood, associated manufacturing industries, have tended to locate at the source of the major inputs because the processes involved a weight loss.

Railway construction across the Prairies was a significant stimulus to a wide variety of manufacturing industries (see Craick, 1950; Bellan, 1958; M.D.I.C., 1970). More importantly, the high cost transporting manufactured goods from Eastern to Western Canada encouraged the development of industries within the Prairies because

¹ See M.D.I.C., 1970; Stabler, 1968; Parliament, 1974; Pattle, 1972.

² Bank of Nova Scotia, 1967; 1971; 1975; Caves and Holton, 1961; Stabler, 1968.

³ See M.D.I.C., 1970.

high freight charges created a protective market in which manufacturers could thrive (Wilson and Darby, 1968). The adoption of a basing-point system of railway freight rates during the early years favoured the growth of manufacturing in Winnipeg.

The most important stimulus to Prairie manufacturing has been the growth of markets (Wilson and Darby, 1968). Population growth, agricultural developments and commercial expansion provided the basis for a wide range of consumer-market and industrial-market oriented manufacturing industries.¹ Internal markets have determined the location of industries within the Prairies as a whole, in the individual provinces as well as in different communities. Consumer-oriented manufactures are highly localized in urban centres and major metropolitan areas. Industrial market-oriented manufacturing on the other hand, are located close to industrial customers. For example, steel-pipe fabrication and drilling and exploration equipment have developed primarily in Alberta where demand has been most significant on account of oil and gas exploration and production. Elsewhere in the Prairies, manufacture of animal feed followed closely the distribution of livestock farming (Bank of Nova Scotia, 1967; Weir and Matthews, 1971).

Prairie manufacturing has also been increasingly export-oriented despite the problem of distance from major Canadian, United States as well as world markets. This development has taken place largely amongst Winnipeg's clothing, motor coach, aircraft and aircraft

¹ See Innis and Lower, 1933; Bellan, 1958; Bank of Nova Scotia, 1967; Kuz, 1974.

components industries. It led to the speculation that there are additional factors relating possibly to historical advantage, local expertise, corporate policy, government influence, local taxes or political climate.

The analysis of Prairie manufacturing based on published statistics reinforced the general findings of the historical approach (Chapter IV). Shift-share analysis suggested that within the Prairies, regional changes in the share of manufacturing employment was apparently associated with growth of local markets, resource developments and some regional advantages. The conclusion was based on the positive net relative change of Prairie labour force attributable to existing industries, resource-based manufactures and new industries.

Spatial correlation analysis between 1970 manufacturing employment and 13 economic variables representing markets, agricultural and mineral resources, transportation, utilities, cost of labour and production, further confirmed the strength of the market factor. Markets denoted by population, population density and retail sales were highly correlated with aggregate manufacturing for the Prairies as a whole and for the three component provinces. However, manufacturing was only weakly correlated with agriculture, mining and transportation, etc.

The exclusion of major manufacturing divisions (i.e. 20 in Manitoba, and 6 and 11 in Alberta and Saskatchewan) improved the correlation for non-market elements, but only marginally. The food and beverage and printing and publishing industries were also found to be significantly correlated with the market variables.

An examination of the relationship between population levels and population thresholds for manufacturing in Prairie urban centres suggested that the market element was not absolutely associated with manufacturing in cities, such as Medicine Hat, Moose Jaw, Lethbridge and Brandon. However, the reverse was true for the five largest cities. Generally, this indicated that markets were more significant for manufacturing in large cities and less so for the smaller centres where other factors such as resources were more important. The population levels and threshold for manufacturing for individual industries were more complex, and no broad patterns were discernable.

In the empirical analysis of Prairie industrial location factors, 401 large manufacturing enterprises were surveyed by post. One hundred and sixty-four replies were eventually selected for the analysis (Chapter V). The survey indicated that the majority of manufacturers who chose to locate in the Prairies or in a particular province were influenced by the desire to be near markets or the major business of their enterprises. Location in a specific city or community depended on markets and also factors such as proximity to business clients, and other firms for the exchange of information, established business connections, living conditions, educational, cultural and recreational facilities.

Regardless of the type of head office and ownership organization or size of enterprise, factors influencing location were basically similar to those cited for aggregate manufacturing at the three geographical scales. Market considerations were highly significant for all enterprises except those engaged in the

manufacture of textiles and clothing, chemicals and petroleum products. Living conditions, transport and communication linkages and proximity to branch and subsidiary operations were top-ranked factors instead.

The most important attributes for the "ideal" location were cited as proximity to markets and transportation and communication linkages. These two factors remained consistently significant regardless of different enterprise characteristics with the minor exception of manufacturing activity. Political climate was the highest ranked attribute in wood, non-metallic minerals, petroleum products and machinery industries.

The survey also found that the internal organization and operating policies of large enterprises affected the location of industries in the Prairies. Marketing strategy led entrepreneurs to establish branches or subsidiaries in Prairie sub-regional markets ineffectively served by the main enterprise operations. Further, product diversification and complementary production processes in separate facilities have fostered the spatial proximity between branches and subsidiaries and the main enterprise operations. Another major reason for this latter pattern was because important administrative functions were performed by, or purchased through the head office or main enterprise operations on behalf of the branch plants and subsidiaries. Lastly, the location of enterprises designated as divisional, regional or "Canadian" head office organizations were only partly related to the geographical origin and proximity of their parent companies.

Generally, this study confirms the fragmented view that the location and spatial organization of manufacturing in the Prairies are significantly influenced by markets or demand considerations. It provides evidence that such elements are especially important to entrepreneurs deciding to invest in the Prairie region or a particular province. Further, the choice of a location in a specific city depends not only on proximity to markets but also a host of other factors which centre around contact linkages, familiarity or connections with local business and purely personal considerations. Also significant is the fact that part of Prairie industrial location patterns are determined by the organizational and operating policies of large manufacturing enterprises.

In a very broad sense, this present study suggests that classical location theory is a useful framework for investigating industrial location and behaviour. Weberian principles were useful for the understanding of raw material-, and market-oriented manufacturing. The analysis of transfer cost and market areas in locational interdependence theories provided an explanation to the role of transportation costs and freight rates in the development and spatial organization of manufacturing in the Prairies.

Apart from economic factors, entrepreneurs are also influenced by personal considerations. Pred's (1967; 1969) behavioural theory and Stafford's (1972) model allowed the incorporation of behavioural or non-economic elements within a location decision framework.

A limitation of theory, however, is the failure to distinguish clearly location decision making in the context of the

appropriate geographical scale even though this has been recognized in empirical investigations. Further, industrial location models and concepts still lack a proper framework that can accomodate elements of enterprise organization as determinants of location.

This study has offered only limited evidence on the question of decision making at different geographical scales and the impact of enterprise organization on industrial location. Undoubtedly, there is a need for further research in these areas. In an age when planned location of industries is increasingly important, a knowledge of what industrialists search for, and at which geographical scale, when locating industries can be invaluable. This implies the further examination of industrial behaviour within specific sector and scale constraints. Unfortunately, severe data limitations exist at this level of analysis and considerable primary research is necessary. In addition, an understanding of the practices or policies adopted by large enterprises in locating ancilliary operations will be necessary for the comprehension of industrial location patterns in space and their implications for regional development.

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APPENDIXES

APPENDIX A

DATA FOR CORRELATION ANALYSIS

TABLE 1 PRAIRIE MANUFACTURING EMPLOYMENT 1970(X 1,000)

<u>Manitoba</u>		<u>Alberta</u>		<u>Saskatchewan</u>	
<u>C.D.+</u>		<u>C.D.+</u>		<u>C.D.+</u>	
1	0.70	1	1.82	1	0.22
2 & 6	1.24	2	3.15	2	0.24
3	0.06	3	0.60	3	0.01
4	0.09	4	0.01	4	0.03
5 & 19	1.65	5	0.09	5	0.17
7	1.47	6	15.19	6	4.56
8	0.06	7	0.14	7	0.79
9	0.07	8	1.07	8	0.25
10	0.19	9	0.57	9	0.58
11	0.03	10	0.98	10	0.21
12	0.21	11	22.06	11	4.24
13	0.02	12	0.26	12	0.04
14	0.04	13	0.61	13	0.04
15	0.12	14	0.80	14	0.71
16	1.50	15	1.63	15	1.30
17	0.11			16	0.24
18	0.04			17	0.13
20	39.31			18	0.40

Source: Statistics Canada; Manufacturing Industries of Canada:
Geographical Distribution, 1970.

+ Census Divisions.

TABLE 2 PRAIRIE POPULATION 1966

(X 10,000)

<u>Manitoba</u>		<u>Alberta</u>		<u>Saskatchewan</u>	
<u>C.D.+</u>		<u>C.D.+</u>		<u>C.D.+</u>	
1	2.99	1	3.89	1	3.94
2 & 6	6.56	2	8.27	2	3.25
3	2.07	3	2.99	3	2.66
4	1.37	4	1.42	4	1.75
5 & 19	5.28	5	3.50	5	4.91
7	5.25	6	36.91	6	17.08
8	2.18	7	4.08	7	5.95
9	1.18	8	8.39	8	4.17
10	1.88	9	1.81	9	5.03
11	1.26	10	7.02	10	3.23
12	2.94	11	47.61	11	14.51
13	1.26	12	5.06	12	2.68
14	0.65	13	4.41	13	3.33
15	1.45	14	2.04	14	5.25
16	5.44	15	8.83	15	8.40
17	2.16			16	4.26
18	1.50			17	2.91
20	50.88			18	2.11

Source: Dominion Bureau of Statistics; 1966 Census of Canada,
Volume 1 (Introductory Report).

+ Census Divisions.

TABLE 3 AVERAGE DENSITY OF POPULATION 1966/1971

Manitoba		Alberta		Saskatchewan	
<u>C.D.+</u>		<u>C.D.+</u>		<u>C.D.+</u>	
1	1.80	1	0.49	1	0.55
2 & 6	1.72	2	1.24	2	0.48
3	0.79	3	0.64	3	0.33
4	0.54	4	0.16	4	0.22
5 & 19	1.38	5	0.54	5	0.83
7	2.10	6	8.38	6	2.57
8	0.92	7	0.53	7	0.77
9	0.04	8	1.48	8	0.44
10	0.97	9	0.11	9	0.97
11	0.44	10	0.84	10	0.63
12	0.35	11	9.22	11	2.53
13	0.69	12	0.10	12	0.44
14	0.66	13	0.48	13	0.48
15	0.41	14	0.17	14	0.38
16	0.04	15	0.10	15	1.03
17	1.27			16	0.53
18	0.39			17	0.43
20	194.60			18	0.02

Source: Dominion Bureau of Statistics: 1966 Census of Canada,
 Volume 1 (Introductory Report).
 Statistics Canada: Advanced Bulletin 1971 Census of Canada,
 (AP-2).
 + Census Divisions.

