THE PREDICTION OF TRADE CENTER VIABILITY IN THE GREAT PLAINS

by

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ABSTRACT

The components of the space-economy in rural parts of the Great Plains have changed radically in the past twenty years, thus forcing a re-assessment of the efficacy of spatial arrangements for local government, education, health care, retail marketing, transportation, and grain storage. There are fewer farmers and fewer, but much larger, farms; and the farms have become highly mechanized and commercialized with a consequent altering of the kind and volume of goods and services needed to support them. Improvement in the means of movement has made rural people less dependent upon the goods and services dispensed locally and, combined with expanding farm incomes, has led to demands for up-grading in a great variety of public and private services.

The system of trade centers which serves rural Saskatchewan has undergone considerable dis-location as a result of such changes. Nearly 15 per cent of the centers disappeared from 1941-1961 and a further 25 per cent otherwise declined in commercial status. At this rate, a further 110 trade centers could disappear in the next two decades, with the consequent loss of more than 1,000 businesses and many millions of dollars in housing and commercial investment. Programs of the provincial government that are applicable at the community level are also affected by these changes: schools and hospitals are forced to close, highway needs are affected by changed travel patterns, and loans for municipal services become a tenuous undertaking.

An adequate response to the problems associated with trade center decline requires some way of distinguishing the prospects for growth or decline -- the viability -- of trade centers. Needed is an estimate of the amount, kinds, and location of trade centers most vulnerable to decline. A basic premise in this regard is that a viable trade center is one that can sustain, or even enhance, its position as a commercial center in the context of normal social and economic change. Change in commercial status is a better indicator of a center's ability to perform its ultimate function -- serving the trading needs of a surrounding hinterland -- than is population change.

A deductive analysis, based on a seven-fold classification of commercial functions for all 906 trade centers extant in 1941,

traced changes in trade centers for the period 1941-1961 according to general situations in size, distribution, and location. Three characteristics of the trade center system changed in the period: (1) the minimal centers, Hamlets, grew in number and proportion; (2) the intermediate level centers, Minimum and Full Convenience centers, declined sharply in number and proportion; and (3) the top four classes of centers increased greatly in number and proportion. These data indicate that small centers decline at a faster rate than large centers, with the important qualification that intermediate level centers decline even faster. Also evidenced, is a tendency toward a polarization of the trade center hierarchy into centers serving local, day-to-day needs and centers serving the specialty needs of large hinterlands. The precarious existence of small centers also appears in jeopardy if they are located within 10-15 miles of a large center or if they are located less than the mean distance from a similar class center.

An inductive analysis, to determine whether trade center decline is due to environmental characteristics employed a factor analysis of 35 variables for 473 incorporated trade centers to distinguish community differences and then a multiple regression model to investigate how these differences were related to trade center changes. Three factors -- Urban Size, Urban Density, and Farm Size -- emerge as the major dimensions on which trade center differences may be described. The Urban Density dimension exhibits the closest relationship to changes in the number of retail firms for 1941-1961. Centers with a low score on the dimension tend to have experienced a large decline in number of firms; those with a high score showed the opposite tendency. The Urban Density scale exhibits a high coincidence between its scale scores and the probabilities for growth and decline derived in the deductive analysis.

Constituting the Urban Density scale are variables that impinge on public policy areas: the scale is dominated by measures of compactness of population and of investment in physical facilities, both of which are of concern in community planning; presence of a high school and hospital are also important in trade center growth and this suggests the need for a location strategy regarding such facilities.

The space-economy of Saskatchewan is generally self-adjusting and this shapes the task of planning. Planning mostly will (1) assist in the smooth and orderly transition of the space-economy, including regulating the pace and incidence of change in the public sector; (2) assist in alleviating the social costs of transition; and (3) act as a monitor of key variables of change and evaluate this performance against agreed upon standards.

Thesis Supervisor: John R.P. Friedmann,
Associate Professor of Planning.

PREFACE

While designed primarily to further the maturity of one individual, a dissertation is never solely the work of its author. The debts I have in this regard are many and various and I wish now to express my appreciation to many people, who gave so generously of their support, knowledge, and time. The writer, of course, assumes complete responsibility for any errors of fact or evaluation.

This study could not have been initiated or come to fruition without the generous support of the Center for Community Studies at the University of Saskatchewan, where I was privileged to spend a year in residence, and, through them the support of the Central Mortgage and Housing Corporation in Ottawa. Prof. W.B. Baker, Director of the Center, gave encouragement from the beginning and provided an invigorating atmosphere in which to conduct the study. Contributing to that atmosphere were several stimulating people to whom I am particularly grateful for their critical observations: Drs. Harold Baker, Leo Kristjanson, James Munger, John Hawley, and Per Stensland. I am also indebted to William Hope and Andre Bouthilette for their assistance in preparing data and illustrations. In Saskatchewan I also received immeasurable help from Dr. Meyer Brownstone and S.J. Clasky of the provincial Department of Municipal Affairs and from E.W. Taylor of Dun and Bradstreet in obtaining data.

The application of factor analysis to the study proved to be a "baptism under fire" for the writer in the realms of multivariate analysis and use of the computer. Helping immensely through these stages were Dr. Peter Gould of Pennsylvania State University, Drs. Cecil Kaller, Duncan Blewett, and John Hamilton of the University of Saskatchewan, and Drs. Aaron Fleisher and James Beshers, and Alan Hershdorfer of the Massachusetts Institute of Technology.

My gratitude to the faculty of the Department of City and Regional Planning of M.I.T. is especially great for their nurturing of an appreciation of the spatial relationships in social and economic development which this study attempts further to illuminate. Prof. John T. Howard, Head of the department, gave invaluable counsel and Prof. Lloyd Rodwin proffered several helpful reviews on both substance and style. Lastly, though by no means last in importance, I wish to thank Prof. John R.P. Friedmann who supervised this dissertation. His keen insights, and enthusiasm, helped immeasurably in seeing the project through, and I shall always be grateful for his further opening up the vistas of regional planning for me.

Regrettably, so many people are deserving of my gratitude that naming them all is not feasible. To all of them -- in government, in universities, and private citizens -- I wish to extend my thanks for their cooperation. Among these others I must, however, acknowledge the many helpful suggestions of Dr. Ira M. Robinson and the work of Mrs. Donna Collins and Miss Irene Kenyon in typing the manuscript.

My final acknowledgement is reserved for my wife in profound appreciation of not only her editorial assistance but, above all, her patience, optimism, and encouragement in what must have seemed an endless task.

G.H. , Toronto, September, 1964.

BIOGRAPHICAL NOTE

JAMES FRANCIS GERALD HODGE was born in Vancouver, Canada, in 1931. He attended the University of British Columbia from 1952-1957, earning his B.A. in sociology and geography. He completed graduate training in city and regional planning at the University of California in Berkeley between 1957 and 1959 and received his Master of City Planning degree. His thesis was Trading Areas as a Basis for Regional Planning. From 1959 to 1961, he taught in the graduate program in community and regional planning of the University of British Columbia, and from 1961 to 1962 was on the faculty of the Department of City and Regional Planning of the Massachusetts Institute of Technology on a part-time basis. He is currently teaching in the Division of Town and Regional Planning of the University of Toronto.

His professional experience in the field of planning includes consultations to the Vancouver Metropolitan Joint Committee on future land use and population distribution resulting in a report Jobs, People and Transportation (with Ira M. Robinson), and to the City of Nanaimo on downtown parking problems. In 1962, he was Associate Planner to Adams, Howard and Greeley in the preparation of a regional model for programming industrial development in Puerto Rico under commission from the Puerto Rico Industrial Development Company. In 1963, he was a visiting scholar at the Center for Community Studies at the University of Saskatchewan, Canada. Among his publications is an article, "Use and Mis-use of Measurement Scales in City Planning," in the Journal of the American Institute of Planners (1963).

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In his classic study, The Great Plains, Walter Prescott Webb listed the main physiographic characteristics of the region:[1]

1) It exhibits a comparatively level surface of great extent;
2) It is a treeless land, and unforested land; and
3) It is a region where rainfall is insufficient for the ordinary intensive agriculture common to lands of a humid climate. The climate is sub-humid.

Had he extended his description to cover the patterns of agriculture and settlement that have evolved in the region, the following characteristics would have been added to the list:

4) It hosts a dry-land agriculture noted for its large farm units, its widespread mechanization, and its productivity of grains;
5) Its farming operations are mostly family enterprises;
6) It is sparsely, but widely, populated and most farm families live on their land holdings; and
7) Its nodes of commercial activity comprise a preponderance of small trade centers diffused very evenly throughout the region. There are no large metropolitan areas.

This, in broad strokes, is a picture of the region with which the present study is concerned (Figure 1).

But in this vast region, that extends from the Canadian Shield to the Gulf of Mexico in mid-North America, dramatic changes have occurred in the agriculture and rural life in the past two or three decades and no single picture of the region can capture the shape of these changes. They are probably most clearly

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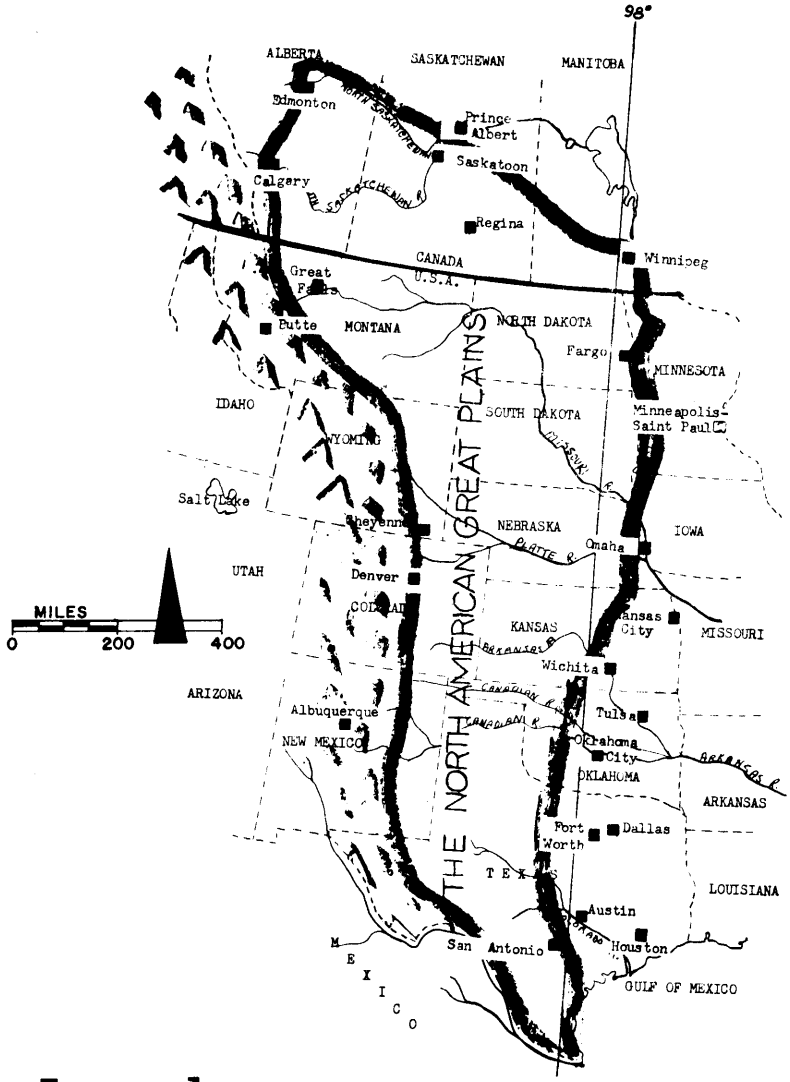

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MAJOR CITIES.....
ROCKY MOUNTAINS...
APPROX. EDGE OF GREAT PLAINS.....

THE NORTH AMERICAN GREAT PLAINS

manifest in the changing settlement pattern of the Great Plains, that is in the changing spatial distribution of social and economic activities and in the facilities that serve these activities. In all its dimensions the settlement pattern has become more distended: farms have grown much larger, farm residences are more widely separated, and trade centers are fewer and farther apart. These changes are of such importance that questions are being raised in both Canada and the United States about the ability to create and maintain a satisfactory living environment in the context of a so dispersed settlement pattern.[2/]

No one question about the future of agriculture and rural life in the Great Plains is more important than that concerning the future of the many small centers one finds so liberally distributed in the countryside. These farm trade centers are important focal points for social and economic activity in the region: besides being places of residence for many, they are places for marketing farm produce and from which farm supplies can be distributed, and they are also places for social interaction and cultural fulfillment for the people of both town and country. But unlike urban centers in our metropolitan complexes these trade centers cannot count on growing, indeed many face continuing decline in their population and in their ability to perform even their normal functions.

The problem of declining trade centers is an important issue for this region on both sides of the U.S.-Canada border and one that policy makers must confront. For this is a prosperous region

with an efficient and highly productive agriculture which plays a significant role in the national economy of each country. From almost all points of view continuing decline of trade centers and dispersion of the settlement pattern means higher costs for farm and small town residents just to maintain their present standard of living, which is, even now, inferior in most respects to their urban counterparts. Therefore, just as a case can be made for planning the space-economy of our burgeoning metropolitan areas so too there is a strong case to be made for planning in regard to the decline of trade centers in the space-economy of this vast non-metropolitan region.

The ultimate aim of this study is to help provide greater understanding of the changes in the trade center system of the Great Plains and, in addition, to provide a base of information and methodology that would be required in planning for the space-economy of the region. While acknowledging differences among the trade center systems in, for example, Missouri, Kansas, North Dakota, Saskatchewan, or Alberta, there is enough similarity to warrant limiting the investigation of trade center changes to one portion of the Great Plains. Thus, in this study, the focus is the Province of Saskatchewan in the northern Great Plains. Its problems of trade center change are typical of those affecting the states to the south and the provinces to the east and west. Observations of the modifications that have occurred in the pattern of trade centers in Saskatchewan in the past twenty years, 1941-1961, are central to this study. For this is the period that has seen agriculture of the Great Plains transformed almost completely

into large-scale, mechanized operations.

The present chapter will discuss, first, the general problem of trade center decline; then the socio-economic setting of this problem and the major forces leading to trade center changes will be described; and, lastly, the methods of analysis used in the study will be presented.

A. THE PROBLEM OF TRADE CENTER DECLINE

"The handwriting is on the wall for a good many of these (small) towns," a contemporary observer of the U.S. Great Plains has commented.[3/] These words are equally applicable to the Canadian portion of the Great Plains. In the last two decades, the total number of trade centers in Saskatchewan has dropped by 127, or 14 per cent; in addition, 237 centers declined in commercial status in the same period. Altogether, there was decline in 40 per cent of the trade centers that existed in Saskatchewan in 1941.

The measure of trade center decline used here, and throughout this study, is the downward shift in retail-service level of a center as defined by positions of centers on a seven-point scale distinguishing functional differences among centers (see Chapter 3). That is, it is a measure of the change in the quality which is basic to a trade center's existence — its ability to provide

retail and commercial services to a rural hinterland. But even if viewed in terms of population growth, as many studies do, the past twenty years have not been kind to Saskatchewan trade centers. Almost 20 per cent of the incorporated centers failed to gain any population in the period 1941-1961 and a further 20 per cent failed to gain sufficient numbers that would have been necessary to hold the equivalent of their natural increase. If data for unincorporated centers were available, these proportions undoubtedly would be much greater.

Such changes in the trade center system are to be expected in light of the now well-defined trends in expanding farm size and in the urbanization of rural life of Saskatchewan. Some centers became unnecessary in the pattern of agriculture and rural life that has been emerging since 1941, where rural population has fallen by one-third and where physical mobility literally has been doubled. Some centers were thus bound to disappear. It is important to note, however, that the tendencies and potential extent of trade center disappearance has only become apparent with the availability of recent (1961) census and other data.[4] But it is now clear that trade center decline is as much an historical fact in Saskatchewan as in the neighboring Plains states of the United States.

If, for the moment, we assume a continuation of the rate of disappearance among trade centers as has occurred in the past twenty years, at least 110 more trade centers face elimination as commercial centers in the next two decades in Saskatchewan. The importance of even such a crude prognosis (which it will be shown

later is probably too low) lies in the possible impact the demise of such a large number of centers could have on most social and economic activities in rural Saskatchewan. Some effects already being felt in Saskatchewan as a result of past changes include decreasing social unity in communities, diminishing strength and influence of the family, increasing difficulties in organizing effective local government, and increasing costs in time and money in obtaining minimum services in health and education.[5] In many small Saskatchewan communities facing a declining population in the countryside, another report notes, "are monuments to brave but unrealistic attempts to build and maintain such services as community halls, hospitals, and even private businesses."[6] Continued trade center decline will serve only to emphasize these difficulties for rural farm and small town people.

Trade center decline also affects many public programs that are applicable to all communities in the province, and it is this aspect of the effects of trade center changes with which this study is particularly concerned. The Government of Saskatchewan is the major contributor to the capital and maintenance costs of schools, hospitals, libraries and roads throughout the province; and it makes grants and/or guarantees loans for communities desiring to obtain sewer and water services. Trade center changes and rural depopulation cannot help but affect the allocation of such funds. Considerable school consolidation has already been prompted by rural depopulation: up to 1953, over 1300, or 31 per cent, of all rural schools had been closed.[7] These same

population trends are responsible for recommendations made recently to the provincial government for closing or curtailing hospital services in over one-third of the communities now with hospitals.[8] The effectiveness of local government has also come into question due to the trends in population and mobility in rural Saskatchewan. Proposals are now in the hands of the provincial government for a complete reorganization of rural local government including the dis-incorporation of villages.[9] Some have commented that the latter proposals for local government would cause many small centers to "dry up" since they would lose one of their most important activities, the rural municipal office.[10] In this last instance, as in many other public decisions provoked by a recognition of rural depopulation, are the seeds of further decline in rural trade centers.