TABLE 4 AVERAGE PERCENTAGE OF POPULATION RESIDING IN URBAN AREAS 1966/71

(X 10)

Manitoba		Alberta		Saskatchewan	
<u>C.D.+</u>		<u>C.D.+</u>		<u>C.D.+</u>	
1	1.78	1	7.54	1	3.35
2 & 6	3.79	2	6.35	2	3.17
3	0.99	3	4.09	3	1.71
4	1.99	4	3.95	4	2.76
5 & 19	2.63	5	2.26	5	3.32
7	6.72	6	9.21	6	8.02
8	3.63	7	2.66	7	6.20
9	1.88	8	5.04	8	4.65
10	3.12	9	6.28	9	4.10
11	-	10	3.09	10	1.51
12	0.98	11	8.87	11	8.43
13	1.28	12	4.26	12	2.72
14	2.77	13	2.05	13	2.67
15	2.55	14	5.30	14	2.88
16	5.47	15	3.79	15	4.07
17	4.17			16	3.31
18	-			17	2.40
20	9.82			18	2.15

Source: Dominion Bureau of Statistics: 1966 Census of Canada, Population, Volume 1 (1-8).
 Statistics Canada, Advanced Bulletin, 1971 Census of Canada, (AP-4).

+ Census Divisions.

TABLE 5 TOTAL VALUE OF RETAIL SALES 1966(X \$10 million)

<u>Manitoba</u>		<u>Alberta</u>		<u>Saskatchewan</u>	
<u>C.D.+</u>		<u>C.D.+</u>		<u>C.D.+</u>	
1	2.49	1	4.76	1	4.04
2 & 6	5.91	2	10.55	2	3.41
3	1.47	3	2.55	3	2.56
4	1.12	4	1.61	4	1.69
5 & 19	3.55	5	3.46	5	4.36
7	6.61	6	49.24	6	21.61
8	1.82	7	4.22	7	7.00
9	0.62	8	9.67	8	5.42
10	2.13	9	2.44	9	5.47
11	0.72	10	7.55	10	2.63
12	1.50	11	60.86	11	19.11
13	0.83	12	4.34	12	2.25
14	0.53	13	3.76	13	3.53
15	1.44	14	2.27	14	5.42
16	4.48	15	8.53	15	7.73
17	2.27			16	4.40
18	0.72			17	2.92
20	62.45			18	1.11

Source: Dominion Bureau of Statistics; Market Research Handbook
(1969 edition).

+ Census Divisions.

TABLE 6 TOTAL INCOME OF PRAIRIE TAXPAYERS 1966

(X \$10 million)

Manitoba		Alberta		Saskatchewan	
<u>C.D.+</u>		<u>C.D.+</u>		<u>C.D.+</u>	
1	2.40	1	5.73	1	5.18
2 & 6	6.30	2	10.84	2	4.73
3	1.52	3	3.01	3	3.31
4	1.44	4	1.79	4	2.15
5 & 19	4.39	5	4.68	5	5.34
7	6.30	6	73.57	6	30.87
8	2.04	7	4.24	7	7.70
9	0.98	8	10.28	8	6.37
10	1.60	9	2.63	9	4.46
11	0.66	10	6.30	10	2.17
12	1.38	11	83.87	11	25.39
13	1.00	12	3.19	12	3.03
14	0.43	13	2.97	13	4.13
15	0.91	14	2.49	14	4.37
16	7.35	15	7.11	15	7.76
17	1.62			16	3.29
18	0.50			17	2.28
20	97.34			18	0.99

Source: Dominion Bureau of Statistics; Market Research Handbook,
(1969 edition).

+ Census Divisions.

TABLE 7 AVERAGE PERCENTAGE OF POTENTIALLY ACTIVE LABOUR FORCE 1961/71*

Manitoba		Alberta		Saskatchewan	
<u>C.D.+</u>		<u>C.D.+</u>		<u>C.D.+</u>	
1	4.51	1	4.47	1	4.42
2 & 6	4.70	2	4.16	2	4.56
3	4.49	3	4.52	3	4.55
4	4.55	4	4.09	4	4.26
5 & 19	4.82	5	4.44	5	4.53
7	4.39	6	3.87	6	3.95
8	4.56	7	4.73	7	4.59
9	4.69	8	4.85	8	4.41
10	4.55	9	4.04	9	4.55
11	4.55	10	4.19	10	4.51
12	4.72	11	3.78	11	4.24
13	4.57	12	4.29	12	4.57
14	4.84	13	4.08	13	4.48
15	5.05	14	4.08	14	4.68
16	5.18	15	4.25	15	4.57
17	4.59			16	4.81
18	5.03			17	4.53
20	3.95			18	5.33

Sources: Dominion Bureau of Statistics, 1961 Census of Canada, Volume 3, Part 3-1 (Labour Force).
 Statistics Canada, 1971 Census of Canada, Volume 3, Part 1 (Labour Force and Individual Income).

* Mean of the percentage of non-gainfully occupied persons over the economically active labour force 15 years and above, for 1966 and 1971.

+ Census Divisions.

TABLE 8 PERCENTAGE OF LABOUR FORCE IN MINING AND QUARRYING 1961

<u>Manitoba</u>		<u>Alberta</u>		<u>Saskatchewan</u>	
<u>C.D.+</u>		<u>C.D.+</u>		<u>C.D.+</u>	
1	0.27	1	0.79	1	6.88
2 & 6	0.16	2	0.81	2	2.04
3	0.08	3	3.40	3	0.54
4	0.34	4	1.38	4	0.96
5 & 19	6.62	5	4.34	5	1.31
7	0.07	6	6.33	6	6.59
8	2.07	7	2.51	7	0.13
9	0.50	8	3.50	8	0.50
10	1.10	9	9.75	9	0.12
11	0.06	10	0.77	10	0.13
12	0.16	11	2.88	11	0.25
13	0.27	12	0.67	12	0.09
14	0.29	13	2.01	13	1.19
15	0.76	14	6.72	14	0.22
16	28.64	15	2.37	15	0.21
17	0.20			16	0.16
18	0.61			17	0.85
20	1.54			18	26.46

Source: Dominion Bureau of Statistics: 1961 Census of Canada:
Volume 3, Part 2 (Labour Force).

+ Census Divisions.

TABLE 9 PERCENTAGE OF LABOUR FORCE IN TRANSPORTATION AND UTILITIES 1961

Manitoba		Alberta		Saskatchewan	
<u>C.D.+</u>		<u>C.D.+</u>		<u>C.D.+</u>	
1	6.80	1	11.03	1	9.75
2 & 6	15.28	2	9.46	2	8.35
3	7.18	3	7.01	3	7.17
4	9.85	4	11.70	4	6.40
5 & 19	20.13	5	9.34	5	9.08
7	11.76	6	10.77	6	11.34
8	9.87	7	7.74	7	11.91
9	8.29	8	6.83	8	9.71
10	9.19	9	11.96	9	7.50
11	5.90	10	6.90	10	5.72
12	4.89	11	10.56	11	11.02
13	9.59	12	6.49	12	10.71
14	6.16	13	6.78	13	9.71
15	8.73	14	11.85	14	6.44
16	10.95	15	9.36	15	7.98
17	10.31			16	7.99
18	5.24			17	6.51
20	13.79			18	5.79

Source: Dominion Bureau of Statistics: 1961 Census of Canada, Volume 3, Part 2 (Labour Force).

+ Census Divisions.

TABLE 10 VALUE OF AGRICULTURAL PRODUCTS 1965(X \$10 million)

<u>Manitoba</u>		<u>Alberta</u>		<u>Saskatchewan</u>	
<u>C.D.+</u>		<u>C.D.+</u>		<u>C.D.+</u>	
1	2.42	1	2.63	1	4.09
2 & 6	5.76	2	7.66	2	4.78
3	2.51	3	3.46	3	4.49
4	2.11	4	2.22	4	2.89
5 & 19	1.73	5	6.35	5	4.28
7	2.19	6	6.99	6	6.56
8	1.76	7	5.30	7	4.74
9	1.17	8	6.06	8	5.44
10	1.53	9	0.11	9	3.71
11	1.12	10	6.95	10	3.69
12	1.19	11	5.99	11	4.69
13	1.39	12	1.60	12	3.57
14	0.52	13	3.50	13	4.80
15	0.92	14	0.30	14	4.32
16	0.07	15	4.20	15	5.91
17	1.23			16	2.76
18	0.72			17	2.29
20	0.57			18	0.16

Source: Dominion Bureau of Statistics, 1966 Census of Canada, Volume 5,
 Parts 1 (Manitoba), 2 (Saskatchewan), 3 (Alberta).

+ Census Divisions.

TABLE 11 AVERAGE WAGES OF PRODUCTION WORKERS IN MANUFACTURING 1965

Manitoba		Alberta		Saskatchewan	
<u>C.D.*</u>		<u>C.D.*</u>		<u>C.D.*</u>	
1	2.51	1	4.42	1	3.91
2 & 6	2.85	2	4.05	2	3.85
3	3.06	3	3.14	3	3.11
4	3.01	4	3.62	4	3.59
5 & 19	5.03	5	3.93	5	3.32
7	3.50	6	4.67	6	4.75
8	3.42	7	7.44	7	4.14
9	3.00	8	3.94	8	3.71
10	3.03	9	5.02	9	4.11
11	2.89	10	4.57	10	2.81
12	3.26	11	4.48	11	4.40
13	2.84	12	3.10	12	3.60
14	2.85	13	3.24	13	4.04
15	3.27	14	4.80	14	3.34
16	5.51	15	3.40	15	4.40
17	3.05			16	3.67
18	2.87			17	4.34
20	3.84			18	4.60

Source: Dominion Bureau of Statistics, Manufacturing Industries of Canada, Section G, Geographical Distribution 1965.

* Census Divisions.