Though there has been considerable adjustment in various public programs and in many communities in response to the stress of rural depopulation, the approach thus far has been a piecemeal one. Public programs have been adapted to the urgency of the situation as perceived by individual government departments. Trade centers have often tried to solve what they considered to be local problems when in fact the forces for change were largely beyond their control. Two recent proposals have, however, brought the issue of trade center decline into sharper focus. Grain elevator companies have urged the consolidation of elevator facilities for the sake of economy in storage and efficiency in allocating box cars. Railway companies, quite independently, have urged the abandonment of uneconomical (to them) branch rail lines amounting

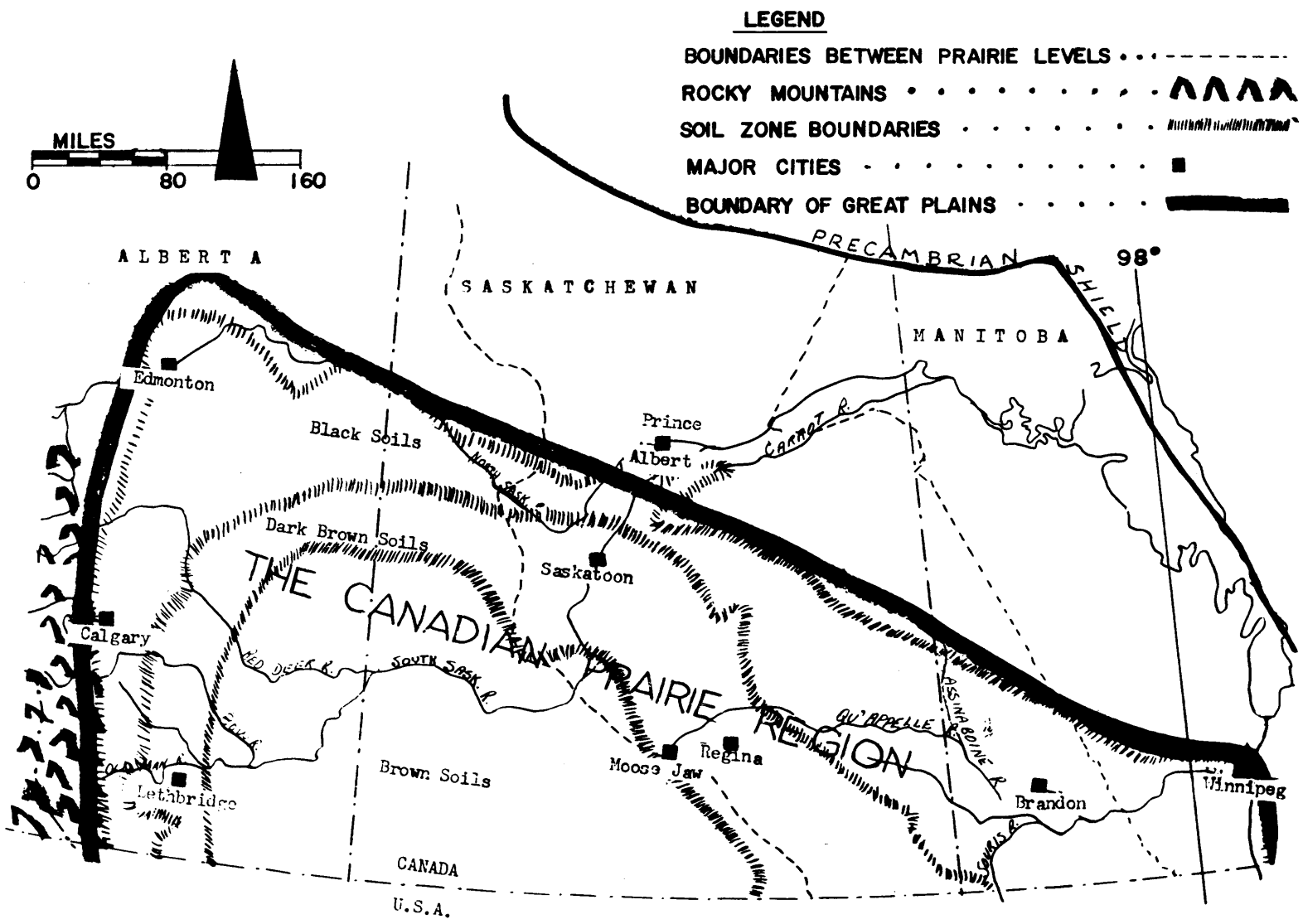
to about one-third of the province's rail mileage. Since virtually all Saskatchewan trade centers are on rail lines, this proposal could affect one-third of all centers in their role as a place for marketing grain and animals, a major raison d'etre for their establishment in the first place. Whether it would be true that the abandonment plan would turn "hundreds of now prosperous towns and villages into ghost communities," as one official has ventured to say, is open to question.[11] But it can be presumed that such action would add doubt to the present precarious existence of many Saskatchewan trade centers.

In summary, it can be seen that the problem of trade center decline has several aspects in substance and time. It can be viewed as a problem affecting individual communities: trade center decline brings a drop in commercial activity and in the employment such activity provides; it will bring the outright closure of some or all of the business establishments with the consequent loss in private investment and local tax revenue. The decline or disappearance of a trade center for commercial purposes often presages its diminution as a location for public facilities such as schools and hospitals. And it certainly affects the population holding power of a trade center with the consequent loss in housing investment. Within the individual community, trade center decline may be viewed in terms of both actual and imminent problems. A declining center will have to adjust, for example, to a decreasing commercial and residential tax base as businesses close or population leaves. It must also face the prospect of demands for further improvement of community

facilities and services.

Trade center decline can also be viewed as a problem affecting the entire province, and in particular the public policies and programs that are applicable at the community level. Trade center decline poses the possibility of public facilities at some locations having to close, as with schools and hospitals. It can also mean changes in travel patterns and thus affect highway needs. The provincial government has the final responsibility for the conduct of educational and health services and for the construction of schools and hospitals; a majority of the provincial budget annually is allocated to these ends. The provincial government's program of aid to municipalities for obtaining water and sewer services, is predicated on the continued survival of the communities to which it gives aid. There are all manner of programs by the provincial government where the concern is with choosing appropriate locations for building public facilities that are affected by decline among trade centers. On the one hand, there will have to be adjustments in facilities and services in centers that are declining. And, on the other hand, programs for new facilities or consolidation of old ones must face the prospect of unintentionally causing some centers to decline.

If there is to be an adequate response to the problems of trade center decline by public authorities at both the provincial and local levels, there must be some way of distinguishing the prospects for growth or decline -- <u>the viability</u> -- of trade centers. No such prognostication has been made. The present


LEGEND
BOUNDARIES BETWEEN PRAIRIE LEVELS
ROCKY MOUNTAINS
SOIL ZONE BOUNDARIES
MAJOR CITIES
BOUNDARY OF GREAT PLAINS
MILES
0
80
160
ALBERTA
SASKATCHEWAN
MANITOBA
PRECAMBRIAN SHIELD
98°
Edmonton
Black Soils
Prince Albert
CARROT R.
Dark Brown Soils
Saskatoon
THE CANADIAN PRAIRIE REGION
Calgary
RED DEER R.
SOUTH SASK. R.
QU'APPELLE R.
ASSINIBOINE R.
Regina
Moose Jaw
Brown Soils
Lethbridge
Brandon
Winnipeg
CANADA
U.S.A.

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study addresses itself to the task of providing an assessment of past changes in Saskatchewan trade centers (from 1941 to 1961) and a forecast of trade center changes over the next two decades. The forecast aimed at here will attempt to make an estimate of the amount of trade center decline that can be expected as well to provide some substance to the prediction in terms of the kinds and location of trade centers most vulnerable to decline. It is hoped that foreknowledge of trade center viability can be useful in designing public programs to alleviate the costs associated with the sparse settlement pattern and be helpful in formulating programs that may, without design, lead to further trade center decline.

B. THE CHANGING PATTERN OF SETTLEMENT

Saskatchewan is the middle one of three Canadian Provinces that constitute the Prairie Region and which, in turn, forms the northern portion of the North American Great Plains (Figure 2). Like its neighboring provinces and states, Saskatchewan's economy is dominated by agriculture with wheat, other food and feed grains, and cattle as the main bases. The farming area of the province totals approximately 120,000 square miles. It is this portion of the province, roughly south of the 54th parallel to the United States border, to which observations of this study are limited.[12/]

On the average, each square mile of farm land in Saskatchewan

has less than one farm. Saskatchewan's 94,000 farms in 1961 occupied an average of 687 acres each. There are variations in average farm size across the province, but farms are still large throughout: in the north and northeast, the farms average 25-30 per cent below the average, and in the west and southwest they average 25-50 per cent above the average. Production on these extensive farms is accomplished through a high degree of mechanization. In increasing amounts over the years since settlement began, capital, particularly in the form of farm machinery, has been substituted for labor in the organization of the farm production process. Saskatchewan farmers today have almost $3 billion invested in farm capital, or just over $30,000 per farm.[13/]

A prodigious output has been achieved by the farmers of the province who, by and large, still operate independent family enterprises. The productivity of Saskatchewan agriculture per unit of labor has increased seven times over its 1941 level, and this is a rate four times faster than the province's manufacturing experienced in the same period. Farm incomes have also shown a steady improvement, but are still subject to considerable instability due to variable prices for farm products, relatively inflexible farm costs, and variable yields.

Saskatchewan's Costly Settlement Pattern

The present high level of agricultural development in Saskatchewan has been achieved within a pattern of settlement

moulded around the isolated farmstead. On-the-land residence of Saskatchewan farmers was fostered by the early Homestead Acts which were similar to those enacted in the U.S. Large farms were encouraged by this legislation and settlers were required to establish and maintain residence on the land in order to secure title to the farm. The square section of land survey employed in the region made impossible the grouping of farmsteads such as in the village form of agricultural settlement found in Europe (Figure 3). The large farms (285 acres on the average as early as 1901) combined with the motive power of the early settlers, horses and oxen, also made it difficult to live far from the land being tilled.

T. Lynn Smith, the rural sociologist, commented twenty-five years ago that probably no more costly a pattern of settlement could be devised than that used in Saskatchewan and throughout the Great Plains:[14/]

> Suppose one were assigned the distasteful task of designing a system of land sub-division that would contribute to the social and physical isolation of the farm population. The system aimed at would disperse agricultural families as widely as possible; make neighboring cooperation and mutual aid possible only with the utmost difficulty; make securing roads, telephone lines, electric power and lights, etc., the most expensive; make participation in the activities of schools, churches, etc., the most difficult; make the marketing of produce and the purchase of supplies the most burdensome; even make the hinderances to the innocent association of children as great as possible....He should then be graded 100 per cent or A-plus when he had developed the familiar checkerboard pattern and placed the dwelling of each farm family at the middle of his holding.

The Saskatchewan settlement pattern does not fit the extreme described by Smith, but it approaches it closely. One study has shown that the average distance between occupied farm dwellings in

Saskatchewan, in 1953, was just over one mile and that almost 25 per cent of the farm dwellings were one-quarter mile or more from the nearest road.15/

The railroad system that was built to carry the province's staple crop to world markets further reinforced the dispersed settlement pattern by providing lines within ten miles of virtually every farm. Farmers could dispose of their grain or other produce at stops which averaged eight or ten miles apart along these lines. Other kinds of businesses to serve the farm trade were encouraged by the railways to locate at the grain stops, thus spawning the present extensive system of agricultural trade centers. There are over 770 such centers today in Saskatchewan, or just over six in every one thousand square miles.16/ The majority of these trade centers (60%) is very small, with less than 200 residents and only six to eight business firms. In the typical small center rural families have access to the following services: groceries or general merchandising, automobile servicing, farm implements supply, fuel supplies, and minor farm machinery repairs. There may also be a church and elementary school, but only infrequently will there be a hardware store or hotel (tavern) and almost certainly no bank, drug store, clothing store, theatre, high school or library. For the latter services, rural farm and small town people must travel to a larger center.

The residents of rural Saskatchewan must meet the costs of great distances to travel for services and endure the inconveniences of small towns in their efforts to obtain a standard of living at a "parity" with other sections of Canadian society.

Furthermore, the innovative spirit that motivates Saskatchewan farmers continually to apply new practices and technologies to improve their output and productivity militates against farm people achieving this "parity." For the prevailing mode of adapting farm operations to changing conditions of markets and inputs involves enlarging the farm unit and thereby making the settlement pattern even sparser. The extraordinary spatial dimensions of these communities in the prairies, engendered by continuing dispersion, has led Professor A.H. Anderson to suggest that the entire Great Plains Region is subject to widespread "social costs" in order to support the settlement pattern.[17] The sparse population distribution proves impracticable for adequate group organization in solving many mutual problems and for providing public services at reasonable costs.

It is almost axiomatic, as Anderson goes on to point out, that "the farther people live from the city, the costlier and less available modern services are likely to be." In the provision of roads, sewerage, electric power, telephone service, etc., extra distances mean additional costs, both at the time of installation and for maintenance.[18] In comparison to normal urban densities of 1,200 or more families per square mile the density of one family per square mile in rural Saskatchewan inevitably leads to much higher shared costs if the same level of services is sought. Furthermore, even the residents of typical small trade centers pay more for the installation of water mains and sewerage than do the residents of larger centers in Saskatchewan.[19]

Two final examples of the difficulties encountered in providing public services in this region are those associated with providing schools and hospitals. In fact, the most sustained public response to the problems caused by the sparse settlement pattern has been the demand for improvements in rural education facilities and services. The pioneer system, exemplified by the one-room, open-country school, has been under revision almost since the beginning of settlement in the province, over sixty years ago. The only solution that has received much acceptance, however, is the consolidation of schools. This means combining school districts, closing small schools, and concentrating facilities usually in a large center which may be remote from farm and small town people. While higher educational standards tend to result from such consolidations, higher costs are usually incurred for conveying children to school.[20] In addition there are costs falling on the shoulders of municipal governments for maintaining the road network for school buses.[21] The degree of consolidation is limited, too, by the constraints of time and distance when transporting young children to school. Thirty miles is generally considered the maximum distance, or an equivalent to 45-50 minutes. Many communities continue to struggle to keep their local school operating at such a marginal level that the migration of one family may result in its closing.

The prospects for many small country hospitals are no more encouraging. They are caught in a squeeze of trying to provide health services locally without having sufficient population in the proximity to cover the costs of modern, specialized medicine.

Hospital consolidation has already occurred and more is imminent, as has already been noted. And as hospitals and schools increasingly are located in larger centers away from much of the farm and small town population, there arises the issue of the disappearance of small towns that depended upon the holding power of such facilities.

These "costs of space" or, more rightly, of too much space occur in at least three forms, according to Kraenzel:[22] (1) Higher capital outlay and operating expenses per capita for such as roads and utilities; (2) Duplication of facilities, as in the retention of local schools that are inadequate or when farm families maintain two dwellings — one on the farm and one in town where the children attend school; and (3) Lower quality service, often necessitating greater costs later, as in the usually meager institutional facilities for hospital care, aid to the aged, and mental illness. Each of these dimensions can be used to describe the trade centers of Saskatchewan as well as other attributes of the settlement pattern already mentioned. The typically small trade centers do suffer greater capital outlays per capita for some services; the great proliferation of trade centers in an age when mobility is so high inevitably means considerable duplication of trade center services; and the small average size of centers generally precludes high quality services in most.

The Effects of Depopulation on the Trade Center Pattern

Saskatchewan's already sparse settlement is undergoing depopulation, the type of change that portends still greater "costs of space" in the future. Depopulation in an agricultural region usually favors an improvement in the economic relationships of the farm operation by distributing the profits less widely and allowing more efficient use of the factors of production. It just as surely works to the disadvantage of the rural community: town businesses lose their customers, farm families remaining on the farm face greater isolation, local institutions are disrupted for want of members, and so on. General depopulation has been occurring in Saskatchewan's rural areas since about 1941. Under the impetus of a greatly improved technology and changing cost-revenue relationships, farming in the region has been transformed and along with it the settlement pattern and the trade center system which is basic to it.

The number of farms has declined by one-third, and the remaining farms have absorbed this land and grown in size by nearly 60 per cent since 1941. Rural population declined by one-third in the same period and its density stood at less than one family per square mile in 1961.[23] This population loss is not restricted to marginal farming areas, but has occurred generally across the province. For example, between 1951 and 1961, 95 per cent of all rural municipalities in Saskatchewan lost population. Even the few that registered gains did not experience an expansion of population equivalent to their natural increase. Table 1 sums up a number of these trends.

TABLE 1. A Summary of Changes in Population, Rural Population Density, Number of Farms, and Number of Trade Centers in Saskatchewan, 1941-1961

	Total Pop. (000's)	Rural Pop[1] (000's)	%	Rural Pop. Density[2] (per sq.mi.)	Number of Farms (000's)	Average Farm Size (acres)	Number Trade Centers
1941	896.0	600.8	67	6.43	138.7	432	906
1951	831.7	461.0	55	4.78	112.0	551	892
1961	925.2	397.7	43	3.95	93.9	687	779
Per Cent Change 1941-61	+3.2	-33.3	--	-39.6	-32.3	+58.9	-13.7

Source: Census of Canada.

Notes: 1. 1941 definition of "rural population," includes all persons not residing within an incorporated city, town, or village.

2. Based on "Occupied Farm Acreage."

Depopulation of open-country residents has been paralleled by a limited amount of agglomeration of people from farms in nearby urban centers. Saskatchewan's urban population, including its large cities, has risen to account for almost 60 per cent of the total in contrast to only 33 per cent twenty years ago. Urban growth has been fastest in large centers but has not been confined to them. The aggregate population increase in incorporated towns and villages since 1941 has been 55 per cent. A majority of this growth is due to an increase in the proportion of farmers residing away from their farmsteads. The so-called "sidewalk farmer" accounts for over 20 per cent of all farmers in the province now and as much

as 30 per cent in some areas. Town farmers are, generally, local farmers, the Royal Commission found in 1953. Over 95 per cent live within fifteen miles of where they farm.[24] The town has also been the destination of those farm residents seeking alternative employment opportunities, especially young adults whose labor is no longer needed on the mechanized farm. It is also a place of retirement for many farmers. However, the growth of population in towns and villages has been sufficient to absorb only one-third of the farm population loss of the past two decades. The small amount of population growth in the province has occurred because of the expansion of the large cities.

The depopulation of the past twenty years has been accompanied by major changes in the pattern and hierarchy of trade centers in Saskatchewan. In 1941, there were 906 trade centers in the province; by 1961, this total had dropped to 779, or a net loss of 127. Almost twice as many more declined in commercial status. These changes have meant not only the loss of over 1000 commercial establishments, but have also meant a loss of one in seven in the alternative locations for rural people to obtain goods and services. In terms of the centers that have survived there has been a shift in their functional distribution: today there are many more centers offering only necessities and more offering specialized goods and services than there were in 1941. However, there are fewer centers offering an intermediate level of services between these extremes.

The convenience goods and services that are the basis of

economic activity for most Saskatchewan trade centers are sustained by a certain volume of customers who spend relatively unchanging amounts for them (i.e., groceries, gas, fuel oil, etc.) even though their incomes change. Crude estimates using the change in population and the change in the number of business establishments (not including the large cities) indicate that it takes fifteen farm families to support one business establishment on "Railway Avenue" in a Saskatchewan trade center.[25] Hence, with the trends to larger farms continuing into the future, depopulation will continue and more trade centers face disappearance or decline. Of those that survive, moreover, the small centers will not likely be able to improve the quality of their services in the face of declining patronage. The benefits of increased consumer spending due to increased farm incomes will tend to accrue to the establishments in larger centers.

The Basis of Depopulation and Trade Center Change

There are two broad pressures for change in rural Saskatchewan.[25] One has to do with the desire for better income levels in agriculture which has resulted in larger farms. The other has to do with the desire for a more "urban" way of life among rural people which has resulted in greater spatial mobility and demands for a higher level of public and private goods and services.

The Expansion of Farm Size. The agriculture of the Great Plains has had to adapt its operations to the region's sub-humid

climate and the farmers responded by developing dry-land farming techniques. These techniques, in turn, require large acreages to produce a satisfactory return in income. Assuming average conditions of soil type and farm management, the size of farm unit in Saskatchewan has come to be the main determinant of farm income. Saskatchewan farmers have expanded their land units from an average of 285 acres at the turn of this century to 687 acres today.

Larger acreages were needed to improve the ratio of economic outputs to inputs, and the new machines that have become available have made it possible to handle larger acreages. The improved input-output ratio has been achieved largely through the substitution of capital for labor. Heavy capital investment in farm machinery and the economies of scale possible in its full utilization have, subsequently, led to further pressures to increase farm size. Farm machinery in the form of trucks, tractors, self-propelled combines, etc., accounts for more than one-quarter of all farm capital investment in Saskatchewan, or about $7,400 for the average farm in 1961.

By choosing to employ ever more sophisticated farming techniques, in the use of machinery and in the use of new seeds, methods of pest and weed control, and new cropping methods, the Saskatchewan farmer has become involved in a "cost-price squeeze" which encourages further enlargement of farms. Higher fixed costs in the form of depreciation on machinery, taxes and rent on land holdings, interest on mortgages and other loans all make for an

inflexible cost structure in farming. Even current operating costs tend to be fixed: the cost of fuel, oil, and maintenance on machinery does not vary much from year to year. On the whole, the prices of inputs for farming have grown faster and farther than the prices obtained for farm products. Thus, the margin of return to a farmer's land and capital resources has narrowed and created pressure for larger farms in order to spread the fixed investments in specialized equipment over as many acres as possible.

Two alternative possibilities, the greater use of irrigation and the greater intensification of operations, could help check the trends to larger farm size, but it is unlikely that they will have much effect in Saskatchewan in the foreseeable future. Water is not plentiful, in any event, and even the huge project now underway on the South Saskatchewan River will make possible the irrigation of only 200,000 acres, or less than one per cent of the province's farming area.[27] Only a few small areas can hope for any levelling off in the trend to larger farms through irrigation. A more promising possibility, at least for the northern half of the Saskatchewan region, is the encouragement that is being given farmers to expand beef cattle production in feeder lot types of operations. Adequate farm incomes could be obtained from much smaller farms if beef were "grown" in place of wheat. However, the present tendency is for farmers to use cattle to supplement and stabilize farm income that continues to rely heavily on wheat and other food grains. The impact on farm size of farmers

turning to beef production will apparently take some years to manifest itself, if it ever does. And in most southerly areas of the province, the variability in fodder production makes it unlikely to have any effect. In short there is little reason to believe that farms will grow smaller, or at best not grow larger, in Saskatchewan in the near future.

The Increasing Urbanization of Rural Life. The dramatic changes in agricultural methods in Saskatchewan are matched by equally dramatic changes in the rural community. The early waves of settlers established relatively self-contained rural communities with country schools and churches, and small commercial centers having a few necessary conveniences. The latter centers, almost always located on a railway line, became the focus of social neighborhoods as the land was occupied more fully, much in the fashion of Galpin's famous study community in Wisconsin of the same period.[28] The extent of local consumer buying (or bartering) defined their boundaries, and the area encompassed had a radius of four to six miles — equivalent to the so-called "team-haul" community of early rural sociology literature.

With the widespread application of mechanical and scientific techniques to farming in the nineteen-twenties, a subtle transformation was begun in the pioneer community. It has gathered momentum in recent years as the technological trends have quickened. Today, group and institutional requirements of rural people are met in several interrelated centers at the same time.[29] The relatively independent service center of the past has become

involved in a territorial division of labor so that rural people now participate in several levels of "community." The new rural community has affected the life of Saskatchewan's rural people in two general ways: First, through the opportunity to enlarge his income and his output by farming larger acreages, the farmer has been bound closer to a complex economy. Markets are now world-wide in extent and the needs of his sophisticated farming operation make him more dependent on more people in his local area and beyond — for implement parts, repairs, fuel, and even for food. Second, through the automobile in particular, the farm family has acquired greater personal mobility, enabling it to "expand" its community by as much as five times. Physical isolation no longer presents the obstacle of earlier times, even though farm families are more widely dispersed.

The new time-distance context has enlarged the world of interaction for farm people. For example, in the team-haul community of 1920, one-half hour's travel would have covered only about three miles, representing an area of 28 square miles in which resided fewer than 250 persons. In 1963, the same travel time would cover, conservatively, 20 miles, representing an area of 1200 square miles in which reside a little more than 5,000 persons. Putting it another way: in 1920, a farmer might travel as much as an hour to reach his local trade center; today, that same travel time allows the farmer to have access to an area in which there are at least 35 different trade centers. To this increased spatial mobility must be added the new horizons provided for farm families by mass communications. The radio,

newspapers, magazines, telephones, and television have contributed to a more critical and selective clientele amongst Saskatchewan's rural people.

Commercial farming and modern technology have permitted new standards of farm life that now manifest themselves in demands for facilities and services of a higher and more urban level in rural centers. The modern supermarket is an excellent example of the direction such demands are taking. Farm people have come to depend more upon community services and commercial outlets, thus making cities, towns, and villages increasingly important in the pattern of social and economic activities of the rural population. Anderson sums up the situation in the following way when referring to similar changes in Nebraska's rural life.[30]

> . . . Modern transportation, and economies of scale, imply centralization of processing, distribution, and supply; with the geographical expansion of the supporting community, overhead costs may be excessive in a small operation. Services which do not represent a physical product increasingly originate in, or are channelled through, the more urban center to town and country residents. Thus "urbanism" is a basic pattern of modern rural culture and it will presumably increase with rising standards of living in rural areas.

The increased urbanization of rural life in Saskatchewan is reflected not only in the changing attitudes of rural people, but also in the continuing differentiation of functions among trade centers. Many of the modern services needed by the rural community can only be supported by larger populations. The ability to take advantage of these patronage shifts devolves usually upon a small number of large and more favorably situated trade centers. The hierarchy of trade centers in Saskatchewan in apparent response to these trends has shown a dramatic increase in the number and

proportion of places in its top four classes since 1941. There were only 90 such centers twenty years ago and they accounted for 10 per cent of the total; by 1961, their number had grown to 125, or 16 per cent of the total. Meanwhile, the total number of trade centers in the province dropped as many small hamlets disappeared and convenience centers declined to a hamlet level. Besides the large growth in the number and proportion of larger, more specialized centers, the trade center system saw the number and proportion of centers of an intermediate type drop sharply. The latter centers seemingly are being by-passed by farm families who, having satisfied their demands for daily necessities locally, seek centers having a very wide range of goods and services.

The growing urbanization of rural life has put many Saskatchewan trade centers under stress that could be important for their continued existence. Traditional trade areas have changed as rural residents are more and more able, and inclined, to travel greater distances to satisfy their wants. Merchants in many small centers have attempted to compete with larger centers either by emulating the highly specialized operations or by extreme competition in prices and ranges of items. In neither attempt have small town merchants met with much success. Competition has also risen among smaller trade centers for a bigger share of the declining supply of farm customers. The vacant store buildings in most small trade centers are mute evidence of the apparent fruitlessness of such efforts.

C. ANALYZING TRADE CENTER VIABILITY

In setting out to distinguish the prospects for growth or decline — the viability — of Saskatchewan trade centers, the following premise has been made: a viable trade center is one that can sustain, or even enhance, its position as a commercial center in the context of normal social and economic change.[31] At any one time, a trade center's array of commercial establishments represents a balance of supply against the demands of consumers and producers in its particular hinterland. At any later point in time, say due to rural depopulation, a decline in the volume of patrons may call for an adjustment in the balance. Some establishments may be forced out of operation, and in a small trade center the change may be sufficient to cause its demise as a commercial center. Increasing farm income may stimulate the appearance of new firms in a trade center; while increased mobility of patrons may disadvantage firms in small centers in favor of centers already possessing a wide array of different establishments. Since trade centers function chiefly to serve their surrounding hinterland, they will be responsive to long-term changes affecting that hinterland.

In Saskatchewan, with the general homogeneity of agricultural activity that exists across the province, all trade centers will tend to be affected in a similar way by such changes as depopulation, increased mobility, and expanding incomes. This assumption guided the choice of analytic method for this study. The specific task, as stated earlier, was to develop a means by which the

amount of trade center decline could be predicted over the next two decades. In addition, it was to provide an indication of the kinds and location of trade centers likely to decline. A statistical and graphical analysis was carried out for all 906 trade centers that existed in Saskatchewan in 1941 in order to determine if trends in trade center decline could be deduced. To supplement this approach, an inductive analysis was also used, employing factor analysis, to determine whether growth or decline among trade centers was dependent upon environmental characteristics possessed to one degree or another by all communities. The factor analysis dealt only with the legally incorporated cities, towns, and villages, or a total of 473 trade centers. Each approach is discussed briefly below.

The deductive analysis of all trade centers extant in 1941 began with the development of a seven-fold classification of different levels of trade center retail and service functions. Trade center classes were derived from observations of Saskatchewan centers as of 1941, 1951, and 1961. Although developed independently, the classification system used here closely parallels a similar scheme used in the analysis of trade centers in four states of the U.S. Great Plains lying immediately south of Saskatchewan.[32] In this way an ordinal scale was provided on which trade centers could be ordered and their performance over the twenty-year period charted. (Details of the construction of this scale are given in Appendix A.)

Based on this scheme a trade center "declines" if it shifts downward one or more functional classes. A trade center may experience "demise" or "disappearance" if it shifts below the threshold of the lowest functional class. A trade center "grows" if it shifts upward one or more classes on the scale. These are measures of changes in the level of goods and services offered by trade centers. They may only coincidentally measure changes in population numbers or population characteristics that might also affect trade center viability.

The deductive analysis consisted of viewing changes in retail service level of trade centers in terms of several hypotheses regarding anticipated changes in the functional distribution and in the location and spacing of trade centers. It was thus possible to determine the aggregate picture of trade center change for all classes and for each class, for the period 1941-61. Through the use of maps of trade center changes, the hypotheses regarding location and spacing and trade center decline were tested. The deductive analysis had to be limited to retail service changes of centers in relation to their functional distribution and location because of the lack of demographic data, including that of population, for all but legally incorporated places. Nevertheless, it provides an illumination of key trends regarding the amount, kind, and location of trade center decline from 1941-1961 from which extrapolations can be made for the period of the next twenty years.

An inductive analysis was undertaken in an attempt to explore the possibility that the decline of specified trade centers could be predicted more precisely rather than just decline by class or general location of centers. For this analysis, only the incorporated trade centers were included, 473 in all. Thirty-five variables for each of these centers were subjected to a "principal axis" type of factor analysis. Factor analysis was chosen because it was possible to analyze systematically the relationships among a large number of variables and thereby determine significant differences between centers. The use of a large number of variables also made it possible to pursue the hypothesis that there are strong and explicable associations between the environment of trade centers and their ability to survive. The thirty-five variables were condensed mathematically to three dimensions (clusters of variables) that were statistically independent of one another and along which each trade center in the sample could be arrayed and compared with other centers.

In order to determine to what extent, if any, these community differences were related to trade center decline, the inductive analysis was further extended to include a regression model. The position of a trade center on each of the three dimensions obtained from the factor analysis was treated as an independent variable in the question of trade center decline. The dependent variable of trade center decline was the measure of change in retail-service level. An additional regression analysis was carried out using population change as the dependent

variable; in both regressions, trade center changes were computed over the period 1941-1961. The usefulness of the inductive analysis lies in the potential it gives for predicting future trade center performance of any designated center for which a factor score is obtained. For the factor analysis provides what are essentially ordinal scales along which all centers can be arrayed. Further substance can be added to the prediction by taking into account the variables that dominate the factor analysis scales considered to be relevant.

The main value of the overall analytical approach used here is, first, it can provide a sense of scale to the question of trade center decline and, second it can provide a sense of content about the constraints on a trade center's growth. By being able to predict the likely extent of trade center decline policies can be planned so as to minimize the ill-effects on local government, on housing, and on business investment, for example, in communities thus affected. And new policies that might call for expansion of public services throughout the province can be planned with the extent of future trade center changes in mind. Probably most important, the results of this analysis should help clarify the potentialities for widespread trade center decline that has been a spectre in public circles in Saskatchewan for some time. The latter issue has not been openly acknowledged partly because of the lack of information about the subject and partly because of practical political reasons. Yet trade center decline is a

problem, the extent of which must be acknowledged, for such a large part of the task of maintaining an adequate standard of living in rural Saskatchewan demands maintenance of an adequate system of trade centers. The Saskatchewan government has already shown in many ways that it is concerned.[33/]

Finally, the analysis undertaken for this study is premissed on the need for planning of the changes in the space-economy of Great Plains' areas. Both the scope and pace of changes in the trade center systems, in particular, indicate that left to chance a less than satisfactory spatial distribution of activities may result. Farm families, in many areas, will be left with excessive distances to travel to schools, hospitals, stores, etc. and many businesses face a dwindling of their customers under current trends of change. So that no area of the province is unduly disadvantaged in maintaining its present level and complement of services, and so that new services may also be provided to all areas in an equitable manner, a comprehensive approach to planning all aspects of the space-economy is advocated. In this sense, the present analysis is explicitly directed at solving a planning problem; its methodology aims not only at deriving an understanding of the basic characteristics of changes in trade center systems but also aims at deriving analytical results which planners in this situation may find immediately useful.

D. ORGANIZATION OF THE STUDY

Having delimited the problem, and described the problem setting and the manner of analysis in this first chapter, the remainder of the study is organized as follows: Chapter Two is designed to provide a critical review of the literature relevant to the question of trade center viability in general and for the Great Plains in particular. The adequacy of present theories for the problem at hand is evaluated and several working hypotheses are suggested. Chapter Three deals with the present system of trade centers in Saskatchewan in terms of both functional and spatial patterns of development. The results of testing the hypotheses presented in the second chapter for the period 1941-1961 are presented in Chapter Four. A prognosis of the trade center system over the next twenty years is also included. The study then explores the possibility that environmental differences among trade center communities affect trade center decline and reports the outcome of a factor analysis and regression analysis in Chapter Five. The complementary nature of the inductive and deductive analyses referred to earlier, is also examined in this chapter. Up to this point, the focus is mainly on the trade centers themselves; in the final chapter (Six), this emphasis shifts to a discussion of the need for planning of the space-economy of Saskatchewan and how the task of planning might be organized. The basic goals of the Saskatchewan space-economy are investigated and their implications for planning and the organization for planning are then discussed.

Several technical appendixes have been included which cover descriptions of the methodology employed in the separate analyses undertaken in this study.

CHAPTER TWO: PERSPECTIVES IN THE LITERATURE ON TRADE CENTER VIABILITY

The literature about trade center viability is not extensive, and what there is comes from a variety of fields that are generally tangential to the problem with which this study is concerned. Among the small amount of literature that is directed at the question of trade center growth and decline over the past half century there are a number of examples of writers providing insightful vistas on the problem which, curiously, have never been thoroughly explored. A striking example of this is a 1912 journal article:[1/]

> Some of us may be repelled at the thought that the village of our boyhood should ever, even in the remote future, be graced with cornfields in the streets and potato patches in the front yards. But whether we like it or not, this process is actually going on. ...the present development in village (de)population seems likely to be more sharply defined a generation or two hence than now.

From such as this striking prophesy of a syndrome of trade center decline that has been remarkably fulfilled a "generation or two" later and from other sources can be constructed a number of relevant perspectives to help in diagnosing trade center viability.

There are three groups of writings that are worthwhile consulting on the question of trade center viability. One is the

considerable amount of work done, mostly by rural sociologists, on analyzing trends in trade center population. In some cases this research was combined with studies of changes in trade center functions. A second group of relevant writings are those concerned with central place theory which provides us with descriptive models of trade center systems. A third group is of more recent origin (within the past 15 years) and is oriented largely to the problems accompanying changes in agriculture and rural life in the Great Plains. In all this literature only a few studies deal more or less directly with the particular problem of trade center viability. There is also little comparative literature for other countries or regions, and Canadian literature is especially meagre.

The available literature is useful for the insights it provides and the many tentative hypotheses that are suggested. The present chapter deals with each of the three groups of writings referred to above. Three of the most relevant hypotheses that emerge directly from the writings have been selected and made operational. The shortcomings of the literature in considering the spatial aspects of trade center change have prompted two additional hypotheses and these are also included in a list of working hypotheses that serve as a guide to the analysis in succeeding chapters.

Do Villages Grow? — A Perspective From Rural Sociological Literature

The first major study of the effects of changes in western North American agriculture on the pattern of towns and villages was carried out by Hoagland in 1912 (12)*. He studied population trends in rural centers for the period 1890-1910 and found considerable evidence of decline. He attributed this to increasing farm size, improved roads and means of transportation, and the desire of rural residents for more specialized goods and services. "The farmer is divorcing himself from dependence on the village," Hoagland claimed. He also found a high degree of correlation between villages with growing populations and the number of rural mail delivery routes emanating from the village. He used rural mail delivery, which was only newly established then, as an indicator of the impact of improved transportation on the pattern of trade centers. He concluded that the number of hamlets and villages in any area was a function of the means of transportation and communication at their time of origin and that as the means improved the number of villages and hamlets could be expected to decline.