TABLE 12 PRODUCTIVITY OF LABOUR IN MANUFACTURING 1965*

		(X \$1000)			
Manitoba		Alberta		Saskatchewan	
<u>C.D.+</u>		<u>C.D.+</u>		<u>C.D.+</u>	
1	5.91	1	11.76	1	8.85
2 & 6	7.96	2	10.92	2	10.88
3	6.77	3	7.34	3	9.70
4	5.47	4	7.93	4	8.78
5 & 19	12.27	5	8.61	5	6.46
7	6.95	6	11.52	6	11.66
8	7.72	7	8.52	7	12.02
9	4.52	8	11.16	8	9.06
10	6.40	9	11.98	9	9.47
11	7.82	10	12.24	10	6.52
12	14.30	11	11.81	11	10.10
13	7.92	12	7.68	12	8.00
14	8.08	13	8.01	13	6.57
15	5.81	14	17.14	14	6.28
16	10.66	15	6.49	15	10.18
17	6.63			16	7.31
18	6.24			17	6.22
20	8.39			18	6.91

Source: Dominion Bureau of Statistics, Manufacturing Industries of Canada, Section G, Geographical Distribution 1965.

+ Census Divisions.

* Value Added

Total Manufacturing Employment

TABLE 13 PER CAPITA COST OF PLANT MATERIALS IN MANUFACTURING 1965

(X \$1000)

Manitoba		Alberta		Saskatchewan	
<u>C.D.+</u>		<u>C.D.+</u>		<u>C.D.+</u>	
1	13.59	1	13.84	1	8.06
2 & 6	13.61	2	25.46	2	22.19
3	19.59	3	9.61	3	8.97
4	8.24	4	9.87	4	8.70
5 & 19	6.76	5	9.74	5	13.14
7	12.34	6	18.83	6	20.85
8	14.33	7	14.84	7	33.90
9	4.46	8	31.94	8	14.37
10	12.60	9	4.19	9	12.02
11	16.95	10	28.94	10	19.39
12	14.32	11	17.91	11	20.42
13	9.65	12	13.33	12	7.42
14	8.22	13	14.47	13	6.31
15	9.76	14	20.18	14	12.25
16	8.35	15	5.74	15	15.37
17	10.13			16	9.87
18	6.94			17	5.01
20	12.50			18	3.15

Source: Dominion Bureau of Statistics, Manufacturing Industries of Canada, Section G, Geographical Distribution 1965.

+ Census Divisions.

TABLE 14 PER CAPITA COST OF FUEL AND ELECTRICITY IN MANUFACTURING 1965

(X \$1,000)					
Manitoba		Alberta		Saskatchewan	
<u>C.D.⁺</u>		<u>C.D.⁺</u>		<u>C.D.⁺</u>	
1	0.31	1	0.53	1	0.77
2 & 6	0.34	2	0.43	2	0.60
3	0.77	3	0.27	3	0.67
4	0.46	4	0.43	4	0.41
5 & 19	0.56	5	0.35	5	0.51
7	0.49	6	0.38	6	0.67
8	0.82	7	0.42	7	0.42
9	0.75	8	0.49	8	0.52
10	0.22	9	2.20	9	0.48
11	1.40	10	1.10	10	0.39
12	1.39	11	0.50	11	0.46
13	0.54	12	0.50	12	0.47
14	0.50	13	0.59	13	0.35
15	0.40	14	1.71	14	0.55
16	4.27	15	0.49	15	0.35
17	0.75			16	0.36
18	0.37			17	0.37
20	0.26			18	4.79

Source: Dominion Bureau of Statistics, Manufacturing Industries of Canada, Section G, Geographical Distribution 1965.

+ Census Divisions.

TABLE 15 EMPLOYMENT IN THE FOOD AND BEVERAGE INDUSTRY 1970

(X 100)					
Manitoba		Alberta		Saskatchewan	
<u>C.D.+</u>		<u>C.D.+</u>		<u>C.D.+</u>	
1	3.61	1	-	1	-
2 & 6	5.67	2	16.95	2	-
3	0.52	3	1.18	3	-
4	-	4	-	4	-
5 & 19	1.53	5	0.23	5	1.10
7	6.78	6	35.89	6	-
8	0.32	7	1.11	7	1.93
9	-	8	5.34	8	1.34
10	0.70	9	-	9	2.96
11	-	10	2.14	10	-
12	-	11	58.87	11	22.54
13	-	12	0.73	12	0.10
14	-	13	0.76	13	0.26
15	-	14	-	14	4.75
16	-	15	2.01	15	-
17	0.81			16	1.26
18	-			17	-
20	82.88			18	-

Source: Statistics Canada, Manufacturing Industries of Canada,
Geographical Distribution 1970.

+ Census Divisions.

TABLE 16 EMPLOYMENT IN THE PRINTING AND PUBLISHING INDUSTRY 1970

(X 100)

Manitoba		Alberta		Saskatchewan	
<u>C.D.+</u>		<u>C.D.+</u>		<u>C.D.+</u>	
1	-	1	-	1	0.15
2 & 6	1.62	2	1.81	2	-
3	-	3	0.15	3	-
4	-	4	-	4	-
5 & 19	-	5	0.18	5	0.25
7	1.20	6	16.53	6	-
8	0.15	7	0.25	7	-
9	-	8	1.38	8	0.39
10	-	9	-	9	0.38
11	-	10	0.76	10	0.15
12	-	11	12.91	11	5.95
13	-	12	-	12	-
14	-	13	0.17	13	-
15	-	14	-	14	-
16	-	15	0.53	15	-
17	-			16	-
18	-			17	-
20	36.63			18	-

Source: Statistics Canada, Manufacturing Industries of Canada,
Geographical Distribution 1970.

+ Census Divisions.

APPENDIX B

DATA FOR ANALYSIS OF POPULATION

THRESHOLDS FOR MANUFACTURING

TABLES 1 - 7

POPULATION SIZE AND MANUFACTURING EMPLOYMENT FOR
SELECTED CANADIAN CITIES, 1901-1961

TABLES 8 - 12

POPULATION SIZE AND EMPLOYMENT IN SELECTED INDUSTRIES
FOR SELECTED CANADIAN CITIES, 1921-1961

TABLE 1 1901

(X 1,000)

City	Manufacturing Employment	Population
Nanaimo	0.183	6.130
New Glasgow	0.430	4.447
Windsor	0.549	12.153
Lachine	0.119	5.561
Fraserville	0.266	4.569
Woodstock	0.548	3.644
Brandon	0.287	5.380
Selkirk	0.150	2.188
Calgary	0.307	4.152
Edmonton	0.103	2.626
Stratcona	0.102	1.550
Vancouver	2.151	26.133
Victoria	1.445	20.919
St. John	4.688	40.711
Amherst	1.299	4.964
Halifax	3.203	40.832
Brantford	3.603	16.619
Guelph	2.206	11.496
Kingston	1.495	17.961
Oshawa	1.206	4.394
Peterborough	2.166	11.239
St. Thomas	1.277	11.485
Winnipeg	3.155	42.340
Hamilton	10.196	52.634
Ottawa	6.886	59.928
Toronto	42.515	208.040
Montreal	44.633	267.730
Quebec City	9.384	68.840

Source: Canada, Bureau of Statistics, Fourth Census of Canada 1901, Volumes 1 (Population) and 3 (Manufactures).

TABLE 2 1911

(X 10,000)

City	Manufacturing Employment	Population
Nanaimo	0.036	0.831
New Glasgow	0.078	0.638
Fraserville	0.026	0.677
Kamloops	0.029	0.377
Woodstock	0.037	0.386
Brandon	0.083	1.384
Portage la Prairie	0.034	0.589
Lethbridge	0.031	0.805
Medicine Hat	0.039	0.561
Moose Jaw	0.051	1.382
Regina	0.056	3.021
Saskatoon	0.025	1.200
Victoria	0.217	3.166
Amherst	0.214	0.897
Halifax	0.401	4.662
Guelph	0.307	1.518
Oshawa	0.322	0.744
Windsor	0.158	1.783
Lachine	0.224	1.070
Peterborough	0.403	1.836
St. Thomas	0.195	1.405
Kingston	0.215	1.887
Calgary	0.213	4.370
Edmonton	0.156	2.490
Vancouver	0.897	10.040
St. John	0.527	4.251
Brantford	0.649	2.313
Ottawa	0.923	8.706
Quebec City	0.867	7.819
Winnipeg	1.171	13.604
Hamilton	2.115	8.197
Toronto	6.527	37.654
Montreal	6.784	47.048

Source: Canada, Bureau of Statistics, Fifth Census of Canada, 1911,
Volume 3 (Manufactures).

TABLE 3 1921

(X 10,000)

City	Manufacturing Employment	Population
Victoria	0.222	3.873
St. John	0.376	3.644
Halifax	0.280	5.837
Kingston	0.160	2.175
Peterborough	0.332	2.099
Calgary	0.355	6.330
Edmonton	0.252	5.882
Fort William	0.134	5.054
Hull	0.363	2.412
Regina	0.158	3.443
Saskatoon	0.115	2.574
Sault Ste. Marie	0.299	2.109
Sherbrooke	0.311	2.352
Sydney	0.349	2.255
Three Rivers	0.280	2.237
Verdun	0.282	2.500
Brantford	0.597	2.944
Ottawa	0.574	10.784
Windsor	0.560	3.859
Kitchener	0.529	2.176
London	0.798	6.096
Quebec City	0.818	9.519
Vancouver	0.902	16.322
Winnipeg	1.252	17.909
Hamilton	2.161	11.415
Toronto	6.671	52.189
Montreal	7.107	61.851

Source: Dominion Bureau of Statistics, Sixth Census of Canada,
1921.

TABLE 4 1931

(X 10,000)

City	Manufacturing Employment	Population
Brandon	0.054	1.708
Sudbury	0.069	1.852
Westmount	0.093	2.424
Moose Jaw	0.081	2.075
Kingston	0.114	3.079
Lachine	0.115	1.863
Fort William	0.106	2.628
Sault Ste. Marie	0.138	2.308
Sydney	0.142	2.309
Hull	0.169	2.943
Saskatoon	0.171	4.329
Victoria	0.198	3.908
St. John	0.204	3.989
Halifax	0.223	5.928
Regina	0.229	5.321
Peterborough	0.258	2.232
Guelph	0.274	2.108
Oshawa	0.279	2.344
Three Rivers	0.303	3.545
Edmonton	0.355	7.920
Brantford	0.402	3.017
Calgary	0.448	8.376
Kitchener	0.489	3.079
Verdun	0.472	6.074
London	0.578	7.115
Ottawa	0.562	12.687
Windsor	0.582	6.311
Quebec City	0.819	13.059
Winnipeg	1.275	21.879
Vancouver	1.285	24.659
Hamilton	1.605	15.555
Toronto	5.596	63.121
Montreal	6.365	81.858

Source: Dominion Bureau of Statistics, Census of Canada 1931,
 Volumes 3 (Population) and 7 (Occupations and Industries).