For whatever reason, Hoagland's prognosis is not disputed, and in fact only barely mentioned, in subsequent literature; however, the work of J.M. Gillette, a decade later, came in for

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*Numbers in parentheses refer to references listed at the end of this chapter.

considerable attention(8). Gillette had data from the 1920 U.S. Census to back up his claim that "the smaller the place, the greater is the liability of loss of population." A number of studies were initiated as a result of the possibility that trade center decline was general. Those by Kolb in Wisconsin (16), Hoffer in Michigan (13), and Sanderson in New York (20) all found that changes were occurring in the trade center pattern. They observed that trade centers were evolving more specialized roles on the basis of the services they could best provide. The country hamlet did not appear to be dying out so much as accommodating itself to the particular role of supplying day-to-day needs. These studies found small trade centers declining while large ones were growing, both in their population and complement of services. Sanderson saw the decline of small centers as being hastened if they were located near large urban centers.

Several other studies done in the U.S. Great Plains and in Saskatchewan did not wholly confirm the findings from the studies made for states to the east of them. Indeed, Zimmerman (26) indicated for Minnesota trade centers over the period 1905-1929 that there was no "substantial correlation" between the growth of large centers and the disappearance (in commercial functions) of small centers. Small centers in the proximity to larger centers did not decline any more than small centers located elsewhere. There was also no significant change in the proportion of trade centers of all sizes, and almost as many centers appeared as disappeared in that same period. In a study of Saskatchewan's trade center system covering 1910-1930, Whetten (24) also found

a lack of a "close geographical relationship between disappearing trade centers and large towns." The Saskatchewan trade center system of 1930 had already been well defined in 1910 by the vast network of rail lines and subsequent changes were "filling in the crevices." Whetten found, too, that disappearing trade centers were randomly located and, at the same time, found little evidence of any uniform distance relationships among classes of trade centers as Kolb had suggested. The work of Landis in South Dakota (17) and Lively in Minnesota (18) provided similar information.

In 1936, sociologists were still not agreed whether trade centers were declining. Brunner asked "do villages grow?" and from his own work and that of others he felt justified in claiming yes, even if it was only "slow growth or relative stability."[2/] A precise answer wasn't possible on either side of this question for two reasons that apparently were not recognized at this time. First, the Great Plains settlement pattern of 1930 that was being studied had just recently been realized: occupation of available land was just being completed, foreign immigration had just ceased, the effect of the gasoline motor for power in farm machinery was only just being felt, personal mobility of farm families was still not extensive. Hence, it is not unreasonable that the relative growth of larger centers and the increasing specialization of functions among all trade centers were seen mainly as refinements on an already defined system of centers. Second, the onset of the Great Depression changed the course of settlement for a decade. There was a

return to the land and rural numbers and densities grew until at least the mid-nineteen thirties when drought again forced people off the land. In Saskatchewan the average size of farm actually decreased between 1931 and 1936 even as the number of farms was growing. Thus, if there was a tendency for small trade centers to decline before 1930, it was somewhat counteracted in the ensuing decade by the many new customers that moved into the trade areas of these centers.

The effect of the Depression on trade center economic stability was examined by Lowry Nelson in 1941 (19). He found that size of commercial activity of a center was a major factor in the economic stability of Minnesota places. Centers offering a wide range of goods and services fared better than those offering only convenience goods. He found that the farther away a small trade center was from a much larger one, the more likely the smaller center would grow. Brunner concluded from 1940 U.S. Census data (6) that "there may have emerged or be emerging in the U.S. two distinct types of service centers for the rural population," large centers serving the special needs of a large hinterland and small centers serving immediate needs of a local population. He averred, however, that the village was not disappearing.

A rigorous analysis of two facets of trade center growth and decline undertaken by Hassinger in 1956 (10) (11) served to clarify part of the picture of accumulated research findings of the past. Hassinger studied more than 300 trade centers in southern Minnesota in an attempt to explain how population change

in these centers was related to (a) their retail service level, and (b) their distance from larger centers. Using a seven-fold classification of retail services he found that 42% of the centers in the lowest two classes lost more than 5% population between 1940 and 1950; whereas in the next two classes only 16% lost population, and in the top three classes less than 6% lost population. Moreover, the middle two classes had a much larger proportion of centers that neither gained nor lost more than 5% population than did any higher or lower classes. Then he examined population change in relation to changes in retail service levels of these centers. He found that of those that retained their retail level from 1939-1950 about half gained more than 5% in population and about half lost population at the same rate. Among those centers that increased their retail level 69% gained population, and of those that declined in retail level only 33% gained population. He also found a distinct shift in the distribution of trade center classes such that there were more centers located in both top and bottom classes in 1950 than in 1939. He put this down to increased mobility and changed buying habits.

When Hassinger studied the distance relationships of population change he found that of the "smaller" centers (less than 2000 pop.) located within ten miles of a larger center only 39% gained more than 5% in population. But of the smaller centers located more than ten miles away, more than 53% gained population. When the larger centers being considered were limited to places of over 5000 people, the previous picture was reversed indicating

that a form of suburbanization was occurring around those large centers. He also found that, grouped according to size, trade centers with 400-999 population showed less tendency to grow within the ten-mile zone than other size categories.

In summary, the work of these rural sociologists provides very useful insights into the question of why trade centers decline. First, trade centers that are small in population size are more likely to decline or disappear than those with a large population. Second, those trade centers that offer only a small range of goods and services are more likely to decline or disappear than those offering a wide range. Although substantial correlation was found for both these relationships there were many instances of trade center growth and decline that could not be explained by either the size of population or the level of retail service of the place. Other relationships such as the proximity to larger centers, or the access to improved transportation or the possession of major public facilities such as a high school or hospital were also suggested as having a bearing on the problem. There is a third insight that is also important and it concerns what Sanderson saw as the emergence of two distinct types of service centers for the rural population. Brunner made the same observation a few years later and Hassinger noted a similar tendency -- the distribution of farm trade centers is becoming polarized around a group of small centers serving local needs and another group of large centers serving specialized needs.

The Perspective Offered by Central Place Theory

There is considerable research devoted to explaining the spatial organization of the functions performed by urban centers. Some of this work is highly inductive, as that of Christaller (7) and Vining (25), and some is largely empirical, as that of Brush (5) and Berry and Garrison (4). The knowledge from both kinds of investigation is useful for understanding the basis of the trade center system in Saskatchewan. However, none of these studies deals explicitly with change in the pattern of central places, and their usefulness in diagnosing trade center viability is limited to inferences that can be drawn from the theory.

The classic model of central places was formulated by Walter Christaller in his Die zentralen Orte in Süddeutschland in 1933. It is relatively well known and may be presented in a summary way. Christaller's basic building blocks are "central place," "central good," and complementary region. He contends that serving economic and social needs of a dispersed population gives rise to service centers in which are located establishments offering various central services. In order to supply these needs it is necessary to have a sufficient market to cover the cost of setting up an establishment. The area occupied by the minimum number of consuming units is the market area of the central good and constitutes the complementary region, or trading area, of the central place.

Christaller also specified certain relationships: (1) the price of a central good varies directly with the distance from

the central place due to transportation costs; (2) consumers will choose to obtain central goods from the closest place available; (3) there is a range, with inner and outer limits, to the market area in which central goods may be sold; and (4) the number of goods sold from a central place varies with the population of that place. The resulting spatial model envisioned by Christaller is a system of central places that blankets an area with the fewest number of centers. On a plain whose resources and income are homogenously distributed, neighboring central places would lie at the corners of equilateral triangles. Hexagonal market areas satisfy this concept for any single set of central goods. For two or more sets there will be overlapping sets of hexagons. The smaller hexagons (representing the market area of widely demanded goods) nest into larger hexagons according to the rule of threes (e.g., six satellite centers of a higher center are also within the market area of two other centers of the same higher rank).

Christaller "fitted" his model to the situation in southern Germany, and, in many respects, achieved a high degree of correlation with reality. However, some significant distortions occurred that are not accounted for in Christaller's theory. Of particular note are the deviations in the number and size and shape of trading areas. Empirical studies of central places in recent years provide refinements which make central place theory a more useful descriptive tool. The work of Brush in Wisconsin is notable for its testing of the Christaller

model. Brush sought to determine whether a "functional and spatial hierarchy" of trade centers existed in Wisconsin. His analysis dealt with 234 settlements in an area almost 8000 square miles in size. Centers were classified according to the commercial functions they performed and three ranks of centers were derived. He studied distance relationships among the centers and observed the size and shape of their trading areas.

Brush found that the mean distance between centers increased for each rank by approximately the $\sqrt{3}$ rule of hexagonal systems. However, the locational patterns did not correspond to Christaller's hexagone. The Wisconsin trade centers tended to be grouped in rows along railway lines or valleys. The shape of the trading areas was accordingly affected by this pattern; instead of being concentric about the trade center they were elongated at right angles to the transportation routes or valleys. A study of Saskatchewan trade centers, of which more will be said later, showed the same sort of deviations from the Christaller model. Brush concluded of Wisconsin, and the same must be said to apply to Saskatchewan, that the spatial pattern of trade centers was a result of "site and transport influence" which contributes to an inertia in the settlement pattern.

Berry and Garrison have directed attention toward making central place theory understandable and verifiable in terms of realistic situations. They have shown through extensive empirical work that central place theory can be reformulated on the basis of two simple concepts: (1) The Range of a Good, which

delineates the market area of a central place for the good; and (2) Threshold Purchasing Power, which is the minimum size of market below which a place will be unable to supply a central good. The threshold, according to Berry and Garrison, is also the point at which sales are large enough for the firm to earn only normal profits. Using just these two concepts they demonstrate that a hierarchical spatial structure of central places emerges no matter what the distribution of purchasing power. Hence, the assumption of a uniform spatial distribution of purchasing power that is basic to the hexagonal arrangement of trade areas can now be dropped.

The refined central place model allows also for excess profits to be earned in the system and is thus more like reality than the earlier model. It can be argued, for example, that purchasing power for some goods in a region will be greater than the multiple of "thresholds" of all the present centers but not great enough to justify establishing an additional center. Present centers therefore earn extra profits. For other goods, usually of a low order, a set of centers may be justified in the interstices of higher order centers, but if the market area of the lower order centers is just at the threshold they will only earn normal profits. These are marginal centers in the hierarchy. If the lower order centers are not established, or if they die out, nearby higher order centers will share in serving the area and thus earn excess profits.

These refinements in central place theory are helpful in

explaining some aspects of change in Saskatchewan's settlement pattern, although Berry and Garrison do not claim it to be a dynamic model. For example, the already functioning system of trade centers faces the prospect of depopulation which decreases the number of consuming units. In Saskatchewan since 1941, rural population has declined by one-third, but there has only been a drop of ten per cent in the number of business establishments in the trade centers serving this population. This is due in part to increased incomes of the rural population now farming larger farms and in part to a reduction of "excess" profits earned by trade centers. There is also the prospect of increased mobility of farm families and their decreased dependence upon local centers. Today, firms in larger centers not only supply the "urbanized" farmer with speciality goods and services, but also compete for the purchasing power previously allocated locally. The firms in the larger centers are thereby offered the opportunity to earn "excess" profits, whereas the local center, if it persists, does so as a marginal center. When a local center reaches this marginal level, where threshold sales coincide with both the inner and outer limit of the range of the central good(s) offered, its existence is bound to be tenuous in the face of continued depopulation. Even the increased incomes of remaining farm families will not be diverted to the purchase of the convenience goods these centers usually offer.

"The Great Plains in Transition" — A Broad Perspective

There has been a growing awareness in the Great Plains over the fundamental changes that are occurring in the agriculture, community life, and settlement pattern of the region. There is a group of writings from a variety of agencies, institutions, and scholars that direct attention to the problems caused by these changes. The main concern of most of this literature is social rather than economic and focuses on the adjustments currently being made in the local community and in other institutions as a result of expanding farm size and the urbanization of rural life. These studies are more prescriptive than the material already reviewed and none of it deals directly with the analytical problem of diagnosing trade center viability. Of five selected for review here, two examine the changing role of small trade centers and three are large scale studies of Great Plains trade centers.

Among the earliest and best work on the changing role of farm trade centers in the Great Plains is A.H. Anderson's study of Adams, Nebraska (1). He examined the spatial pattern of farm marketing, consumer shopping, and social contacts in a large area surrounding the center. He also studied the area's agriculture, level of living on the farm, and the size and composition of population. He found that such small trade centers still remained dominant as locations for marketing farm products and were increasing their importance as institutional and social centers,

at least on an informal level. He concluded that as retail centers such small towns, at best, could hope to supply only the day-to-day needs of farm people. Rural shopping patterns were found to be shifting to large trade centers (population over 2,500), or "farm cities" as he called them.

In a later study of six Nebraska counties (2) Anderson confirmed the increasing dominance of the "farm city" in the social and economic relationships of farm and small town people. He made the observation that "much of the Plains region appears to be overcrowded with small service centers" and that this represented uneconomic duplication of many facilities. He called for "economic community units" as a counterpart to the large size economic farm units of the region in order to collect the dividends of the man-land adjustment occurring in agriculture. His prescription suggests that community institutions and services be adapted to provide better accessibility to schools, churches, recreation places, hospitals, etc., and that isolated farm residences be relocated either to all-weather roads or to nearby villages and towns.

A recent study of one county in south-central Kansas has developed data showing how residents of that part of the Great Plains feel about the relative advantages of large and small centers (3). In general, it was felt that large centers (pop. over 2,500) had more adequate services and facilities in medical care, hospital care, employment opportunities, community recreation, streets and roads, and retail marketing than had small

centers (pop. range 200-900). Moreover, it was felt that the services and facilities of large centers had been improving faster and to a higher level than those in small centers. The future role of small communities was seen to be mainly a place of residence for a larger community of people: few, if any, commercial functions would be performed there. The persons most likely to reside there would include people who had lived in the community most of their lives and who were unable or unwilling to move, people who had retired from nearby farms and wished to remain in the locale, and people who preferred small town living.

The effects of adjustments in Great Plains agriculture on social organization in the region have received much attention from Kraenzel, whose 1955 book, The Great Plains in Transition, (14) supplies the heading for this section. His studies for Montana (15) indicated a considerable increase in the area of service and association for both formal and informal group activity. This is necessary under the prevailing sparse population pattern, but with continuing depopulation is not sufficient to allow effective social organization, he found. Moreover, social organization was being increasingly centered in towns and cities rather than in the open country or hamlets. Smaller places were remaining as centers for informal local association but were too weak in both population size and fiscal capacity to promote "community" projects. There was thus a tendency for social organization to take on a "formal and legal emphasis" to

compensate for local deficiencies of a real power and finances. Extra-territorial arrangements in the form of special districts became necessary for providing schools, hospitals, roads, and so on.

Before moving to a review of two larger scale studies, note should be made of three points arising from the studies just discussed. First, there is further evidence of a polarization of trade center types around a relatively few "farm cities" serving speciality needs and a large number of local convenience centers. Second, there is an indication that the level and quality of public services are important to the growth of farm trade centers. Third, the effectiveness of local governmment must be accounted for in any assessment of trade center viability.

The Saskatchewan Royal Commission on Agriculture and Rural Life studied the system of trade centers in the provinces in the course of its investigations in 1956(21). They sought to establish a basis for determining the functional differences among centers as well as to offer an explanation of their level of development and location. They adopted Christaller's "Marketing Principle" of trade center location and applied this in an analysis of trade centers in a 35,000 square mile area of southwestern Saskatchewan. A classification scheme was developed which identified five types of central places according to the level of goods and services offered: Hamlet, Village, Town, Greater Town, City. All trade centers were classified and their

trading areas mapped. A pyramidal distribution of trade center classes was found and it corresponded closely to Christaller's theoretical distribution. The main differences were more Hamlets and fewer Villages than the model predicted. There was a close correlation between the distribution by function and by population size; and the average distance between trade centers also conformed closely to the distances that might be expected with an hexagonal structure.

Despite the closeness of "fit" to the Christaller scheme, a regular hexagonal system of trade areas did not exist in Saskatchewan. Neither the shape of trade areas nor their arrangement conformed to the theoretical model; and the criterion that lower order centers be linked by transportation to two or three higher order centers was met in only half the cases. Reasons for the divergencies were sought by introducing environmental influences such as the occurrence of national or provincial boundaries, topographical variations, and transportation systems. It was deduced that transportation routes, primarily railways, were the single strongest influence of deviation from the model. In contrast to the theoretical expectations, the rail network helped to produce a trade center system in Saskatchewan that has more centers, a larger proportion of small centers, and a linear arrangement of centers along the rail lines.

Upon completion of the trade center analysis, which was essentially static, some recent trends in agriculture and rural

life were examined to determine whether the trade center system could expect to remain stable in the future. Trends in farm mechanization, depopulation, farm income, and personal mobility were judged to cause a shift in emphasis from the small village-centered community to larger ones in Towns and Greater Towns. Hamlets and Villages were not expected to grow but only a few would fail to survive, as long as there were day-to-day needs of farm people to be met. However, a little discussed finding of the study showed ample evidence of general decline among small trade centers, i.e. among Hamlets and Villages. On an index of change related to per capita postal revenue of the center from 1931-51 compared to the provincial average, 83 per cent of the Villages and 75 per cent of the Hamlets showed decline. Furthermore, the Commission attributed a "remarkable stability" to the trade center system that was not justified. They had observed a great deal of constancy of proportions among population classes of incorporated trade centers over the forty years preceding the study. But almost one-half of the trade centers in Saskatchewan are not incorporated, and population data for them are usually not available. Indeed, the latter centers tend to be small in population size, low in functional rank, and hence more susceptible to decline. Had the Commission had access to 1961 population data, it is likely that these conclusions about stability in the system would not have been as strongly drawn.

Among the most recent studies of Great Plains trade centers is the work of the Upper Midwest Economic Study whose area encompasses North and South Dakota, Montana, Minnesota, and parts

of northern Wisconsin and Michigan. Analysis has been carried out on the urbanizatinn process in the region since 1930 (22) and on the nature of present trade centers and trade areas in the region (23). The main findings may be summarized as follows: first, most of the population growth of the past thirty years has occurred at a relatively few selected centers, and second, retail trade is increasingly concentrated in so-called "partial" or "complete" shopping centers (equivalent to Anderson's "farm cities"). Trade centers at the lowest level in the functional hierarchy generally failed to grow or even declined in population size between 1930 and 1960. A close correlation was found between population growth, population size, and previous growth. On this basis it was concluded that "the larger a place was at the beginning of the automotive era, the better have been its chances to retain old functions and acquire new ones." There was the clear indication that major shopping center towns were "penetrating" their trade areas more fully and attracting buying power away from smaller outlying centers. The larger centers are favored because of the economies of scale in their establishments, because of the increased speed and range of transportation bringing both customers and goods to them, and because of the increasing competition among the larger centers themselves that encourages further internal economies.