TABLE 5 1941

City	(X 10,000)	
	Manufacturing Employment	Population
Charlottetown	0.046	1.482
Brandon	0.073	1.738
Dartmouth	0.088	1.085
Fredericton	0.061	1.006
Lethbridge	0.074	1.461
Medicine Hat	0.083	1.057
Prince Albert	0.072	1.251
Verdun	0.143	6.735
Moncton	0.121	2.276
Moose Jaw	0.121	2.075
Brockville	0.152	1.134
Saskatoon	0.206	4.303
Cornwall	0.258	1.690
Kingston	0.308	3.013
Sudbury	0.315	3.220
Regina	0.328	5.825
Victoria	0.329	4.407
Outremont	0.366	3.075
Halifax	0.385	7.049
St. John	0.403	4.460
Hull	0.411	3.295
Sydney	0.438	2.831
Guelph	0.526	2.327
Sault Ste. Marie	0.531	2.579
Fort William	0.546	3.059
Peterborough	0.546	2.535
Calgary	0.594	8.890
Three Rivers	0.598	4.201
Edmonton	0.627	9.382
Sherbrooke	0.638	3.597
St. Catharines	0.694	3.028
Oshawa	0.718	2.681
Brantford	0.741	3.195
Ottawa	0.891	15.495
Kitchener	0.922	3.656
London	0.991	7.813
Quebec City	1.443	15.076
Winnipeg	2.081	22.196
Windsor	2.174	10.531
Vancouver	2.704	27.535
Hamilton	3.896	16.613
Toronto	10.324	66.746
Montreal	13.912	90.301

Source: Dominion Bureau of Statistics, Census of Canada 1941,
 Volumes 2 (Population) and 7 (Occupation and Industries).

TABLE 6 1951

(X 10,000)

City	Manufacturing Employment	Population
Eastwiew	0.066	1.380
Charlottetown	0.076	1.589
Fredericton	0.089	1.602
Barrie	0.090	1.251
Dartmouth	0.101	1.503
Brandon	0.113	2.060
Prince Albert	0.117	1.715
Lethbridge	0.128	2.295
Medicine Hat	0.143	1.636
Moose Jaw	0.171	2.436
Moncton	0.188	2.733
Sudbury	0.293	4.241
St. John	0.309	5.287
Saskatoon	0.312	5.327
Victoria	0.316	5.133
Cornwall	0.321	1.690
Fort William	0.344	3.495
Regina	0.366	7.132
Outremont	0.386	3.006
Halifax	0.393	8.559
Kingston	0.393	3.346
Hull	0.460	4.348
Sydney	0.475	3.132
Lachine	0.576	2.777
Guelph	0.584	2.739
Three Rivers	0.647	4.607
Sault Ste. Marie	0.669	3.245
Sherbrooke	0.796	5.054
St. Catharines	0.817	3.798
Peterborough	0.872	3.827
Brantford	0.907	3.673
Calgary	0.965	12.906
Ottawa	0.969	20.205
Edmonton	1.006	15.963
Oshawa	1.172	4.155
Kitchener	1.193	4.487
Windsor	1.237	12.005
London	1.388	9.534
Quebec City	1.445	16.402
Winnipeg	2.757	23.571
Vancouver	3.338	34.483
Hamilton	5.139	20.832
Toronto	11.952	67.575
Montreal	16.973	102.152

Source: Dominion Bureau of Statistics, Census of Canada 1951,
 Volumes 1 (Population) and 4 (Occupations and Industries).

TABLE 7 1961

(X 10,000)

City	Manufacturing Employment	Population
North Battleford	0.022	1.123
Swift Current	0.028	1.219
Portage La Prairie	0.032	1.239
Kamloops	0.035	1.008
Glace Bay	0.044	2.419
Charlottetown	0.067	1.832
Fredericton	0.066	1.968
Nanaimo	0.071	1.414
Eastview	0.075	2.456
Amherst	0.096	1.079
Prince Albert	0.098	2.417
Brandon	0.113	2.817
Prince Rupert	0.138	1.199
Moose Jaw	0.152	3.321
Medicine Hat	0.165	2.448
Barrie	0.175	2.117
Port Albert	0.191	1.156
Victoria	0.233	5.494
Brockville	0.259	1.774
Stratford	0.279	2.047
Chatham	0.281	2.983
Woodstock	0.316	2.049
Fort William	0.313	4.521
St. Catharines	0.327	8.447
Outremont	0.329	8.075
Hull	0.364	5.693
Halifax	0.370	2.740
Saskatoon	0.376	9.553
Sudbury	0.397	8.012
Kingston	0.445	5.353
Drummondville	0.449	2.791
Regina	0.468	11.214
Three Rivers	0.602	1.242
Lachine	0.630	3.863
Sault Ste. Marie	0.640	4.309
St. John	0.657	5.515
Sherbrooke	0.668	6.655
Peterborough	0.689	4.719
Ottawa	0.815	26.821
Verdun	1.077	7.832
Quebec City	1.101	17.198
Calgary	1.158	24.964
Oshawa	1.248	6.242
Kitchener	1.386	7.449
Windsor	1.455	11.437

TABLE 7 Contd.

City	Manufacturing Employment	Population
Edmonton	1.500	28.103
Winnipeg	2.342	26.543
Hamilton	2.537	9.251
London	2.772	16.957
Vancouver	2.827	38.455
Toronto	8.699	67.241
Montreal	15.610	119.106

Source: Dominion Bureau of Statistics, Census of Canada 1961, Volumes 1, Part 1 (Population) and 3, Part 2 (Labour Force).

TABLE 8 1921

(X 1,000)

City	Population	Food & Beverages	Printing & Publishing	Textiles	Clothing	Chemicals	Non-Metallic Minerals
Brantford	29.440	0.667	0.103	0.602	0.317	0.044	0.040
Calgary	63.303	0.605	0.404	0.031	0.389	0.066	0.127
Edmonton	58.821	0.672	0.288	0.025	0.432	0.020	0.082
Halifax	58.312	0.700	0.343	0.005	0.417	0.054	0.234
Hamilton	114.151	0.893	0.722	2.701	1.483	0.272	0.709
Montreal	618.506	5.163	3.725	4.613	16.669	1.048	1.837
Ottawa	107.843	0.305	1.326	0.029	0.885	0.094	0.214
Quebec City	95.193	0.548	0.554	0.033	1.994	0.064	0.106
Regina	34.432	0.223	0.248	0.006	0.183	0.024	0.325
Saskatoon	25.739	1.216	0.128	0.001	0.138	0.011	0.090
Sherbrooke	23.515	0.156	0.098	1.004	0.452	0.006	0.034
Toronto	521.893	6.658	6.373	2.439	12.452	1.473	2.090
Vancouver	163.220	1.264	0.637	0.140	1.094	0.055	0.190
Windsor	38.591	0.246	0.235	0.012	0.223	0.180	0.135
Winnipeg	179.087	1.827	1.694	0.214	1.557	0.262	0.533

Source: Census of Canada 1921, Volumes 2 (Population) and 4 (Manufactures).

TABLE 9 1931

(X 10,000)

City	Population	Food & Beverages	Printing & Publishing	Textiles	Clothing	Chemicals	Non-Metallic Minerals
Calgary	8.376	0.063	0.034	0.001	0.032	0.009	0.112
Hamilton	15.555	0.088	0.087	0.201	0.110	0.013	0.047
Montreal	81.858	0.540	0.404	0.282	1.912	0.047	0.135
Ottawa	12.687	0.047	0.131	0.015	0.072	0.005	0.012
Quebec City	13.059	0.067	0.054	0.034	0.139	0.006	0.011
Toronto	63.121	0.479	0.580	0.209	1.352	0.085	0.108
Vancouver	24.659	0.183	0.106	0.011	0.161	0.012	0.026
Winnipeg	21.879	0.141	0.148	0.074	0.238	0.013	0.010

Source: Dominion Bureau of Statistics, Census of Canada 1931, Volumes 3 (Population) and 7 (Occupations and Industries).

TABLE 10 1941

(X 10,000)

City	Population	Food & Beverages	Printing & Publishing	Textiles	Clothing	Chemicals	Non-Metallic Minerals
Hamilton	16.613	0.160	0.076	0.251	0.293	0.077	0.150
Montreal	90.301	0.939	0.634	0.722	3.013	0.432	0.327
Ottawa	15.495	0.089	0.161	0.008	0.051	0.009	0.021
Quebec City	15.076	0.093	0.097	0.050	0.178	0.080	0.011
Toronto	66.746	0.931	0.879	0.355	1.439	0.474	0.127
Vancouver	27.535	0.373	0.192	0.043	0.127	0.037	0.034
Windsor	10.531	0.104	0.039	0.066	0.018	0.087	0.019
Winnipeg	22.196	0.322	0.191	0.032	0.306	0.067	0.059

Source: Dominion Bureau of Statistics, Census of Canada 1941, Volumes 2 (Population) and 7 (Occupation and Industries).

TABLE 11 1951

(X 10,000)

City	Population	Food & Beverages	Printing & Publishing	Textiles	Clothing	Chemicals	Non-Metallic Minerals
Calgary	12.906	0.251	0.082	0.008	0.032	0.050	0.020
Edmonton	15.963	0.307	0.069	0.007	0.046	0.023	0.016
Brantford	3.673	0.568	0.019	0.095	0.039	0.029	0.041
Fredericton	1.602	0.009	0.011	0.009	0.002	-	0.002
Hamilton	2.083	0.258	0.113	0.269	0.361	0.123	0.016
Lachine	2.777	0.042	0.008	0.028	0.021	0.022	0.022
Lethbridge	2.295	0.052	0.011	-	0.004	0.001	0.001
Montreal	102.152	1.678	0.847	0.953	3.746	0.744	0.389
Ottawa	20.205	0.130	0.252	0.013	0.036	0.029	0.026
Regina	7.132	0.106	0.047	0.001	0.015	0.010	0.011
Quebec City	16.402	0.173	0.112	0.018	0.224	0.093	0.033
Saskatoon	5.327	0.137	0.038	0.004	0.009	0.006	0.003
Toronto	67.575	1.223	1.165	0.335	1.613	0.656	0.189
Vancouver	34.483	0.601	0.288	0.053	0.169	0.053	0.039
Windsor	12.005	0.163	0.061	0.063	0.025	0.114	0.028
Winnipeg	23.571	0.480	0.227	0.059	0.490	0.064	0.048

Source: Dominion Bureau of Statistics, Census of Canada, Volumes 1 (Population) and 4 (Occupations and Industries).

TABLE 12 1961

(X 10,000)

City	Population	Food & Beverages	Printing & Publishing	Textiles	Clothing	Chemicals	Non-Metallic Minerals
St. John	6.363	0.092	0.027	0.007	0.005	0.008	0.002
Saskatoon	9.553	0.201	0.047	0.004	0.009	0.007	0.020
Sault Ste. Marie	4.309	0.059	0.016	0.001	0.002	0.005	0.001
Sherbrooke	6.655	0.077	0.035	0.208	0.036	0.009	0.005
Sudbury	8.012	0.057	0.020	-	0.004	0.013	0.009
Victoria	5.494	0.045	0.029	0.001	0.003	0.007	0.002
Calgary	24.964	0.489	0.140	0.011	0.020	0.055	0.075
Edmonton	28.103	0.487	0.113	0.007	0.105	0.133	0.063
Hamilton	27.399	0.410	0.141	0.152	0.118	0.138	0.226
London	16.957	0.419	0.161	0.007	0.109	0.058	0.029
Montreal	119.106	1.982	0.930	0.744	3.572	0.777	0.418
Ottawa	26.821	0.190	0.214	0.006	0.024	0.046	0.031
Brantford	5.520	0.091	0.027	0.101	0.010	0.048	0.026
Fort William	4.521	0.048	0.018	0.003	0.002	0.003	0.008
Kitchener	7.449	0.305	0.012	0.047	0.029	0.017	0.020
Lethbridge	3.545	0.091	0.018	0.001	0.003	0.001	0.006
Brandon	3.321	0.046	0.012	0.002	0.001	0.003	0.005
Fredericton	1.968	0.014	0.013	0.002	-	0.001	0.002
Penticton	1.386	0.013	0.004	0.001	-	0.002	0.002
Portage La Prairie	1.239	0.024	0.004	-	-	0.001	0.001
Regina	11.214	0.144	0.062	0.003	0.013	0.011	0.044
Toronto	67.241	1.222	0.936	0.225	1.071	0.497	0.185
Vancouver	38.450	0.617	0.266	0.057	0.166	0.056	0.050
Windsor	11.437	0.204	0.061	0.008	0.017	0.044	0.018
Winnipeg	26.543	0.499	0.215	0.046	0.415	0.054	0.053

Source: Dominion Bureau of Statistics, Census of Canada 1961, Volumes 1, Part 1 (Population) and 3, Part 3-2 (Labour Force).

APPENDIX C

SURVEY LETTER AND QUESTIONNAIRE



The University of Manitoba

Department of Geography

Winnipeg, Manitoba
Canada R3T 2N2

I am a graduate student at the University of Manitoba undertaking research into some of the factors affecting the geography and development of Prairie manufacturing industry. This research is sponsored by the Canadian Commonwealth Scholarship and Fellowship Administration, Ottawa.

The main part of this analysis of Prairie industry involves a questionnaire designed to provide basic research information which unfortunately is not available from other sources. This questionnaire is being sent to all manufacturing enterprises which have their headquarters or main administrative offices in the Prairie provinces, and which consist of more than one branch or subsidiary operation. I would appreciate, therefore, your cooperation in filling out the enclosed questionnaire as fully as you find possible.

I should like to emphasize that this is an independent academic study. Any questionnaire received will be treated in strictest confidence and all subsequent analysis will be undertaken in a manner that precludes the disclosure of individual returns. In addition to the questionnaire, I would welcome any further observations or information that you consider to be significant in affecting the location of your enterprise.

On completion of the questionnaire, could you please return it in the enclosed stamped addressed envelope as soon as possible.

Thanking you for your cooperation.

Yours very truly,

Mohan Appana

MA/mg

Encls. 2



THE UNIVERSITY OF MANITOBA

DEPARTMENT OF GEOGRAPHY

SURVEY INTO THE GEOGRAPHY OF PRAIRIE MANUFACTURING ENTERPRISES

CONFIDENTIAL

section A. GENERAL

1. Name and Address
of Enterprise.

2. Could you please indicate with a tick in the appropriate box whether your enterprise in the above address is one of the following:-

(a) Head Office	<input type="checkbox"/>
(b) Regional Head Office	<input type="checkbox"/>
(c) Divisional Head Office	<input type="checkbox"/>
(d) Other. Specify.	<input type="checkbox"/>

3. Please state briefly the nature of the manufacturing activity or activities that your enterprise is engaged in.

4. For each of the columns (a), (b), and (c), please indicate with a tick in the appropriate box, the type of organization, total employment* and annual total value of shipments of goods of own manufacture, of your enterprise.

* Production and related employees as well as administrative, sales, etc., employees.

(a) Type of Organization	(b) Total Employment	(c) Total Value of Shipments (\$)
Individual ownership <input type="checkbox"/>	Less than 15 <input type="checkbox"/>	Less than 25,000 <input type="checkbox"/>
Partnership <input type="checkbox"/>	15 - 49 <input type="checkbox"/>	25,000 - 49,999 <input type="checkbox"/>
Incorporated Co. (Private) <input type="checkbox"/>	50 - 99 <input type="checkbox"/>	50,000 - 99,999 <input type="checkbox"/>
Incorporated Co. (Public) <input type="checkbox"/>	100 - 199 <input type="checkbox"/>	100,000 - 499,999 <input type="checkbox"/>
Incorporated Co-operative <input type="checkbox"/>	200 - 499 <input type="checkbox"/>	500,000 - 999,999 <input type="checkbox"/>
Unincorporated Co-operative <input type="checkbox"/>	500 - 1,499 <input type="checkbox"/>	1,000,000 - 4,999,999 <input type="checkbox"/>
	More than 1,500 <input type="checkbox"/>	Over 5,000,000 <input type="checkbox"/>

5. The name and address (head office) of the Parent Company if any.

6. Please name each branch* and/or subsidiary* operation (within Canada and the U.S.A.) which is directly controlled by your enterprise office. Indicate also their location, type of establishment, major functions or products, year of establishment and ownership control. The structure of a hypothetical enterprise is given as an example below.

*Branch offices or plants, regional or divisional head offices, manufacturing plants, transport and merchandising establishments, etc.

[illegible]

section B. Enterprise Structure - cont'd.

7. Please examine each of the following functions which may be provided at your enterprise office. Indicate with a tick in the appropriate column or columns whether the policy is normally:-

- (a) to provide this function internally at the level of the branch and/or subsidiary operations (Column A),
- (b) to provide this function internally through your enterprise office at the address given in Q.1 (Column B),
- (c) to purchase this function from other companies through your enterprise office (Column C),
- (d) none of these. Please specify (Column D).

Function	Column A	Column B	Column C	Column D
Accounting				
Advertising				
Computer Facilities				
Legal Services				
Marketing				
Market Research				
Public Relations				
General Maintenance				
Storage/Warehousing				
Transport of raw materials and finished products				
Other. Specify.				

section C. RELOCATION

8. Was your enterprise office ever located elsewhere prior to the present location at the address given in Q.1?

☐

YES

☐

NO

If the answer is "NO", proceed to section D, Q.10.

If "YES", state the different locations* at which your enterprise office has been located previously, in the spaces provided below.

* Please indicate even if relocation occurred within the same city, i.e. from city center to suburbs.

Location	Original Location	2nd Location	3rd Location	4th Location
City				
Province/State				
Year relocated				

9. Please indicate the major reasons that have led to the relocation of your enterprise office. Tick the appropriate reasons* in the column or columns applicable to your enterprise.

REASONS FOR RELOCATION

[illegible]

section D. FACTORS OF LOCATION

10. Please indicate whether the factors listed below have played any significant role in the present location of your enterprise office in the following geographical settings:-

- (a) the Prairies as a whole,
- (b) a particular Prairie province,
- (c) a particular Prairie city.

Rank in order of importance 1, 2, 3, only the most important factors which may apply to each geographical setting under consideration. Note that a particular factor may apply to the three columns simultaneously. The columns designated (a), (b) and (c) correspond to the three geographical settings listed above.

FACTORS OF LOCATION	(a)	(b)	(c)
Major business of enterprise is concentrated here			
Near to markets of enterprise			
Distinct and separate area for management and administrative purposes			
Proximity to branch and/or subsidiary operations of enterprise for pooling or sharing of common functions and services			
Close personal contact and communication with executives of the branch and/or subsidiary operations			
Maintenance of direct and close contact with other companies here			
Proximity to business clients for face-to-face contact			
Proximity to institutions, i.e. insurance, banking, finance, etc., to serve the administrative needs of the enterprise			
Proximity to functions in advertising, publishing public relations, accounting, computing, legal services, mass media, etc.			
Proximity to other businesses or institutions for the exchange of information in specialized functions			
Excellent transport and communication linkages within the region and internationally			
Proximity to qualified administrative and management staff			
Favourable business taxes			
Availability of office premises			
Established business connections			
Favourable political climate for business			
Pleasant living conditions			
Better educational facilities			
Better cultural and recreational facilities			
Other. Specify.			

11. Have any new branch and/or subsidiary operations (i.e. manufacturing plants, offices, etc.) which come under the control of your particular enterprise office, been built and/or acquired after the latter was established at the present location?

NO

If "YES", has the present location of this enterprise office influenced the location of the branch and/or subsidiary operations which were established later?

NO

If "YES", indicate the manner in which this enterprise office has influenced the location of the operations established later.

section E. THE 'IDEAL' LOCATION

12. Assuming there is a need to consider a location for a NEW enterprise office similar to this, what characteristics should the 'ideal' location possess? Please tick off the most significant characteristics listed below and specify any other which in your opinion is necessary or important.

CHARACTERISTICS OF THE 'IDEAL' LOCATION	
Close to the markets of the enterprise	
Near to clients of the enterprise	
Near to branch and/or subsidiary operations of enterprise for centralization of certain functions or services	
Near to branch and/or subsidiary operations of enterprise for close personal contact and communications between executives	
Geographically central for administrative purposes	
Near to legal, financial, publicity, management, etc. services or functions	
Near to sources of business and/or general information	
Efficient transport and communication linkages	
Qualified administrative and management personnel	
Favourable business taxes	
Favourable political climate for business	
Office premises at reasonable costs	
Pleasant living environment	
Good educational facilities	
Good cultural and recreational facilities	
Other. Specify.	

THANK YOU FOR YOUR COOPERATION
IN THIS SURVEY.