Usefulness of the Literature in Diagnosing Trade Center Viability

As stated at the outset, the literature reviewed here does not provide a conclusive picture of the reasons for trade center decline. There are seeming inconsistencies among the studies about whether trade centers are really dying out or only declining relatively. To a large degree the differences stem from the use of different measures of trade center size and function and different definitions of trade center decline. However, even if there is not general agreement on the nature and extent of trade center change in the Great Plains, the amount of literature devoted to the subject indicates that fundamental changes are occurring.

The present study has, in large measure, been stimulated by the inconclusiveness of the literature on the subject of trade center change. The content of the study and the methods of analysis it proposes to use have derived from an attempt to clarify three major issues that are raised by the literature. First, and foremost, is the issue of whether trade centers actually are declining and, if so, to what extent. An appropriate means of measuring trade center change is needed for this purpose. A second point of issue stemming from the literature is the validity of a number of tentative hypotheses about the nature of trade center change -- e.g., that it is related largely to trade center population size, that it is most prevalent in proximity to larger centers, that it is occurring mostly in certain classes of trade centers. These hypotheses

need to be made operational so that they can be tested. The third issue stems from the conclusions of a number of studies that the key relationships governing trade center change are more complex than those of size, retail service level, proximity to large centers, etc. just alluded to. This conclusions would seem to warrant further study to discover which other relationships might exist. It will be helpful to discuss each of these issues in order to understand better the rationale behind the analysis conducted in the following chapters.

Throughout most of the literature population change is used to measure viability among trade centers. This is not a satisfactory measure of the ability of a center to survive either in terms of analytical method (dozens of trade centers are too small to be recorded in official censuses), or in terms of the true nature of trade centers. In Saskatchewan, as in the rest of the Great Plains, trade centers exist to serve primarily the commercial needs of a limited, surrounding, agriculturally-based population. The number of persons residing in such a trade center may increase for three possible reasons, all other things being equal: open-country residents may choose to reside in town; family size of those residing in town may increase; or migrants may be attracted by a large expansion of economic activity. The last possibility is limited to a few centers by virtue of their location relative to non-agricultural resources or their superior location for commerce in serving a very large hinterland. The possibility of family size increasing is not

borne out by recent data. The possibility of an increase of town residence by farmers is more likely, on the basis of Saskatchewan data, but it must be remembered that the source of this kind of population flow is exceedingly limited. Moreover, even if a trade center grows in population by the inflow of farm families, this means no more than the transfer of an originally dispersed hinterland population to a point of central residence. It cannot be expected to affect significantly, the amount of commercial activity in the community. Conversely, a trade center that shows no change in population, or even some decline, still may be viable in commercial terms as it serves the dispersed population in its hinterland.

For the present study, then, change in the retail service level of a trade center will be used as the prime measure of growth or decline of trade centers. This measure has the advantage not only of data being available for all trade centers (through Dun and Bradstreet Directories) but also of being inherently involved in the meaning of <u>trade</u> center. It is a measure of the basis of a trade center's existence, its power to attract patrons. The actual measure, a seven-point scale of trade center specialization in goods and services, is described in Chapter Three. Population changes of trade centers are also included, where the data is available, to supplement the analysis of changes in retail service level.

Turning to the second issue, there are a number of apparently important judgements raised in the literature about the

relationships governing trade center change. They have arisen from generally limited observations of trends in a few trade center characteristics. In the present study of Saskatchewan there exists the possibility of testing the validity of these judgements. First, however, the judgements have to be converted into testable hypotheses. Those considered most relevant for this study and their reformulation into testable hypotheses are discussed below.

Some Hypotheses on Trade Center Change. First, if trade centers that are small in population size or low in retail service level are more likely to decline or disappear than centers with large populations or a high retail service level, as contended by Lively, Hassinger, and others, then for Saskatchewan we should find:

> Trade centers ranking low in the retail service hierarchy at the beginning of the period, lost rank more rapidly than higher ranking centers between 1941 and 1961. (1)

Second, if there were two distinct types of trade centers emerging in rural areas -- those serving local, day-to-day needs and those serving specialized needs of large areas -- in place of a more differentiated hierarchy, as contended by Anderson, Brunner, and others, then for Saskatchewan we should find:

> Between 1941 and 1961, the number of centers at both extremes of the retail service hierarchy increased relatively to centers in the middle range of the hierarchy. (2)

Third, if larger trade centers have a debilitating effect on small, nearby centers, as contended by Sanderson, Lowry, and others, then for Saskatchewan we should find:

a. The density of small trade centers in both 1941 and 1961 decreases with increasing proximity to larger centers (Class 5 or larger): and/or (3a)

b. The rate of decline between 1941 and 1961 for centers ranking low in the retail service hierarchy increases with increasing proximity to larger centers (Class 5 or larger). (3b)

The literature reviewed here generally disregards the relationship of changes in trade centers to the characteristic spacing of trade centers.[3/] In a region so uniformly dotted with small farm trade centers as Saskatchewan, it would seem unusual if trade center changes were not closely related to the spacing of centers. Or, conversely, it would seem unusual if the recent changes in retail service level of so many centers had not engendered some new characteristic spacing within trade center classes. Brush found for Wisconsin, as did The Royal Commission studying southwestern Saskatchewan, that the spacing of centers within any class was higher by $\sqrt{3}$ than for centers in the next lowest class, or an affirmation of that part of Christaller's theory. Whether this spacing still prevails in Saskatchewan or whether it did in an earlier period needs to be examined. The twin processes of rural change that have been occurring in Saskatchewan in recent decades -- depopulation and increasing physical mobility -- suggest that the characteristic spacing would also change so that farm families had to travel farther to convenience goods centers but not as far to shopping

goods centers. If this is so, then we should find:

> The characteristic spacing of trade centers in any one class for the period 1941-1961 is increasing for centers at the lower end of the retail service hierarchy and decreasing for centers at the upper end of the retail service hierarchy. (4)

A further aspect of the spacing of trade centers in Saskatchewan that would seem important to their continued vitality concerns their actual spacing relative to the average spacing for like centers. In Saskatchewan it can be observed that many like centers are situated adjacent to one another at very small intervals. Where like centers lie adjacent to one another there would seem to be insufficient trade area for each unless their spacing is at or above the mean for the class. If the spacing were less than the mean, decline of one or more of the centers would not seem unusual. If less-than-average spacing between like centers leads to their instability, then for Saskatchewan we should find:

> Where trade centers of the same class situated adjacent to one another were separated by less than the average spacing for the class in 1941 one or more of the centers experienced relative decline during the period 1941-1961. (5)

"Relative decline" as used in this hypothesis acknowledges the possibility that one of the adjacent centers may grow to a higher level, thereby relatively downgrading the other center(s).

Finally, there is raised by the literature the issue that the relationships governing trade center change cannot be adequately deduced from only the evidence of retail service level, or proximity to larger centers. Various environmental factors are introduced in the studies reviewed here, by evidence and

inference, as being significant in determining the chances of a trade center's survival. In order to adequately explore the notion that the relations are more complex and involve many more variables requires an inductive approach to ascertain what, if any, are the associations between such variables. A factor analysis, as proposed in the preceding chapter, can help accomplish this purpose by providing a statistical base upon which additional hypotheses about trade center change can be formulated and tested.

The usefulness of the literature in this regard results from the large number of variables it suggests should be taken into account when attempting to diagnose trade center viability. Listed below are these variables; they are each stated in terms of the relationship they are assumed to bear toward <u>improving</u> a trade center's chances for survival. That is, if a trade center possesses some or all of the following qualities, its chances for survival will be greater than for a center not possessing them, or at least not possessing a high degree of them:

1. A large population,
2. A history of sustained population growth,
3. A wide selection of retail services,
4. Good access to rail transportation,
5. Good access to highway transportation,
6. A high level of community services,
7. A high school,
8. A hospital,
9. A high ratio of non-agricultural employment,
10. High rural population density and/or
11. A location not in proximity to large centers.

Four points need to be made about this list. First, it cannot be said to exhaust the range of variables that might possibly impinge on the question of trade center survival. Other possibilities include, the proportion of dependent population, the efficiency of local government, and the level of education of the population. The full range of variables considered in the present study is described in Chapter Five. Second, quantitative measures must be found for these and any other variables considered important to the problem in order to develop the needed statistical base. The quantitative measures used herein are also described below. Third, variables have been included to which mention has already been made in the hypotheses formulated above. They are included because it will be necessary to establish the interrelationships among all variables that are deemed important to the problem. Fourth, these variables and others that might be added are not, as they now stand, either independent or dependent variables in the usual meaning of these terms. They merely constitute the input for the proposed factor analysis. From the latter will be extracted clusters of variables which are highly intercorrelated and these clusters can be examined for their potential role as independent variables in determining trade center change.

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CHAPTER THREE: TRADE CENTERS AND TRADE AREAS IN SASKATCHEWAN, 1961

The pattern of trade centers and trade areas in Saskatchewan must be looked at in a perspective that deals initially, with the development of the whole Canadian West. For, until 1930 when the federal government returned control of all natural resources to the three prairie provinces, development of the province was subject to policies and programs aimed at settling the entire region. Moreover, these federal policies and programs have had a lasting impact on the physical environment of Saskatchewan. They were responsible for the grid survey system, the pattern of dispersed farmsteads, the numerous farm centers, and the vast railway net. Within this context evolved a highly commercialized and mechanized agriculture and a base of population that is highly mobile in physical terms and in attitude.

The long-standing pattern of settlement has become outmoded in recent decades and has undergone considerable change. It is today a mirror of both past and future settlement patterns. This chapter examines the image of today's settlement pattern; in particular it examines the functional and spatial patterns of trade centers and trade areas.

A. EVOLUTION OF THE SETTLEMENT PATTERN

Basic Policies for Settling the Canadian West

Following Confederation of the British Colonies of North America in 1867, the new Dominion of Canada was faced with developing policies and programs for opening up a territory five times its own size west of the Great Lakes to the Rocky Mountains. The land had to be settled and the foundations of a viable economy laid in an almost uninhabited region of over one-half million square miles, and about which little was known of its soils, climate, or weather. The Canadian Prairie Region, or the North-West Territory as it was known, was separated from the then-settled area of the St. Lawrence Valley by a thousand miles of wilderness and was under pressure from United States interests who wished to expand northward from the newly-settled Dakota territories.

The young Dominion of Canada was faced with four basic demands if it was to secure the North-West Territory for its own settlement.[1/] First, a system of communication had to be provided which would link the prairies with the St. Lawrence Valley. Second, a policy had to be devised for distributing land. Third, settlers had to be encouraged to come to the region by an adequate immigration policy. And, fourth, a staple crop had to be found that would support the population and repay the cost of exploiting the land. A number of policies were formulated over the sixty years from 1870-1930 to meet these demands, by which time settlement was virtually complete. The

long-run implications of the policies for the settlement pattern were not always fully considered. But the policies helped meet the short-run objectives of settlement remarkably well.

Railway Policy. If the prairies were to be settled, a railway link with the St. Lawrence Valley was of prime importance. The greatest asset possessed by Canada for accomplishing this task was the unoccupied land through which the railway would pass. Thus, originated the Canadian land grant policy of subsidizing railway construction; many of its provisions were patterned on similar experience in the United States.[2/] The major difference in Canadian policy was the allowance for railways to choose any land "fairly fit for settlement," if the land along their rights-of-way was not suitable. U.S. policy, restricted free railway land to narrow zones paralleling rights-of-way.

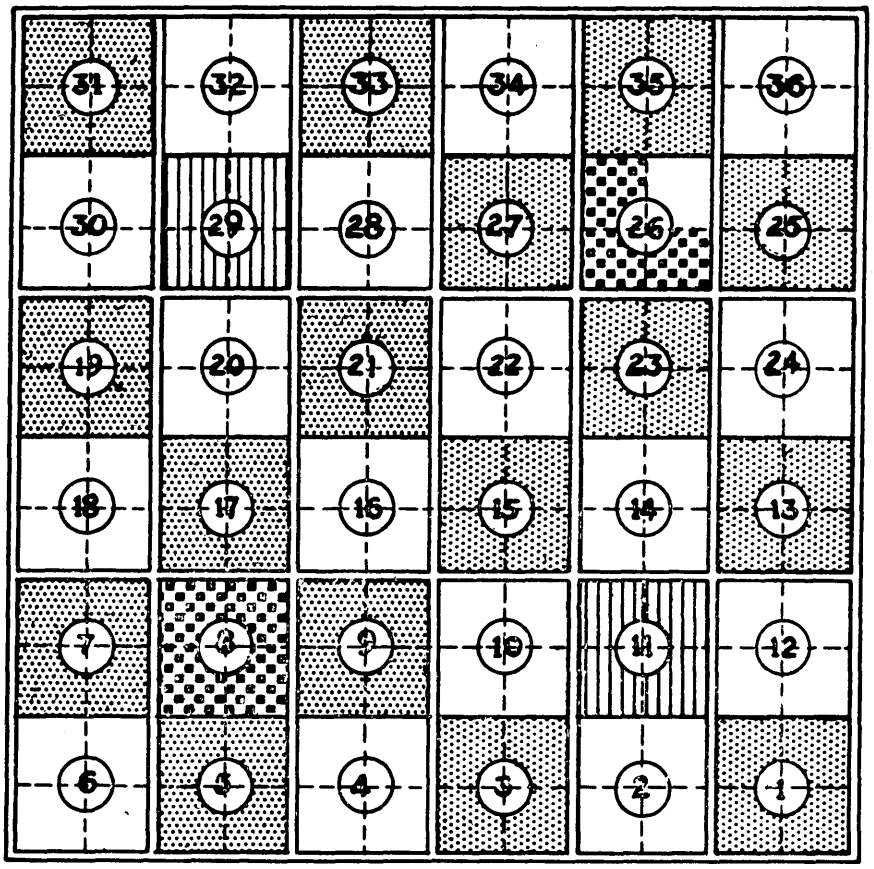
After several abortive starts, the railway was completed to the prairies in 1883 and extended to the Pacific Coast in 1885. The building of branch line railways into areas where settlers had established themselves was also aided through land grants to the companies. By 1907, land grant subsidies were replaced by the device of guaranteeing bonds for construction purposes. In all, 2000 miles of rail lines were built in Saskatchewan under the incentive of land grants; however, the railroads had chosen almost half their total land grants within the province. These amounted to 15.2 million acres, or about 25 per cent of the present farming area. While it was in

effect, the land subsidization policy had the result of encouraging a plethora of both branch and trunk lines. Hardly any part of Saskatchewan was left more than ten miles from a railway because of the rule-of-thumb used by the companies which defined the service area of a line in grain-growing areas as all the territory within ten miles.[3]

Land Distribution Policy. The land assets of Canada in the prairie region at Confederation amounted to an estimated 110 million acres of arable land, after grants had been made to the Hudson's Bay Company and for a few other subsidiary purposes. The staples of the so-called "Dominion Lands policy" were the railway land grant, as already described, and the free homestead. A grid survey using the American system of townships six miles on a side which contained 36 sections of 640 acres each and quarter sections of 160 acres was adopted for Canada. Railway companies, while the land grant was in effect, had the right to choose from among the odd-numbered sections and settlers were entitled to claim a free homestead of 160 acres in any even-numbered section except those already granted for school purposes and to the Hudson's Bay Company. The township in the Canadian west thus took on the characteristic form shown in Figure 3.

The survey system made a lasting impact on the physical environment of Saskatchewan. First, it engendered the pattern of dispersed farmsteads; homesteaders had to maintain residence on their land in order to obtain title to it and the farms were separated from one another by the intervention of railway and other land grants. Second, it was responsible for the almost

ORIGINAL DISTRIBUTION OF LAND WITHIN TOWNSHIPS



Railway Lands

School Lands

Free Homestead Lands

Hudson's Bay Lands

PLAN OF TOWNSHIPS AFTER REGULATIONS OF 1882: (a) School Lands (Sections 11 and 29), (b) Hudson's Bay Company Lands (Sections 8 and three-quarters of 26; the whole of 26 in every fifth township), (c) Free-homestead lands (remaining even-numbered sections), (d) Railway lands (all odd-numbered sections). Each section (640 acres) bounded on three sides by a road allowance of 66 feet.

complete saturation with roads that prevails in rural Saskatchewan. The survey system provided for roads on three sides of every section, or 1.5 miles of road for every square mile of land. In 1955, there were about 104,000 miles of municipal roads and provincial highways, generally following section lines, or just over one mile for every square mile of occupied farm land.[4]

Immigration Policy. Providing a population to occupy the prairies was the third demand that had to be met in settling the west. Canada used a variety of means to attract settlers: it maintained agencies abroad, it gave financial aid for Atlantic crossings and transportation in Canada, and it granted large tracts of land to individuals and societies that would bring in immigrants. Despite these efforts, most settlers came under their own initiative. By 1926, when immigration was beginning to slow down, the distribution of farm operators in Saskatchewan indicated that only about half utilized the incentives of the immigration policy.[5] One important effect of this policy, however, was through its provisions for large land reserves for groups of settlers, which often encouraged socially and culturally distinct enclaves of people many of which continue to exist.

Staple Crop Policy. A generation after Confederation it still remained to be demonstrated that a staple crop could be produced on a consistent basis in the prairie region. Experience at the Red River Settlement in Manitoba and also in the U.S. Plains pointed tentatively to wheat. But much refinement

was needed in farming techniques and now strains of wheat were required in order to develop a viable agriculture in the sub-humid climate and northerly latitudes of the Canadian Prairies. Several experimental farms were established by the federal government and to them must be given a large part of the credit for overcoming these constraints. They developed an earlier maturing wheat, Marquis, that fit with the short frost-free season and they promulgated vigorously "dry-land farming" techniques for this region where rainfall is between ten and thirty inches per year.[6]

Besides developing techniques for growing wheat the government also had to face the task of marketing the produce. Since the main markets were in eastern North America and Europe, it was necessary to devise means to store and move the grain and to have a system of inspection to ensure its quality. Large terminal elevators were established on the Great Lakes and at a few inland points; while at the local level the typical physical facilities for grain handling were a railway siding, a loading platform and/or flat warehouse, and possibly one or more grain elevators. Grain loading stops were established by the railway companies on the average of six to ten miles apart.[7] The nucleus of grain collection facilities at these stops was often used by the railway companies to attract further commercial activity to serve local farmers. The railroads generally had large land holdings at these sites and often had them already surveyed into elaborate townsites.[8] At least a few residences

and places of business were established at nearly 85 per cent of the over-1100 grain stops. This is the foundation of the present extensive trade center system.