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APPENDIX D

RESULTS OF QUESTIONNAIRE SURVEY

TABLE 1 DISTRIBUTION OF USABLE RETURNS BY PROVINCE
AND TYPE OF HEAD OFFICE ORGANIZATION

<u>Head Office Organization+</u> <u>Province</u>	H.O.	R.H.O.	D.H.O.	C.H.O.	Total
Alberta	47	7	13	4	71
Saskatchewan	19	4	4	1	28
Manitoba	45	3	12	5	65
Prairies	111	14	29	10	164

+ H.O.: Head Office; R.H.O.: Regional Head Office; D.H.O.: Divisional Head Office; C.H.O.: "Canadian" Head Office.

TABLE 2 DISTRIBUTION OF USABLE RETURNS BY PROVINCE
AND TYPE OF OWNERSHIP ORGANIZATION

<u>Ownership Organization+</u> <u>Province</u>	I.	P.	Pr.I.	Pu.I.	I.C.	C.C.	Total
Alberta	3	2	41	22	3	-	71
Saskatchewan	1	1	17	4	3	2	28
Manitoba	2	2	43	16	2	-	65
Prairies	6	5	101	42	8	2	164

+ I.: Individual Ownership; P.: Partnership; Pr. I.: Private Incorporated Company; Pu.I.: Public Incorporated Company; I.C.: Incorporated Co-operative; C.C.: Crown Corporation.

TABLE 3 DISTRIBUTION OF USABLE RETURNS BY PROVINCE
AND EMPLOYMENT SIZE GROUP

Employment Size+ Province	a	b	c	d	e	f	g	Total
Alberta	7	20	9	12	12	10	1	71
Saskatchewan	3	10	3	5	4	1	2	28
Manitoba	6	11	14	15	13	5	1	65
Prairies	16	41	26	32	29	16	4	164

+ Number of Employees a: <15; b: 15-49; c: 50-99; d: 100-199;
e: 200-499; f: 500-1,499; g: > 1,500.

TABLE 4 DISTRIBUTION OF USABLE RETURNS BY PROVINCE
AND VALUE OF SHIPMENTS SIZE GROUP

Value of Shipments Size+ Province	a	b	c	d	e	f	g	n.a.*	Total
Alberta	-	2	-	5	12	19	32	1	71
Saskatchewan	-	-	1	5	2	10	9	1	28
Manitoba	4	1	-	3	8	25	22	2	65
Prairies	4	3	1	13	22	54	63	4	164

+ Dollars a: <25,000; b: 25,000-49,999; c: 50,000-99,999;
d: 100,000-499,999; e: 500,000-999,999; f: 1,000,000-4,999,999;
g: >5 million.

* not available.

TABLE 5 DISTRIBUTION OF USABLE RETURNS BY PROVINCE

AND TYPE OF MANUFACTURING ACTIVITY

Manufacturing Activity ⁺ Province	F/B	T/C	W	P/P	Me	Ma	T/E	N-Me	Pe	Ch	O	Total
Alberta	7	3	6	3	11	10	10	4	3	5	9	71
Saskatchewan	2	1	3	2	5	3	1	3	3	3	2	28
Manitoba	9	7	4	8	7	7	4	2	-	3	14	65
Prairies	18	11	13	13	23	20	15	9	6	11	25	164

⁺ F/B: Food and Beverages; T/C: Textile and Clothing; W: Wood Industries; P/P: Printing and Publishing; Me: Metal Products; Ma: Machinery; T/E: Transport Equipment; N-Me: Non-Metallic Minerals; Pe: Petroleum Products; Ch: Chemicals; O: Other Manufacturing.

TABLE 6 LOCATION FACTORS CITED BY ENTERPRISES IN THE SURVEY

- 1 Major business of enterprise concentrated here
- 2 Near to markets of enterprise
- 3 Distinct and separate area for management and administrative purposes
- 4 Proximity to branch and/or subsidiary operations
- 5 Close contact and communication with branch and/or subsidiaries
- 6 Close contact with other companies
- 7 Proximity to business clients for face-to-face contact
- 8 Proximity to insurance, banking, finance, etc.
- 9 Proximity to advertising, public relations, accounting, computing, etc. services
- 10 Proximity to other businesses for exchange of information
- 11 Transport and communication linkages
- 12 Proximity to qualified administrative and management staff
- 13 Favourable business taxes
- 14 Availability of office premises
- 15 Established business connections
- 16 Favourable political climate
- 17 Pleasant living conditions
- 18 Better educational facilities
- 19 Better cultural and recreational facilities
- 20 Owners lived here
- 21 Better contacts with government departments
- 22 Raw materials
- 23 Availability of labour
- 24 Government aid
- 25 Enterprise organized specifically to serve region

TABLE 7 DIFFERENT GEOGRAPHICAL SCALES AND NUMBER OF
ENTERPRISES CITING LOCATION FACTORS

Location Factors [#]	Geographical Scale ⁺		
	a	b	c
1	53	43	30
2	61	36	32
3	10	7	16
4	15	9	13
5	9	11	10
6	14	10	19
7	22	13	28
8	11	5	15
9	10	4	11
10	8	6	13
11	23	12	21
12	6	6	20
13	6	13	13
14	6	3	13
15	20	18	34
16	16	18	10
17	23	13	22
18	11	3	13
19	12	2	12
20	16	-	1
21	-	-	1
22	4	4	1
23	1	1	1
24	1	3	-
25	-	-	1
Number of enterprises responding to question	116	73	74

⁺ a: The Prairies; b: Prairie Province; c: Prairie city.

- No response to factor.

[#] Numbers below correspond to location factors listed in Table 6, Appendix D.

TABLE 8 NUMBER OF ENTERPRISES CITING LOCATION FACTORS
IN ALBERTA, SASKATCHEWAN AND MANITOBA

Location Factors [#]	Alberta	Saskatchewan	Manitoba
1	28	7	8
2	23	9	4
3	5	1	1
4	6	3	-
5	8	2	1
6	6	3	1
7	10	2	1
8	3	2	-
9	2	2	-
10	6	-	-
11	6	3	3
12	2	4	-
13	8	2	3
14	-	2	1
15	13	2	3
16	16	1	1
17	11	1	1
18	3	-	-
19	2	-	-
20	-	-	-
21	-	-	-
22	2	1	1
23	-	-	1
24	-	1	2
25	-	-	-
Number of enterprises responding to question	39	16	18

- No response to factor.

[#] Numbers below correspond to location factors listed in Table 6, Appendix D.

TABLE 9 NUMBER OF ENTERPRISES CITING LOCATION FACTORS
IN FIVE PRAIRIE CITIES

Location Factors#	Winnipeg	Calgary	Edmonton	Regina	Saskatoon
1	5	7	9	3	2
2	5	8	11	3	1
3	2	3	2	3	2
4	3	4	3	1	-
5	-	3	2	1	1
6	2	9	3	-	1
7	2	9	7	2	3
8	3	4	3	-	2
9	2	4	-	-	2
10	2	5	4	-	1
11	4	5	7	-	2
12	7	4	2	-	2
13	-	-	5	-	2
14	4	3	-	-	2
15	8	8	10	2	3
16	-	2	6	-	-
17	2	3	7	2	2
18	3	-	4	2	2
19	2	1	3	2	2
20	-	1	-	-	-
21	-	-	1	-	-
22	1	1	-	-	-
23	-	1	-	-	-
24	-	-	-	-	-
25	-	-	-	-	1
Number of enterprises responding to question	17	17	17	5	5

- No response to factor.

Numbers below correspond to location factors listed in Table 6,
Appendix D.

TABLE 10 NUMBER OF ENTERPRISES, CLASSIFIED BY HEAD OFFICE ORGANIZATION, CITING LOCATION FACTORS

Geographical Scale	The Prairies				Prairie Province				Prairie City			
Head Office												
Organization ⁺	H.O.	R.H.O.	D.H.O.	C.H.O.	H.O.	R.H.O.	D.H.O.	C.H.O.	H.O.	R.H.O.	D.H.O.	C.H.O.
Location Factors [#]												
1	35	1	12	5	30	4	9	-	23	3	4	-
2	37	6	13	5	21	6	9	-	21	4	7	-
3	8	-	2	-	5	-	2	-	10	3	2	1
4	10	1	3	1	7	-	1	1	9	2	2	-
5	6	1	2	-	7	-	3	1	8	1	1	-
6	9	1	4	-	8	1	1	-	13	4	1	1
7	15	-	4	3	10	1	2	-	21	4	3	-
8	9	1	-	1	3	-	2	-	12	-	2	1
9	7	2	1	-	2	-	2	-	9	-	1	1
10	6	-	2	-	3	1	2	-	11	-	1	1
11	11	4	7	1	8	2	1	1	16	2	2	1
12	4	1	1	-	5	-	1	-	17	-	1	2
13	4	2	-	-	9	1	3	-	9	-	3	1
14	2	3	1	-	3	-	-	-	10	-	2	1
15	15	1	3	1	11	2	5	-	24	3	6	1
16	10	2	3	-	14	1	3	-	7	-	2	1
17	18	3	2	-	10	-	3	-	17	1	3	1
18	8	3	-	-	3	-	-	-	11	1	-	1
19	8	2	2	-	2	-	-	-	9	1	1	1
20	16	-	-	-	-	-	-	-	1	-	-	-
21	-	-	-	-	-	-	-	-	1	-	-	-
22	3	1	-	-	4	-	-	-	1	-	-	-
23	1	-	-	-	1	-	-	-	1	-	-	-
24	-	-	-	1	1	-	1	1	-	-	-	-
25	-	-	-	-	-	-	-	-	1	-	-	-
Number of enterprises responding to question	78	9	21	8	38	7	15	2	51	8	13	2

+ H.O.: Head Office; R.H.O.: Regional Head Office; D.H.O.: Divisional Head Office; C.H.O.: "Canadian" Head Office.

- No response to factor.

Numbers below correspond to location factors listed in Table 6, Appendix D.