The Settlement Period in Saskatchewan

The settlement period in Saskatchewan effectively began at the beginning of this century and continued for the next thirty years by which time immigration was terminated, over 85 per cent of the land had been occupied, and the period of great drought and depression had started. As the twentieth century began there was a "favorable conjuncture" of circumstances that brought an unprecedented influx of settlers to the province: the price of wheat had been moving upward since 1893; ocean transport costs for wheat were lowered; the best land on the American frontier had been taken by 1896; interest rates were low at the time; the incidence of rainfall was high; and a harder, earlier maturing wheat had become available.[2/] The vast expansion of settlement from 1900-1930 can be seen from the fact there were tenfold increases in both the population and number of farms in Saskatchewan (see Tables 2 and 3). The population today is only a little higher than the level reached in 1931.

On the matter of farm size, it is important to note that farmers in Saskatchewan discovered early the impracticability of the 160-acre homestead. In 1901, the average farm in Saskatchewan already occupied 285 acres, and continued to expand to 408 acres by 1931, an increase of 43 per cent.

TABLE 2: Distribution of Rural and Urban Population, Saskatchewan 1901-1961

	RURAL		URBAN		PROVINCE	
Year	Number	%	Number	%	Number	%
1901	77,013	84	14,266	16	91,279	100
1911	361,037	73	131,395	27	492,432	100
1921	538,552	71	218,958	29	757,510	100
1931	630,880	68	290,905	32	921,785	100
1941	600,846	67	295,146	33	895,992	100
1951*	461,047	55	370,681	45	831,728	100
1961*	397,697	43	527,484	57	925,181	100

Source: Census of Canada.

* Definition of "rural" and "urban" population according to that used in 1941 and previous censuses.

The vagaries of the region's climate as well as the potential offered by mechanization forced these changes. By implication, then, agriculture as practiced in Saskatchewan has been always commercially oriented; it was not just for subsistence. Reliance on a single cash crop, wheat or other food grains, sold in world markets under competitive conditions contributes to the highly commercial outlook of Saskatchewan farmers. As long as farm practice in the region favors extensive development, farm operators who are commercially motivated will opt for larger farms and the commensurate level of mechanization.

The use of power machinery on Saskatchewan farms did not become widespread until after 1920, although steam tractors and

TABLE 3: Number of Farms and Inputs per Farm, Saskatchewan, 1901-1961

Year	Number of Farms	Average Farm Size[1] (acres)	Workers Per Farm	Machinery Per Farm[2] (constant $)	Total Capital Per Farm[2] (constant $)
1901	13,445	285	1.52	446	5,100
1911	96,055	297	1.38	738	10,820
1921	119,451	368	1.46	1,006	9,630
1931	136,472	408	1.50	1,480	10,100
1941	138,713	432	1.35	960	5,550
1951	112,018	550	1.32	2,270	9,040 (1950)
1961	93,924	687	1.28(est.)	3,280	13,150

Source: Census of Canada, and Thomas L. Powrie, "Labor and Population in Saskatchewan," unpublished thesis University of Saskatchewan, 1955.

Notes: 1. Occupied farm acreage.

2. 1935-39 dollars = 100; cf., G.E. Britnell and V.C. Fowke, Canadian Agriculture in War and Peace, (Stanford, Calif.: Stanford University Press, 1962), Appendix Table XVII, p. 466.

steam power units had been available from just before the turn of the century. It was the adaptation of gasoline-powered engines to farm machinery that provided the needed impetus: in 1921, one farm in six had a tractor, by 1926, this ratio had reached one in four, and was one in three by 1931 at which time one farm in two also had a car or truck.[10/] This speed-up in the substitution of machinery for labor also marked the beginning of the situation where the agricultrual economy was not able to absorb all the natural increase in

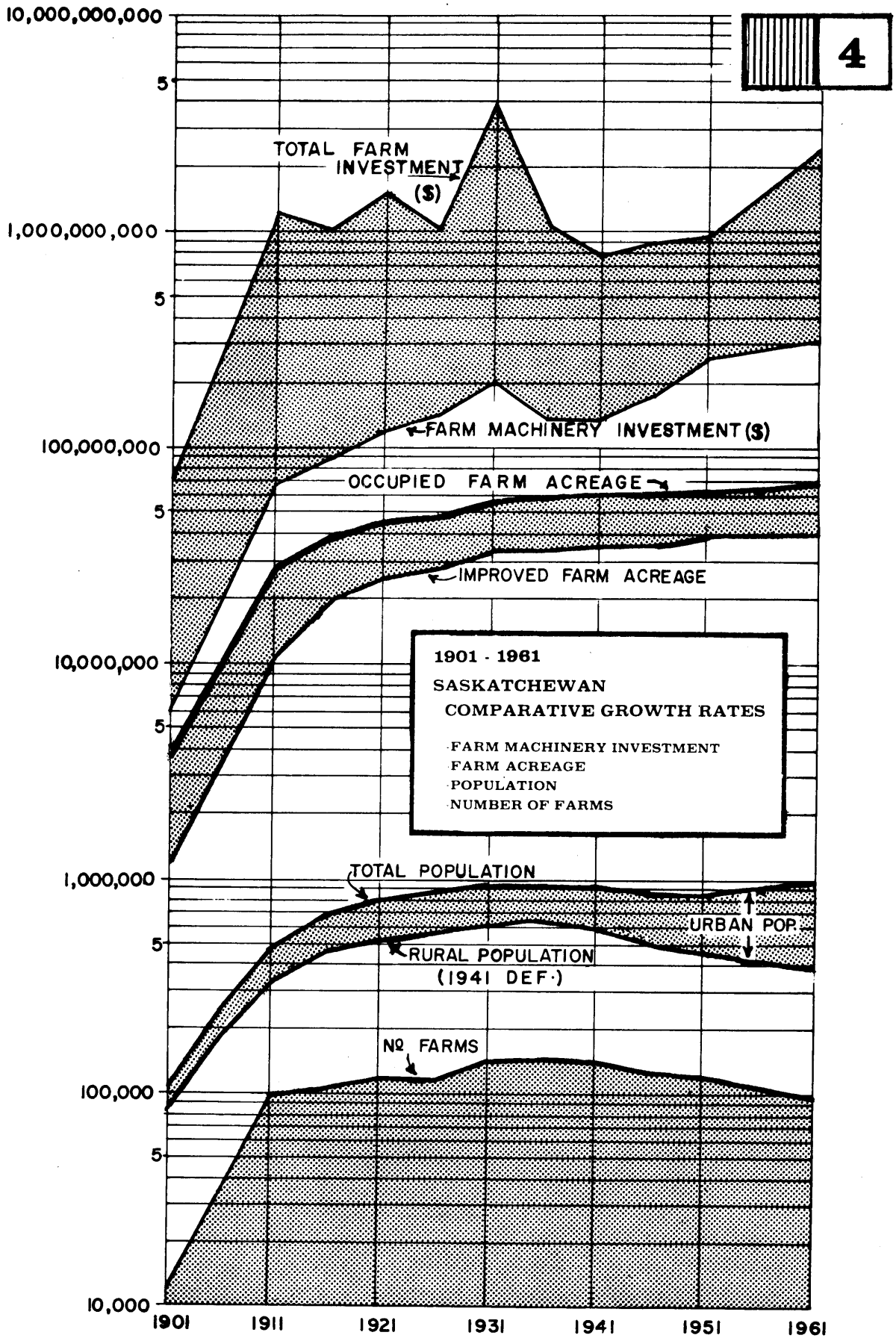
farm population, a situation that continues to prevail (see Figure 5).

It was in this period that the province's extensive railway network largely was constructed and the complementary trade center system, which followed the rail routes, was established. From a total of slightly less than one-thousand miles of trackage in 1900, within thirty years there was over eight thousand miles of trackage. The number of trade centers, likewise, increased from less than one hundred to over eight hundred in the same thirty years (Table 4).

TABLE 4: Growth in Railway Mileage and Trade Centers, Saskatchewan, 1900-1950

Year	Railway Mileage	Trade Centers
1900	962	60
1910	2,932	360
1920	6,220	687
1930	8,166	833
1940	8,777	905
1950	8,739	891

Source: File material Saskatchewan, Local Government Continuing Committee.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5
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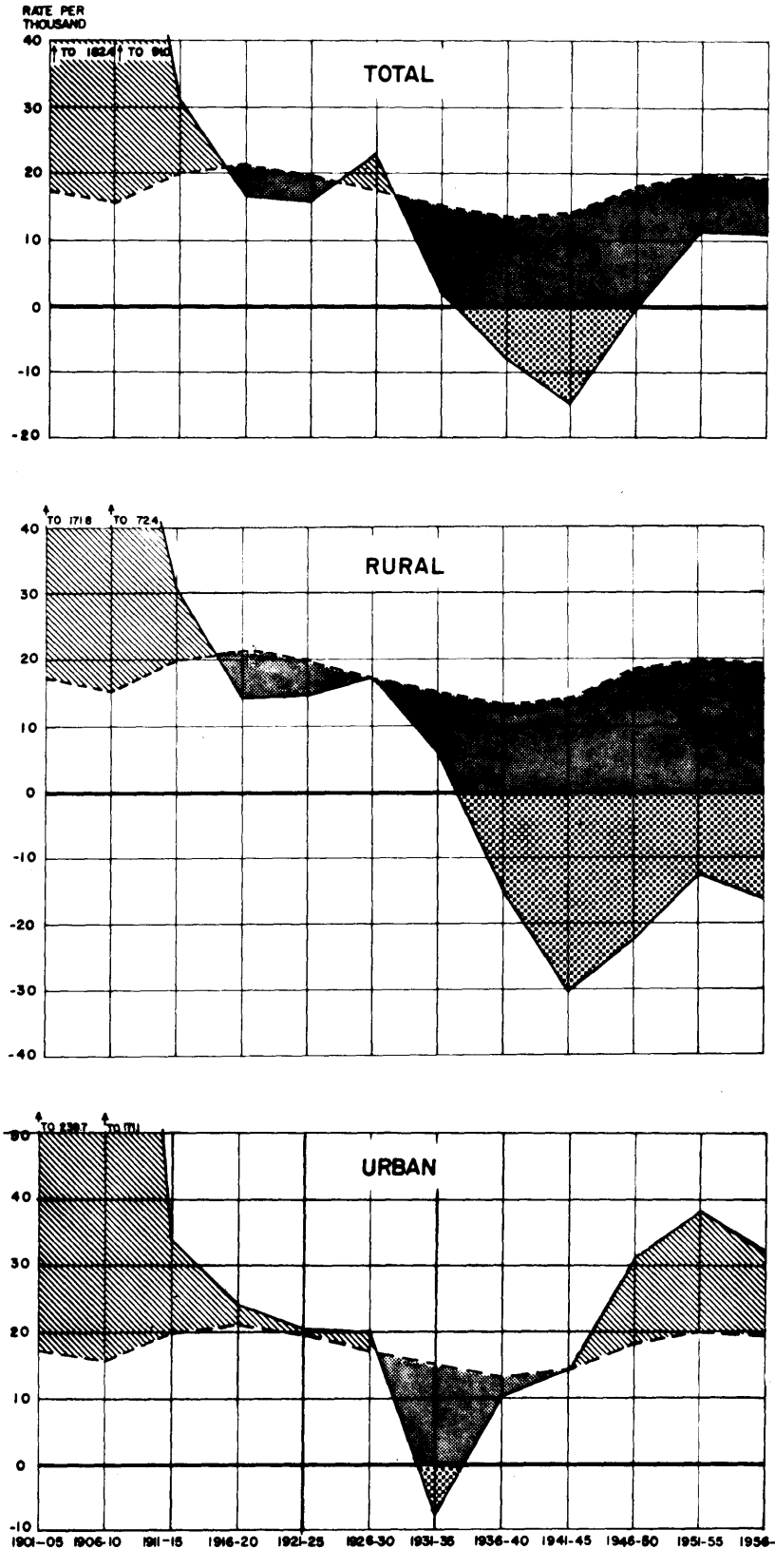
TOTAL FARM INVESTMENT ($)
FARM MACHINERY INVESTMENT ($)
OCCUPIED FARM ACREAGE
IMPROVED FARM ACREAGE
1901 - 1961
SASKATCHEWAN
COMPARATIVE GROWTH RATES
FARM MACHINERY INVESTMENT
FARM ACREAGE
POPULATION
NUMBER OF FARMS
TOTAL POPULATION
URBAN POP.
RURAL POPULATION (1941 DEF.)
Nº FARMS
1901
1911
1921
1931
1941
1951
1961

5



POPULATION CHANGES IN SASKATCHEWAN 1901 - 1961

Legend:

— Rate of Population Change

---Rate of Natural Increase

NET IN - MIGRATION

NET OUT - MIGRATION

POPULATION LOSS

The settlement period in Saskatchewan, 1900-1930, was the formative period in the province's development. It was in this period that the basic pattern of the space-economy was laid down which still influences much of the spatial distribution of activities of the rural population. Many of the constraints on present development were set in this period, including the trends to larger farms, the trends in farm mechanization, and the trends in railway and trade center development. A number of these trends are shown in Figure 4; there seems little doubt that the character of these trends will continue well into the future as well.

Recent Trends in Farm Mechanization and Population Change

World depression and unprecedented drought in the nineteen thirties halted, and in some cases reversed, the trends of the settlement period. However, the trends to larger farms, more mechanization, and rural population loss were restored after 1940. In response to relative prosperity caused by better crops and the demands of World War Two, because of a labor shortage brought on by the War, and in conjunction with major improvements in the efficiency of farm machinery these trends were even accelerated. The number of occupied acres per farm increased from 432 in 1941 to 550 in 1951, an increase of almost 30 per cent compared to the 11 per cent gain in farm size in the decade prior to 1931. The value of farm machinery per farm (in constant dollars) regained the losses sustained during the depression decade, and in 1951 was almost one and one-half times larger than in 1941. In the succeeding decade, 1951-61, the increases in

farm size and the value of machinery per farm were not as dramatic but were still impressively high -- 25 and 45 per cent, respectively.

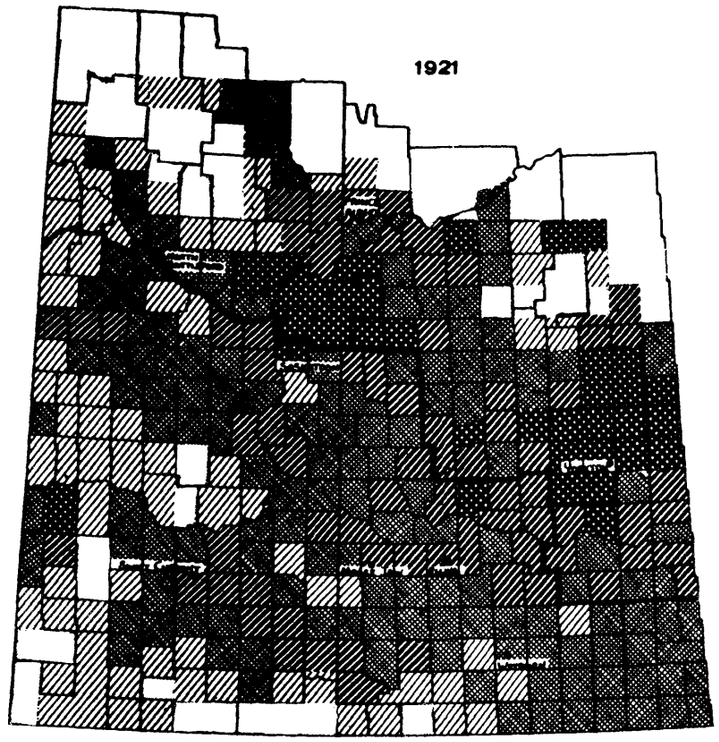
The important consequence of the rapid increase in farm size and mechanization that commenced in 1940 has been rural depopulation. Not only hasn't the agricultural economy been able to absorb the natural increase of rural population, but it has also witnessed an absolute drop in rural population as workers flowed out of agriculture. Total population of the province fell as a result between 1936 and 1956. It did not regain its 1931 level until substantial non-agricultural employment opportunities appeared toward the end of the 1950's. Beginning in the five years prior to 1940 and continuing up to the present time, there has been a steady drop in rural population.[11] It has never been less than 12 per cent in any five-year period and has been as much as 30 per cent. Meanwhile, the land base occupied by farms has continued to increase with the result that the gross density of rural population has declined sharply. In 1941, the density stood at 6.43 persons per square mile on the average in the province; in 1961, it stood at only 3.95 persons per square mile, or a drop of almost 40 per cent. With but two exceptions all rural areas in the province have suffered depopulation during the past two decades as can be seen on Figure 6. The exceptions are in northern areas where new land has recently been opened up and on the fringes of larger centers where a kind of "suburbanization" has been taking place.