TABLE 11 NUMBER OF ENTERPRISES, CLASSIFIED BY OWNERSHIP ORGANIZATION, CITING LOCATION FACTORS

Geographical Scale		The Prairies						Prairie Provinces						Prairie City					
Ownership Organization ⁺		I.	P.	Pr.I.	Pu.I.	I.C.	C.C.	I.	P.	Pr.I.	Pu.I.	I.C.	C.C.	I.	P.	Pr.I.	Pu.I.	I.C.	C.C.
Location Factors #																			
1		4	3	28	15	3	-	-	3	26	9	3	2	-	2	19	9	-	-
2		3	3	35	17	3	-	-	2	18	11	4	1	-	2	17	12	1	-
3		1	2	5	2	-	-	-	-	3	3	1	-	-	1	12	3	-	-
4		2	-	8	2	2	1	-	1	6	1	1	-	-	2	8	2	1	-
5		2	-	5	2	-	-	-	2	6	2	1	-	-	1	7	1	1	-
6		-	2	5	5	2	-	-	1	6	2	1	-	-	2	12	5	-	-
7		1	-	13	6	2	-	-	2	8	2	1	-	-	1	20	6	1	-
8		1	-	8	1	1	-	-	2	1	1	1	-	-	2	8	5	-	-
9		1	-	7	1	1	-	-	-	2	1	1	-	-	2	5	4	-	-
10		1	1	5	-	1	-	-	1	4	1	-	-	-	2	6	5	-	-
11		2	2	11	6	2	-	-	2	5	3	2	-	-	1	11	7	2	-
12		-	-	4	1	1	-	-	2	1	2	1	-	-	2	12	6	-	-
13		-	-	5	1	-	-	-	2	7	4	-	-	-	3	6	4	-	-
14		-	-	4	2	-	-	-	-	1	2	-	-	-	2	7	4	-	-
15		3	1	9	7	-	-	-	2	11	5	-	-	-	1	24	8	1	-
16		1	3	6	6	-	-	-	2	10	6	-	-	-	2	6	2	-	-
17		1	2	15	4	-	-	-	2	7	4	-	-	-	1	15	5	1	-
18		1	1	8	1	-	-	-	2	-	1	-	-	-	3	8	1	1	-
19		1	1	7	3	-	-	-	2	-	-	-	-	-	3	6	2	1	-
20		-	-	15	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-
21		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
22		-	-	1	2	-	-	-	-	-	1	2	1	-	-	-	-	1	-
23		-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	1	-
24		-	-	-	-	1	-	-	-	2	1	-	-	-	-	-	-	1	-
25		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Number of enterprises responding to question		5	4	73	28	5	1	-	4	41	21	5	2	-	4	43	22	5	-

+ I.: Individual Ownership; P.: Partnership; Pr.I.: Private Incorporated Company; Pu.I.: Public Incorporated Company; I.C.: Incorporated Co-operative; C.C.: Crown Corporation.

- No response to factor.

Numbers below correspond to location factors listed in Table 6, Appendix D.

TABLE 12 NUMBER OF ENTERPRISES, CLASSIFIED BY EMPLOYMENT SIZE, CITING LOCATION FACTORS

Geographical Scale Employment Size ⁺ Location Factors [#]	The Prairies							Prairie Province							Prairie City						
	a	b	c	d	e	f	g	a	b	c	d	e	f	g	a	b	c	d	e	f	g
1	5	12	8	12	10	4	2	5	11	7	7	9	3	1	6	8	4	4	5	3	-
2	5	18	10	12	10	5	1	5	9	7	3	7	4	1	3	9	3	8	6	3	-
3	-	4	2	2	-	2	-	-	2	1	-	1	2	1	2	6	3	3	2	-	-
4	1	4	2	1	3	3	1	-	4	1	-	2	1	1	2	4	1	3	2	-	-
5	-	5	1	1	1	1	-	1	3	3	1	1	1	1	-	5	-	2	2	-	-
6	-	3	3	2	4	-	2	2	2	1	2	2	-	1	3	4	3	3	4	2	-
7	2	3	5	4	5	1	2	2	3	4	1	2	-	1	5	7	4	6	5	1	-
8	-	-	5	2	1	2	1	-	1	2	-	-	1	1	1	4	3	3	3	1	-
9	-	1	2	2	3	1	1	-	-	2	-	-	1	1	1	4	1	2	2	1	-
10	-	2	3	1	-	1	1	1	1	2	1	-	1	-	2	3	3	2	2	1	-
11	-	6	6	5	4	2	-	2	2	1	1	2	3	1	2	6	2	3	5	3	-
12	-	-	2	2	2	-	-	-	1	2	-	1	1	1	1	4	5	2	6	2	-
13	-	3	-	2	1	-	-	1	1	6	3	1	1	-	-	5	1	1	4	2	-
14	-	1	2	3	-	-	-	-	-	-	1	-	2	-	2	3	1	2	4	1	-
15	-	6	2	7	2	2	1	4	4	3	4	2	1	-	6	8	3	8	5	4	-
16	-	6	1	3	3	1	1	2	3	4	3	5	1	-	1	3	1	2	1	2	-
17	2	4	4	5	6	2	-	2	2	4	1	2	2	-	5	5	3	2	3	3	1
18	-	3	2	4	1	1	-	-	1	1	-	1	-	-	1	4	3	1	2	1	1
19	-	2	2	4	3	1	-	-	1	1	-	-	-	-	1	4	2	1	3	-	1
20	1	3	5	5	1	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
22	-	2	-	-	1	1	-	1	1	-	1	-	1	-	-	-	-	-	-	1	-
23	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-
24	-	-	-	-	1	-	-	-	-	-	-	2	1	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Number of enter- prises responding to question	8	28	22	26	20	9	3	9	16	12	11	16	8	1	10	17	10	14	15	6	2

+ Number of employees; a: <15; b: 15-49; c: 50-99; d: 100-199; e: 200-499; f: 500-1,499; g: >1,500

- No response to factor.

Numbers below correspond to location factors listed in Table 6, Appendix D.

TABLE 13 NUMBER OF ENTERPRISES, CLASSIFIED BY VALUE OF SHIPMENTS SIZE, CITING LOCATION FACTORS

Geographical Scale		The Prairies							Prairie Province							Prairie City						
Value of Shipments ⁺	Location Factors [#]	a	b	c	d	e	f	g	a	b	c	d	e	f	g	a	b	c	d	e	f	g
1		3	1	-	3	8	14	23	-	-	1	4	7	15	14	-	1	-	6	5	7	10
2		2	2	-	3	10	20	23	-	-	-	4	6	12	13	-	-	-	5	2	13	10
3		1	-	-	1	2	3	2	-	-	-	-	-	3	4	-	-	-	3	1	6	4
4		2	-	-	1	1	4	6	-	-	-	1	1	4	3	-	-	-	1	2	6	2
5		2	-	-	1	-	2	3	-	-	-	2	2	3	3	-	-	-	-	1	5	2
6		-	1	-	-	1	3	7	-	-	-	2	2	3	3	-	1	-	-	3	5	7
7		-	1	-	2	-	7	11	-	-	-	1	5	4	3	-	1	-	1	3	5	7
8		-	-	-	-	1	5	5	-	-	-	-	1	2	2	-	-	-	1	2	13	5
9		-	-	-	-	1	4	5	-	-	-	-	-	2	2	-	-	-	1	1	6	4
10		-	-	-	-	1	4	3	-	-	-	1	1	2	2	-	-	-	1	2	2	4
11		1	-	-	-	4	9	9	-	-	-	2	2	3	5	-	-	-	-	3	5	3
12		-	-	-	-	-	4	2	-	-	-	-	1	2	3	-	-	-	1	4	5	7
13		-	-	-	1	1	1	2	-	-	-	-	2	5	4	-	-	-	1	1	5	9
14		-	-	-	-	-	3	2	-	-	-	-	-	-	3	-	-	-	1	2	5	5
15		-	1	-	-	1	9	6	-	-	1	3	4	6	4	-	-	-	2	2	4	3
16		-	1	-	-	3	4	6	-	-	-	1	5	4	6	-	-	-	4	4	15	9
17		-	-	-	1	3	8	10	-	-	-	1	3	3	6	-	-	-	-	3	3	4
18		-	-	-	-	1	5	4	-	-	-	-	1	1	1	-	-	-	4	4	7	5
19		-	-	-	-	1	3	7	-	-	-	-	1	1	-	-	-	-	2	1	6	2
20		1	-	-	1	1	10	3	-	-	-	-	-	-	-	-	-	-	2	1	5	2
21		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
22		-	-	-	-	1	1	2	-	-	-	-	1	1	2	-	-	-	-	-	1	-
23		-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	1
24		-	-	-	-	-	-	1	-	-	-	-	-	-	3	-	-	-	-	-	-	1
25		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Number of enterprises responding to question		4	2	0	6	16	43	42	0	0	1	7	11	21	29	0	1	0	8	10	25	26

⁺ Dollars; a: <25,000; b: 25,000-49,999; c: 50,000-99,999; d: 100,000-499,999; e: 500,000-999,999; f: 1,000,000-4,999,999; g: >5 million.

- No response to factor.

[#] Numbers below correspond to location factors listed in Table 6, Appendix D.