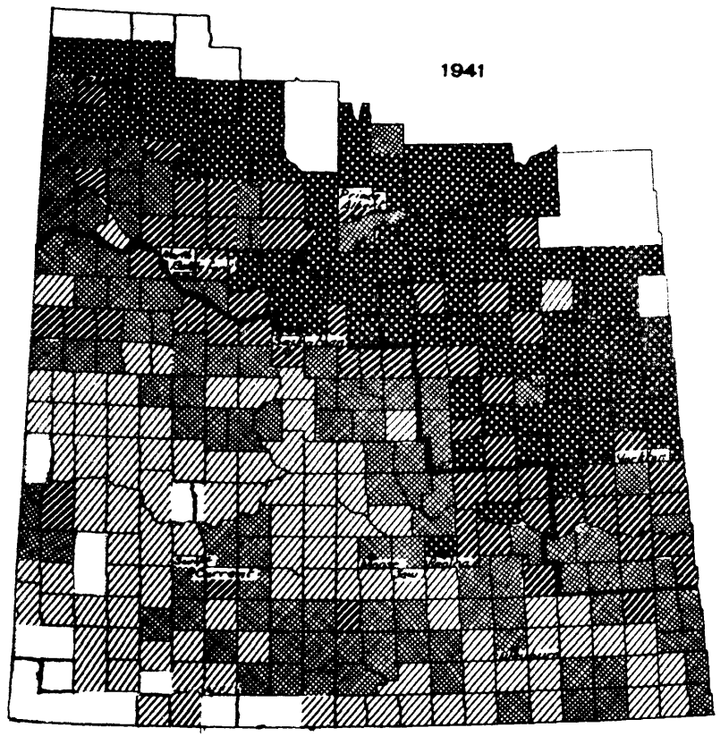
CHANGES IN RURAL POPULATION* DENSITY 1921 - 1961

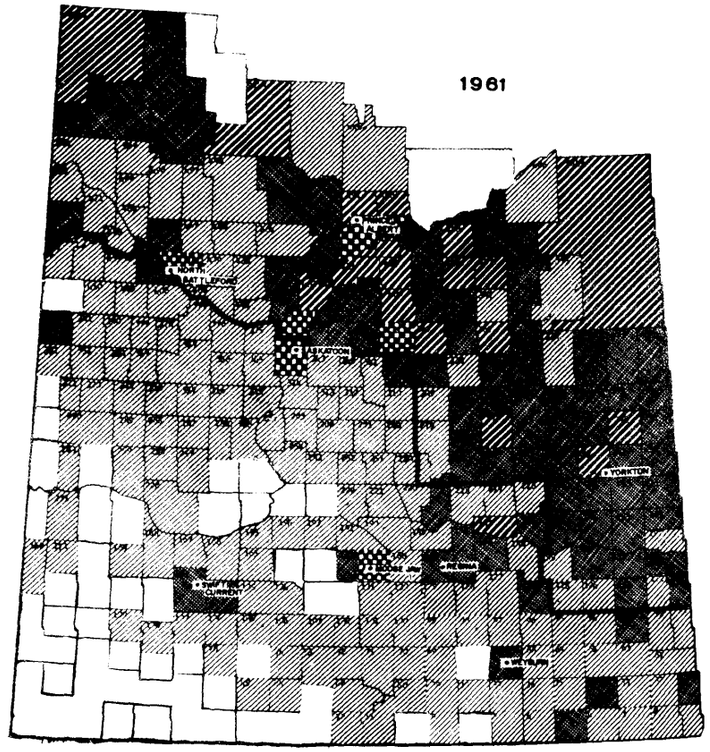
Legend: Persons per sq. mile

- 0 – 1.99
- 2.00 – 3.99
- 4.00 – 5.99
- 6.00 – 7.99
- 8.00 +

* "Rural Population" is defined here as all population residing within the boundaries of Rural Municipalities, exclusive of incorporated cities, towns, and villages. Current R.M. boundaries are used throughout to facilitate analysis.







It will be seen from the map of rural population density that there is a gradient of density running from southwest to northeast across Saskatchewan. This gradient is consistent with the pattern of soil zones (see Figure 2) and climate that prevail in the province. The more arid southwest, or Prairie Region as it is called, with its characteristically poorer soils supports only very large farms. The northeast, or Park Region, with its greater rainfall and richer soils can accommodate smaller economic farm units. However, depopulation has been tending to reduce the rural density gradient. In the decade just past, rural depopulation occurred at a faster rate in the northeast than in the southwest, and a further diminishing of the differences in density can be expected.

B. TYPES OF TRADE CENTERS AND TRADE AREAS

The Functions of Trade Centers

Trade centers in Saskatchewan perform two general functions: a commercial function and a social function. The commercial function can be divided into two parts for descriptive purposes. First, trade centers act as a local nexus between the farm production unit and the agricultural economy. Second, trade centers act as a source of retail goods and services for rural residents. The social function performed by trade centers is

based on their ability to act as a focus for social expression in various community activities.

The Commercial Function. Trade centers are an essential part of the system for efficiently producing, marketing, and distributing the output of the province's farms. The local trade center brings within easy reach of the farmer many of the services and facilities necessary for him to maintain a sophisticated farming enterprise:minimum parts and repair services for machinery, sales of seed, fuel, and oil, grain sales and storage. These basic services are distributed at almost all railway grain stops, and the farmer has come to depend upon being able to obtain them within, approximately, 6-8 miles of his farm. It is to his advantage not to have to transport grain or animals long distances to market or to have his machinery idled excessively by long trips for parts or repairs. A trade center offering these basic services, in Douglas North's words, provides "external economies for the export industry."[12/] Not all the services needed by the modern, mechanized farm can be found locally and for hardware and supplies, banking, more elaborate implement parts and repairs, or legal and business services the nearest trade center may be as much as twenty miles away.

Besides providing goods and services for the farm firm, trade centers provide goods and services for the farm family and for the residents of small towns and villages. Here rural people shop for food, clothing, or furniture and obtain such services as mail delivery, medical care, shoe repairs, or commercial entertainment.

There is, of course, a high degree of differentiation among trade centers since not all goods and services can be offered at all places. All trade centers provide local mail service and grocery shopping, for example, but additional patrons will have to be attracted to the center that is to provide a hotel, bank, or drug store. More specialized goods and services are supplied, therefore, at other than local centers.

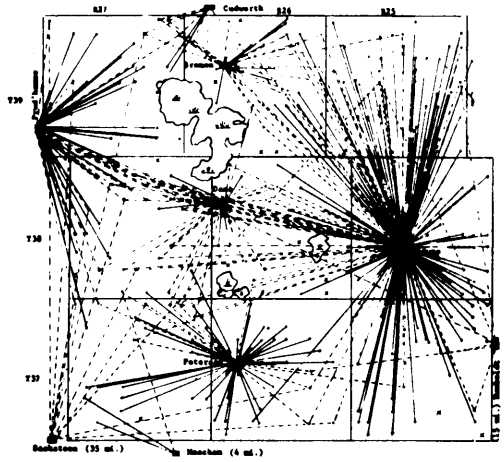
A number of studies of trade center communities in Saskatchewan have found that 30-45 per cent of farm families most often patronize their local centers for food, mail, hardware, and petroleum products.[13] But, as these findings indicate, farm families do not limit their purchases of even day-to-day necessities to a single, nearby trade center. The presence of a very large center within easy reach may further disrupt local shopping patterns, another Saskatchewan study shows.[14] In short, with the former isolation gone due to better means of travel most rural families have frequent contact with several centers for commercial purposes (see Figure 7).

The Social Function. Trade centers in Saskatchewan provide a focus for organized community activities and informal neighborliness in addition to their commercial functions. The elementary school and the church are characteristic social facilities in all levels of trade centers. Most farm trade centers also have a Community Hall that is used frequently for public dances, fairs, or the meetings of voluntary and elected groups. A sports

7

TRADE AREAS of FARM RESIDENTS

GROCERIES:

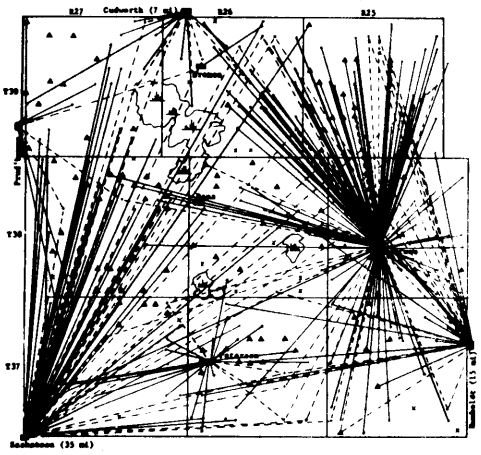


Bayne Municipality
Saskatchewan, 1958

Legend:

- · Location of a farm dwelling
- — Linkage from farm to center usually Patronized
- --- Linkage to two or more centers
- (25 mi.) Indicates distance to trade center outside municipal boundary

CLOTHING:



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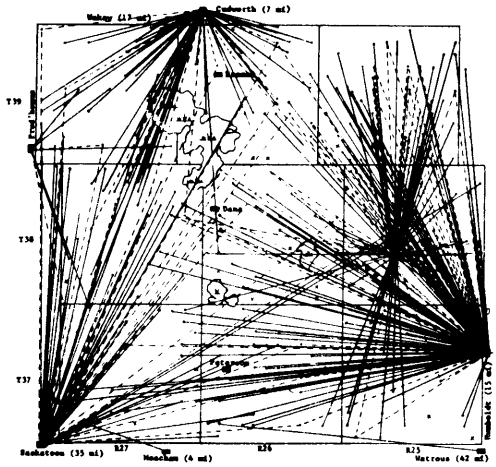


ground, an ice skating rink, and, in many towns, a curling rink are standard community assets. One very small trade center (pop. 86) in Saskatchewan showed evidence in a study of its social activities -- square-dancing, school sports days, and municipal celebrations -- that participants came from towns 20 or 30 miles away.[15] This is a much larger service area than such a size of town enjoyed for its commercial activities. Trade centers that are legally incorporated have local government activities as well. Many others, incorporated and unincorporated, are the seats of government for surrounding rural municipalities, school districts, hospital districts, or other public entities.

Trade centers are differentiated in their performance of public and recreational functions just as they are in commercial functions. However, the "division of labor" among trade centers in social functions also may be due to differences in the characteristics of the local population such as the proportion of school children or elderly people. This complicates any classification of trade centers on the basis of their level of social functions. In order to describe the entire trade center system it may be assumed that the performance of social functions is highly correlated with both the level and vitality of the commercial functions in a trade centers. A later section will show how the presence of such facilities as a high school and hospital relates to trade center classes. In the present study a classifi-

cation scheme of trade centers, therefore, is based on a definition of commercial functions performed in the province's centers.

The Trade Center Hierarchy

There are seven types of trade centers in Saskatchewan. From the lowest to the highest functional level they are Hamlets, Minimum Convenience centers, Full Convenience centers, Partial Shopping centers, Complete Shopping centers, Secondary Wholesale-Retail centers, and Primary Wholesale-Retail centers.[16] Each center in the province has been classified according to the variety of commercial activities found in the center (see Table 5 and Figure 8). The classification scheme is comparable to those devised for use in other studies of Great Plains trade centers.[17] It is based on the number of retail and service establishments in the center and is explained fully in Appendix A. The trade center classes thus defined are discussed below:

1) Hamlets are the most ubiquitous form of trade center in Saskatchewan. One-third provide only minimal services in grocery shopping and automobile servicing (the threshold level for all trade centers). The remainder offer one or more additional services up to a total of five including

welding and repairs, farm implements, or fuel oil sales. There may be as many as seven business establishments in these centers. When located on a railway they have one or more grain elevators.

2) Minimum Convenience centers provide an increment of services not found in Hamlets: hardware store, lumber yard, hotel, restaurant. Hamlet services tend to reappear in greater strength in these centers which may have as many as thirteen business establishments. All but four such centers are on railways.

3) Full Convenience centers offer the fullest range of convenience goods and services among local centers. They offer a bank, frozen food storage, barber, billiard parlour, and automobile sales in addition to the services characteristically found in lower level centers. Centers in this class may have as many as twenty retail and service firms.

4) Partial Shopping centers offer several specialized establishments not found in lower level centers: drug store, shoe repair shop, women's clothing, meat market, electrical appliance sales and service, movie theatre. These centers are also stronger in the less specialized services as evidenced by more and/or larger facilities compared to lower centers. Public services also play a prominent role: most have a hospital, physician, dentist, lawyer, local newspaper, and many have well-developed public utilities systems. They may have as many as thirty-nine firms.

5) Complete Shopping centers offer the most urban level of retail, professional, and public services found in centers in rural Saskatchewan. These centers, with upwards of one hundred commercial establishments display greater strength in all the services found in lesser centers and offer, in addition, such as dry cleaning, shoe sales, men's clothing, bakery products, tailor, mortician, jeweler, upholstering, tire and battery service, mail order outlets, and variety stores. Many have small department stores. Some wholesale distribution is also carried on from these centers such as for automotive and implement parts and bulk oil. All but a few have a substantial hospital and a comparatively urban level of public utilities.

6) Secondary Wholesale-Retail centers comprise all the small and medium-size cities of the province. They possess the level of retail specialization of the complete shopping centers with more elaboration of services and facilities. In addition, there is an array of wholesaling functions and an increased level of transportation, financial, and public services, and there may be some manufacturing activity. The distinctive wholesaling activities include building materials, fuel, farm equipment, business machines and food. Such

centers are generally regional headquarters for many provincial and federal government services.

7) Primary Wholesale-Retail centers in Saskatchewan are the two largest cities, Regina and Saskatoon. These centers supply a full range of retail and wholesale services and are also important manufacturing centres. Some services, such as the provincial government seat in Regina and the provincial university in Saskatoon, are province-wide in scope. In most services characterizing these centers the service areas are the southern and northern halves of the province, respectively.

TABLE 5: Population, Number of Retail Establishments, and Index of Sales Volume for Trade Centers, Saskatchewan, 1961

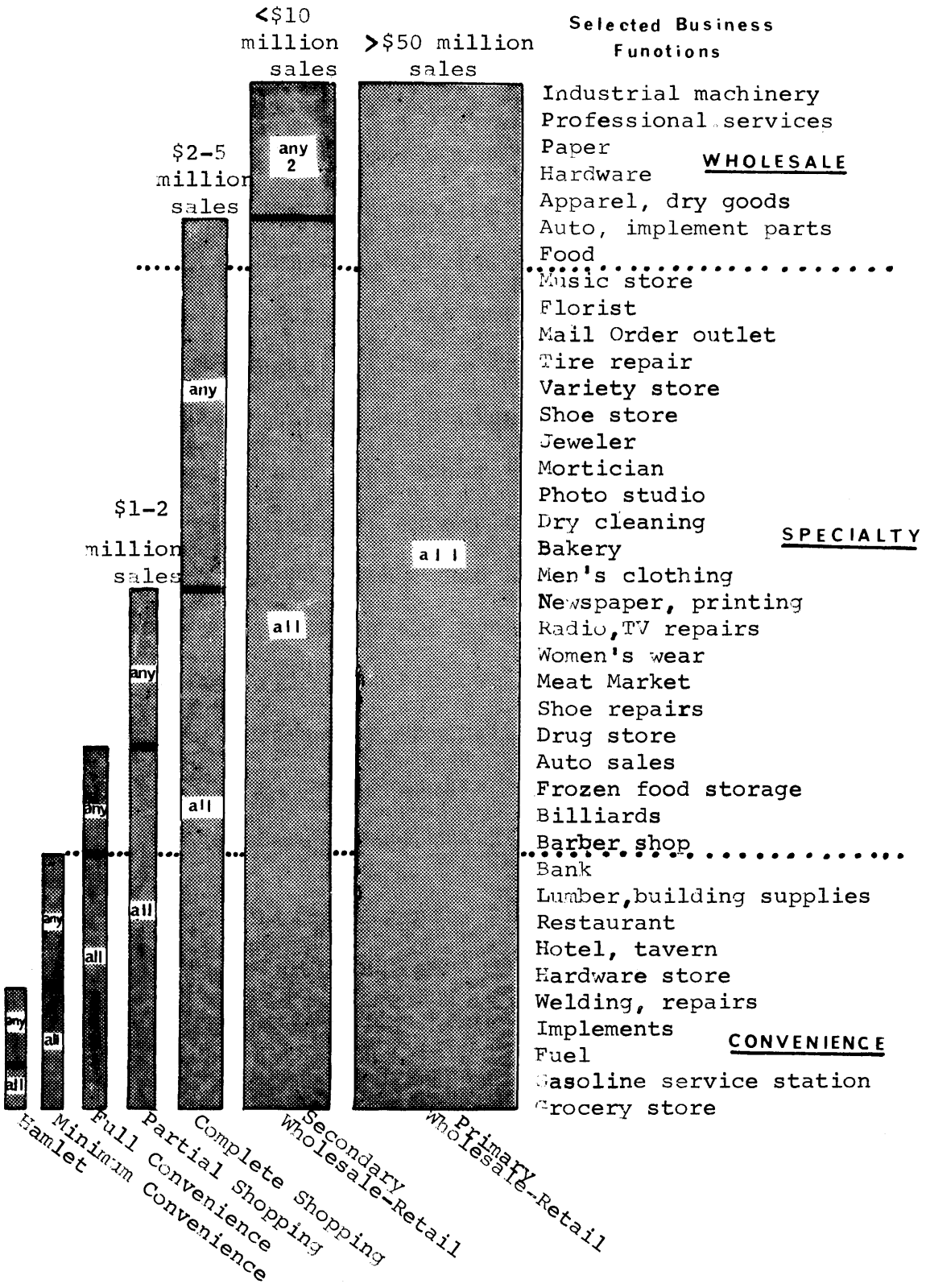
Type of Center	No. of Centers	Population Median[1] (000's)	Population Range (000's)	Avg. No. Firms	Sales Volume[2] Index
Primary Wholesale-Retail	2	103.80	95.5-112.1	1414.0	over 2000
Secondary Wholesale-Retail	9	10.00	5.2-33.2	232.0	500
Complete Shopping	29	1.80	0.9- 4.0	58.5	100
Partial Shopping	85	0.61	0.3- 1.4	26.1	35
Full Convenience	100	0.36	0.2- 1.6	16.5	13
Minimum Convenience	150	0.21	0.08-0.7	9.9	7
Hamlet	404	0.05	0.03-0.3	3.3	under 3

Source: Dun & Bradstreet Reference Book, January 1961 and Census of Canada.

Notes: 1. Population of unincorporated places has been estimated.

2. Sales volume of Complete Shopping centers - 100. Index derived from a limited sample of centers for 1957 contained in files of Saskatchewan, Local Government Continuing Committee.

COMMERCIAL FUNCTIONS OF TRADE CENTERS 8



Two qualifications about the above classification need to be made. First, the types of businesses listed in the descriptions for the various classes of centers are characteristic only of the array of establishments found in these types of centers. They do not constitute a complete list and they are, moreover, symptoms of the differences among trade centers, not the causes of such differences.[18] Second, it is difficult, if not impossible, to define precise thresholds between the classes of centers. The demarcations are more diffuse than the specifications used here suggest. The result is that some trade centers inadvertently may have been assigned to either an immediately higher or lower class than their actual development attests. It is not unreasonable to expect that there is a balancing out of the centers ranked either too high or too low; thus the proportions in each class are probably correct. Furthermore, any centers that fall at or close to the divisions between classes may be defined as "transitional" having either recently shifted from one class to another or are likely to in the future in light of the changes occurring in agriculture and rural life.