TABLE 14 NUMBER OF ENTERPRISES, CLASSIFIED BY MANUFACTURING ACTIVITY, CITING LOCATION FACTORS

Geographical Scale	The Prairies										Prairie Province										Prairie City												
Manufacturing Activity+ Location Factor#	F/B	T/C	W	P/P	Me	Ma	T/E	N-Me	Pe	Ch	O	F/B	T/C	W	P/P	Me	Ma	T/E	N-Me	Pe	Ch	O	F/B	T/C	W	P/P	Me	Ma	T/E	N-Me	Pe	Ch	O
1	8	4	2	3	8	8	6	4	1	3	6	2	3	3	3	9	5	3	3	1	4	7	1	1	2	3	10	3	2	5	1	-	2
2	11	2	3	2	15	8	6	3	1	3	7	4	1	1	3	12	4	2	1	2	3	3	2	-	2	4	9	3	1	4	-	1	6
3	1	3	1	-	1	1	-	-	-	1	2	-	-	-	-	1	1	1	1	1	-	2	-	-	-	1	4	3	1	3	1	1	2
4	2	3	2	-	1	1	-	1	2	1	2	-	-	-	1	2	1	1	2	1	-	1	1	-	-	-	3	1	2	1	1	2	2
5	2	3	-	-	-	1	1	-	-	1	1	-	-	-	1	2	2	1	2	1	1	1	-	-	-	1	4	1	1	-	1	-	2
6	1	-	1	1	2	2	2	2	-	1	2	1	-	-	-	5	1	2	-	-	-	2	1	1	1	-	5	1	2	-	2	3	3
7	2	2	1	1	4	3	3	1	1	2	2	-	1	-	-	5	3	2	-	-	-	2	-	-	1	6	6	2	1	3	2	3	4
8	1	3	3	-	-	1	-	1	-	-	2	-	-	1	-	1	-	-	1	-	-	2	-	-	1	2	2	1	1	1	2	3	2
9	3	2	-	-	-	1	1	1	-	-	2	-	-	-	-	1	-	-	2	-	-	1	-	-	1	-	2	1	1	1	2	3	-
10	1	1	2	-	-	-	1	1	1	-	1	-	-	-	-	3	1	-	1	-	-	1	2	-	2	-	2	1	1	-	2	3	2
11	4	1	3	2	3	3	1	1	-	3	2	2	1	-	1	1	-	2	-	1	1	3	1	1	2	3	5	2	1	-	2	3	1
12	1	-	-	1	1	-	1	1	-	-	1	-	-	1	-	2	-	1	-	-	2	-	-	2	2	4	1	2	1	2	3	1	1
13	1	-	-	-	1	1	1	-	-	1	1	-	1	2	2	5	-	-	-	-	2	1	-	-	2	2	2	-	4	2	-	-	1
14	1	-	-	-	2	1	-	-	-	1	1	-	-	1	-	1	-	1	-	-	-	2	1	1	1	1	1	1	1	2	2	3	1
15	1	3	1	2	2	5	3	-	-	2	1	1	-	-	1	9	2	3	-	-	-	2	-	-	3	4	6	1	4	3	2	3	5
16	1	1	1	1	2	1	3	1	-	2	2	-	-	1	2	6	1	3	-	1	2	2	-	-	1	1	3	-	2	-	-	1	2
17	2	4	1	-	4	4	3	1	-	2	2	-	1	1	-	7	-	1	-	1	-	2	-	-	2	3	5	1	3	1	2	2	3
18	2	2	1	-	-	3	-	-	-	2	1	-	-	-	-	1	-	-	-	1	-	1	-	-	2	2	1	2	2	1	-	1	2
19	2	2	1	-	1	2	2	-	-	1	1	-	-	-	-	1	-	-	-	-	-	1	-	-	-	2	2	1	2	1	1	1	2
20	-	2	2	2	-	4	-	-	-	1	5	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	1	-	2	1	1	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	1	-
23	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
24	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Number of enterprises responding to question	15	7	8	7	18	16	9	6	3	7	20	5	5	5	5	16	8	7	4	4	6	8	5	1	7	7	17	7	6	6	3	6	9

+ F/B: Food and Beverages; T/C: Textile and Clothing; W: Wood Industries; P/P: Printing and Publishing; Me: Metal Products; Ma: Machinery; T/E: Transport Equipment; N-Me: Non-Metallic Minerals; Pe: Petroleum Products; Ch: Chemicals; O: Other Manufacturing.

Numbers below correspond to location factors listed in Table 6, Appendix D.

TABLE 15 IMPORTANT ATTRIBUTES FOR THE 'IDEAL' LOCATION
CITED BY ENTERPRISES IN THE SURVEY

- 1 Close to markets of enterprise
- 2 Near to clients of enterprise
- 3 Near to branch and/or subsidiary operations of enterprise for centralization of certain functions or services
- 4 Near to branch and/or subsidiary operations of enterprise for close personal contact and communication between executives
- 5 Geographically central for administrative purposes
- 6 Near to legal, financial, publicity, management, etc. services or functions
- 7 Near to sources of business and/or general information
- 8 Efficient transport and communication linkages
- 9 Qualified administrative and management personnel
- 10 Favourable business taxes
- 11 Favourable political climate for business
- 12 Office premises at reasonable costs
- 13 Pleasant living environment
- 14 Good educational facilities
- 15 Good cultural and recreational facilities
- 16 Skilled labour supply
- 17 Supply of material inputs

TABLE 16 NUMBER OF ENTERPRISES, CLASSIFIED BY HEAD OFFICE ORGANIZATION,
CITING IMPORTANT ATTRIBUTES FOR THE 'IDEAL' LOCATION

Head Office Organization ⁺ Attributes#	H.O.	R.H.O.	D.H.O.	C.H.O.
1	80	12	21	6
2	52	5	13	4
3	21	1	5	1
4	20	1	4	2
5	29	3	6	4
6	18	2	9	1
7	29	4	9	3
8	84	9	22	5
9	35	4	10	4
10	53	4	15	4
11	69	7	19	4
12	29	4	17	2
13	44	6	11	3
14	33	4	11	4
15	29	4	9	2
16	7	-	1	-
17	3	1	2	-
Number of enterprises responding to question	99	13	28	9

+ H.O.: Head Office; R.H.O.: Regional Head Office; D.H.O.: Divisional Head Office; C.H.O.: 'Canadian' Head Office.

- No response to attribute.

Numbers below correspond to the list of attributes in Table 15, Appendix D.

TABLE 17 NUMBER OF ENTERPRISES, CLASSIFIED BY OWNERSHIP ORGANIZATION,
CITING IMPORTANT ATTRIBUTES FOR THE 'IDEAL' LOCATION

Ownership Organization ⁺ Attributes#	I.	P.	Pr.I.	Pu.I.	I.C.	C.C.
1	4	4	76	32	3	-
2	3	4	45	18	4	-
3	1	1	17	5	2	2
4	1	-	18	5	1	2
5	1	3	25	8	3	2
6	1	1	19	7	2	-
7	1	2	27	13	2	-
8	3	4	75	32	6	-
9	2	2	32	13	3	1
10	2	3	53	17	1	-
11	3	4	63	26	3	-
12	2	1	29	9	1	-
13	1	2	45	14	1	1
14	-	2	36	12	1	1
15	1	2	30	9	1	1
16	-	-	5	2	1	-
17	-	-	1	3	2	-
Number of enterprises responding to question	5	4	93	39	6	2

⁺ I.: Individual Ownership; P.: Partnership; Pr.I.: Private Incorporated Company; Pu.I.: Public Incorporated Company; I.C.: Incorporated Co-operative; C.C.: Crown Corporation.

- No response to attribute.

Numbers below correspond to the list of attributes in Table 15, Appendix D.

TABLE 18 NUMBER OF ENTERPRISES, CLASSIFIED BY EMPLOYMENT SIZE, CITING
IMPORTANT ATTRIBUTES FOR THE 'IDEAL' LOCATION

Employment Size ⁺ Attributes [#]	a	b	c	d	e	f	g
1	9	28	22	29	22	8	1
2	5	15	14	20	13	4	3
3	4	7	3	4	7	3	-
4	3	6	1	7	8	2	-
5	5	9	5	7	10	5	1
6	3	6	4	7	3	6	1
7	4	10	7	10	6	5	3
8	11	29	23	22	21	11	3
9	2	12	9	13	11	5	1
10	7	18	15	18	13	5	-
11	7	22	19	23	16	10	2
12	6	11	9	10	3	3	-
13	8	15	11	14	10	5	1
14	5	14	12	7	8	6	-
15	4	13	10	6	5	6	-
16	-	3	-	1	3	1	-
17	1	1	1	1	1	1	-
Number of enter- prises responding of question	14	36	26	31	28	11	3

⁺ Number of employees; a: <15; b: 15-49; c: 50-99; d: 100-199;
e: 200-499; f: 500-1,499; g: >1,500.

- No response to attribute.

[#] Numbers below correspond to the list of attributes in Table 15,
Appendix D.

TABLE 19 NUMBER OF ENTERPRISES, CLASSIFIED BY VALUE OF SHIPMENTS SIZE,
CITING IMPORTANT ATTRIBUTES FOR THE 'IDEAL' LOCATION

Value of Shipments ⁺ Attributes [#]	a	b	c	d	e	f	g
1	4	1	-	9	14	42	45
2	2	2	-	5	7	23	31
3	-	-	-	3	4	5	15
4	-	-	-	3	1	6	16
5	1	-	-	6	4	12	14
6	-	-	-	1	4	11	20
7	-	2	-	4	4	13	47
8	3	2	-	11	13	40	27
9	1	1	-	2	7	14	30
10	1	1	-	8	9	23	39
11	2	1	-	7	9	37	13
12	2	1	-	5	5	13	24
13	1	1	-	8	5	22	19
14	1	1	-	6	6	18	14
15	1	2	-	4	6	16	4
16	-	-	-	1	-	3	3
17	-	-	-	-	1	2	-
Number of enter- prises responding to question	4	3	0	12	17	52	57

⁺ Dollars: a: < 25,000; b: 25,000-49,999; c: 50,000-99,999;
d: 100,000-499,999; e: 500,000-999,999; f: 1,000,000-4,999,999
g: > 5 million.

- No response to attribute.

[#] Numbers below correspond to the list of attributes in Table 15,
Appendix D.

TABLE 20 NUMBER OF ENTERPRISES, CLASSIFIED BY MANUFACTURING ACTIVITY,
CITING IMPORTANT ATTRIBUTES FOR THE 'IDEAL' LOCATION

Manufacturing Activity ⁺ Attributes [#]	F/B	T/C	W	P/P	Me	Ma	T/E	N-Me	Pe	Ch	O
1	13	7	7	11	20	17	11	5	4	8	16
2	7	3	4	8	12	12	9	3	1	3	12
3	4	1	2	2	4	3	4	2	2	2	2
4	3	1	4	2	2	2	5	-	2	2	4
5	5	2	5	5	4	7	1	2	3	4	4
6	5	-	3	3	5	4	3	3	1	1	2
7	3	-	4	4	11	7	4	2	1	2	7
8	12	8	10	9	22	13	9	6	6	9	16
9	5	4	3	5	11	7	4	4	1	2	7
10	7	5	5	6	17	10	6	4	3	6	7
11	7	5	8	9	18	14	8	6	5	7	12
12	3	3	3	5	7	7	2	-	3	5	4
13	5	4	3	5	14	8	6	3	3	6	7
14	3	2	2	6	12	8	3	4	4	4	4
15	3	3	2	6	10	6	2	1	3	3	5
16	1	2	-	-	1	2	-	-	-	2	-
17	2	-	1	-	-	-	-	-	-	2	1
Number of enterprises responding to question	16	8	12	13	23	18	13	7	6	11	22

⁺ F/B: Food and Beverages; T/C: Textile and Clothing; W: Wood Industries; P/P: Printing and Publishing; Me: Metal Products; Ma: Machinery; T/E: Transport Equipment; N-Me: Non-Metallic Minerals; Pe: Petroleum Products; Ch: Chemicals; O: Other Manufacturing.

- No response to attribute.

[#] Numbers below correspond to the list of attributes in Table 15, Appendix D.

CENSUS DIVISIONS FOR THE PRAIRIE PROVINCES