The trade center hierarchy that exists today in Saskatchewan shows a less regular frequency distribution among the intermediate levels than might have been expected. Minimum and Full Convenience centers and Partial Shopping centers constitute relatively similar proportions of the total. A better step-like arrangement would exist if the two classes of convenience centers were combined. This would mask, however, the trends

that are occurring among classes of the trade center hierarchy, which indicate a great expansion in the number of Partial Shopping centers and a reduction of the number of convenience centers. These trends are discussed in the next chapter, but suffice it to say here the present distribution appears to represent a stage in a trend in which centers supplying convenience goods are becoming less attractive when they are larger than Hamlets but smaller than Partial Shopping centers.

The present distribution may also be examined in light of the theoretical expectations of the Christaller model. In that hexagonal scheme each center is surrounded by six centers of the next lower rank and each lower ranking center, in turn, is equidistant from three higher ranking centers. Hence, in a complete hexagonal system of trade centers the number of centers of any given rank is equal to twice the number of all higher ranking centers. Starting with the two centers that comprise the Primary Wholesale-Retail centers of Saskatchewan, the frequency distribution under a hexagonal model can be computed as in Table 6. It will be seen from this table that the actual distribution does not conform to the theoretical in either total numbers or the numbers expected in each class (except in one case).[19/] In a later section, it will be shown that the Christaller model is also inapplicable with regard to the spacing of trade centers in Saskatchewan. The trade center hierarchy, therefore, seems more appropriately described in terms of the empirical findings than in terms of such a model.

TABLE 6: Real and Theoretical Distribution of Trade Centers, Saskatchewan, 1961.

Type of Center	Expected Distribution* No.	Total	Actual Distribution No.	Total
Primary Wholesale-Retail	2	--	2	--
Secondary Wholesale-Retail	4	6	9	11
Complete Shopping	12	18	29	40
Partial Shopping	36	54	85	125
Full Convenience	108	162	100	225
Minimum Convenience	324	486	150	375
Hamlet	972	1458	404	779

* Expected distribution based on the rule postulated by Christaller that the number of centers in any rank is twice number of all higher ranking centers. Thus, the second column in each case is a cumulative total.

Population of Trade Centers and Trade Areas

There is a direct correlation between the retail service level of a trade center and its population size. But there is also a wide range of population within any given trade center class. The median and modal values of population for each class

are given in Table 7. Among lower ranking centers the range of population in any class is due in large part to the differing proportions of farm families maintaining town residence from one area to another as well as to differing degrees of attractiveness that one town has over another for residential purposes. Among large centers the range of population represents responses to a variety of local conditions. Many large centers, for example, are railway division points while others serve as supply centers for exploiting various mineral resources in their locale. The classification scheme of trade centers used here also contributes to a range of population within each class by bracketing centers with a range of commercial development.

The very small population size that is typical of lower ranking centers is an important factor in their continued existence. Of Hamlets, 91 per cent have a population under 150 and the median population is only 50. For Minimum Convenience centers, 81 per cent are under 300 population; and of Full Convenience centers, 92 per cent have less than 500 residents. These small sizes underline the difficulty of the lower ranking centers in maintaining a relatively attractive position as commercial and social centers and as places of residence. Neither a high level of physical amenities nor very many local government services can be supported by a tax base that depends upon so few residents. Not only is it difficult for these small communities to raise sufficient money for public projects, but the scale at which they must be built generally means higher per capita costs than for the same project in a large center. A study of 82 trade centers

TABLE 7: Proportion of Trade Centers in 1961 Population Size Classes, Saskatchewan.

Type of Trade Center	No. of Trade Centers	Population Median (000's)	Per cent in 1961 Size Class*						
			0-149	150-299	300-499	500-999	1000-4999	5000-39999	40,000 & over
Primary Wholesale-Retail	2	103.80	0	0	0	0	0	0	100
Secondary Wholesale-Retail	9	10.00	0	0	0	0	0	100	0
Complete Shopping	29	1.80	0	0	0	3	97	0	0
Partial Shopping	85	0.61	0	2	22	65	11		
Full Convenience	100	0.36	0	33	59	7	1	0	0
Minimum Convenience	150	0.21	16	65	16	3	0	0	0
Hamlet	404	0.05	91	8	1	0	0	0	0
Total Number of Trade Centers	779		51	21	13	9	5	1	0

Source: Census of Canada. ☐ Modal values.

* Population of unincorporated trade centers has been estimated.

which possessed combined waterworks and sewerage systems showed that small population size correlated closely with increasing costs per capita for the facilities (r=0.66). Indeed, the correlation would have been closer if costs had been translated into constant dollars to account for different times of installation of the different utilities systems.

The prospects for the future development of Saskatchewan trade centers will also be affected by the age-distribution of their population. Using data available only for incorporated places it was found that the proportion of residents in the dependent age groups (0-14 years of age and over 65) in trade centers differed from rural farm groups and from those in large cities of the province. The population under 15 averaged 31 per cent of the population in the incorporated trade centers compared with 37 per cent in the rural farm population and 32 per cent in cities.[20/] A more significant difference was found in proportions of over-65 population: the average for the incorporated centers was 15 per cent, while for the cities it was only 9 per cent and 6 per cent for rural farm residents. According to these figures the incorporated trade centers should not be as affected by out-migration of young people as farm areas. On the other hand, the incorporated centers can expect higher-than-average death rates because of the very high proportion of elderly people. This not only makes it difficult to maintain population in these centers, but it also raises the question of providing housing, recreation, and other facilities for the aging population.

Average trade area populations for all trade centers appear in Table 8. The size of trade area for each class of center was calculated by dividing the total study area (121,980 sq. mi.) by the total number of centers offering the particular level of goods and services (the number of centers in the class plus all higher ranking centers). To the trade area size were applied the average rural population density and the population of all lower ranking centers which had been averaged for the number of trade areas in the class.

TABLE 8: Average Trade Area Population for Various Types of Trade Centers, Saskatchewan, 1961.

Type of Center	Population (thousands)			
	Center[1]	External Trade Area[2]		Total
		Rural	Small Urban	
Wholesale-Retail[3]	11.2	36.20	17.45	64.85
Complete Shopping	2.43	9.95	3.49	15.87
Partial Shopping	0.61	3.18	0.71	4.50
Full Convenience	0.36	1.77	0.29	2.42
Minimum Convenience	0.21	1.06	0.05	1.32
Hamlet	0.05	0.51	---	0.56

Source: Tables 1, 4, and 8.

Notes:
1. Median value
2. Mean value
3. Both types of Wholesale-Retail centers combined for convenience.

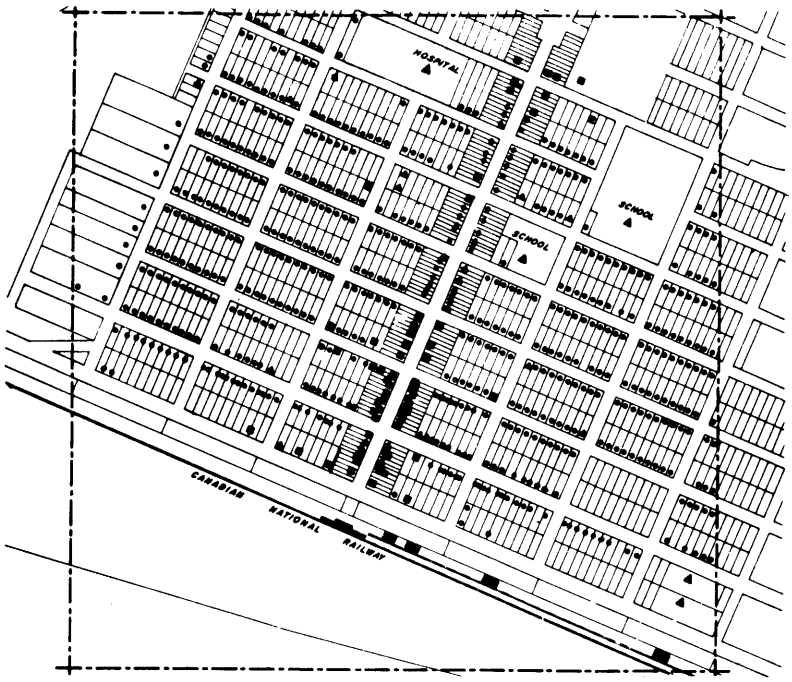
Hamlets serve about 560 rural residents (mostly on farms) on the average, according to these data. In equivalent terms, Hamlets serve about 110 farms, which means that it takes about 33 farms to support one business establishment in the average Hamlet with 3-4 firms (see Table 5 for average number of firms by trade center class). Knowing the possibilities for further rural depopulation points up the tenuous existence of Hamlets that are dependent upon this population base. Successively higher ranking centers include increasing proportions of urban population of smaller centers within their hinterlands. For Complete Shopping centers, an average of 22 per cent of the external trade area population reside in lower ranking places. The ratio of trade center population (median) to total trade area population (mean) varies from 9 per cent in Hamlets to 17 per cent in Wholesale-Retail centers.

The Development of Physical Facilities in Trade Centers

The level of development in physical facilities of Saskatchewan trade centers is closely associated with the level of retail service. As measured by the presence of selected physical facilities in 473 incorporated places, lower ranking centers are much less developed than higher ranking centers in the trade center hierarchy. Table 9 compares the physical facilities found in Saskatchewan centers of various retail service level. Hamlets, for example, are the locations for high schools in only

42 per cent of the cases, and no Hamlets have hospitals. Only one Hamlet has a waterworks system above the minimum required by provincial law (public well, standpipe, or tank). These percentages would be much lower if data for unincorporated centers were available. Minimum Convenience centers have high schools in 77 per cent of the cases, but only 5 per cent of this level of center have a hospital, and the proportions are similarly small for those having full waterworks and sewerage systems. The level of urban development , measured in these terms, becomes progressively higher with higher retail service levels of centers with only a few Complete Shopping centers missing any of these facilities.

Another way to view the level of urban development is the degree of population density of the trade center. For the incorporated centers, for which data was available, it was found that the gross density of population within the area subdivided for urban purposes averaged 2.56 persons per gross acres. In contrast to even the low densities of normal suburban areas of 8-12 persons per gross acre, it can be seen that Saskatchewan trade centers are sparsely developed. Figure 9 shows the extent of urban development of a large and a small trade center in the province. The excessive subdivision into small lots combined with a light scattering of dwellings, as shown in the lower sketch, is typical of small trade centers in the province. It was also found that low density of population in a trade center



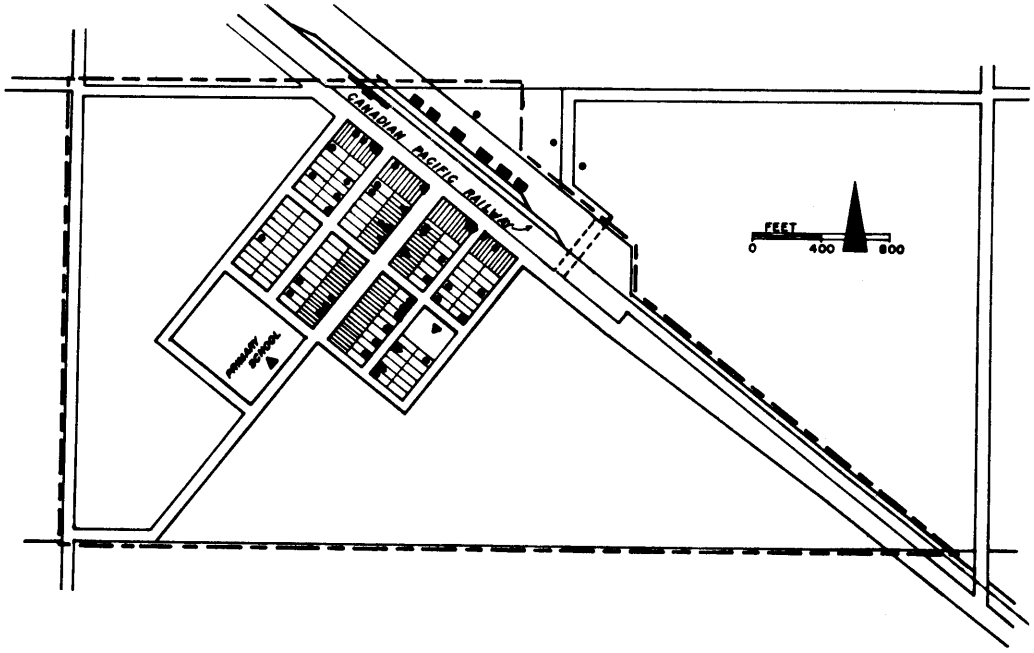
9

LEGEND
● - RESIDENCES
■ - COMMERCIAL BUILDINGS
▲ - PUBLIC AND SEMI-PUBLIC BUILDINGS

Above: Portion of the town of Biggar, population 2,702; gross density 7.2 persons per acre.

Below: Village of Heward, population 136; gross density of built up area 1.4 persons per acre

COMPARATIVE URBAN DEVELOPMENT



exhibits a fairly close correlation with a low level of retail services (r = 0.63) and also with a small population (r=0.64).[21] Clearly, these low densities make it difficult for a community to provide itself with just minimum services at a reasonable cost; in turn, it contributes to an unattractive community setting.

TABLE 9: Percentage of Incorporated Trade Centers With Selected Physical Facilities, Saskatchewan, 1961

Type of Center	High School	Hospital	Waterworks* System	Sewerage System
Primary Wholesale-Retail	100	100	100	100
Secondary Wholesale-Retail	100	100	100	100
Complete Shopping	100	97	93	90
Partial Shopping	95	68	45	51
Full Convenience	93	33	13	27
Minimum Convenience	77	5	3	8
Hamlet	42	0	1	0

* A fully-pressurized system over-and-above that required as a minimum in provincial statutes.

C. THE SPATIAL PATTERN OF TRADE CENTERS

The spatial pattern of trade centers that presently exists in Saskatchewan is shown in Figure 10. Two characteristics of this pattern are immediately apparent -- the very uniform distribution of centers and the beadlike formations that comprise the distribution. Each of these characteristics is discussed below in terms of the density and spacing of centers along with their effect on the size and shape of trade areas.

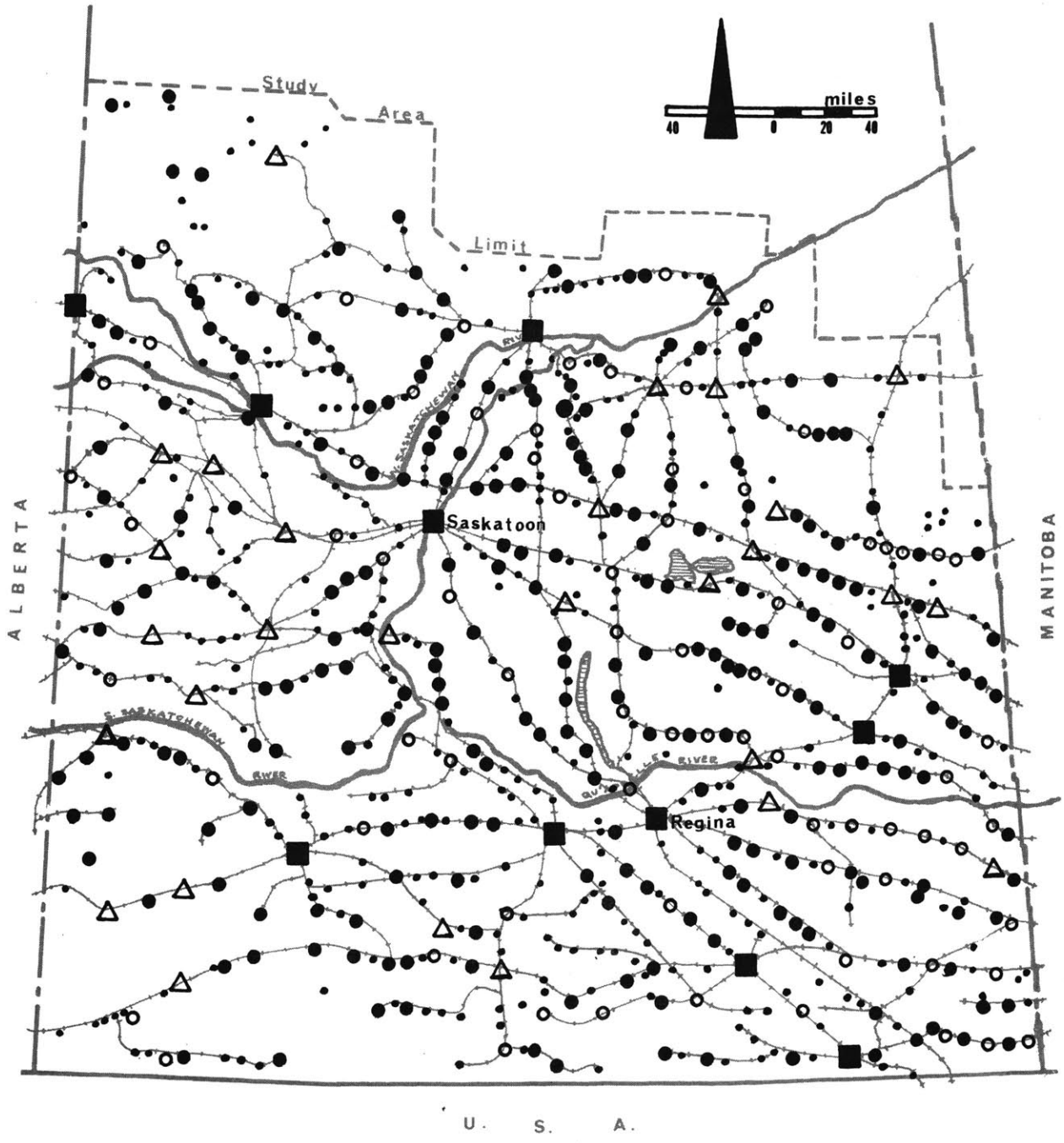
Density of Trade Centers

The general density of trade centers in Saskatchewan is 6.4 per 1000 square miles.[22] Although this is an average figure for the province, the actual distribution is remarkably uniform throughout. If one were to overlay a 1000 square mile grid on a map of Saskatchewan trade centers, it would be found, for the most part, that the density was no higher than 8 nor less than 5 per 1000 square miles. A general density of 6.4 trade centers in every 1000 square miles means that within a radius of less than 18 miles or, conservatively one-half hour's travel by auto a rural family has access to more than six trade centers offering at least Hamlet-level goods and services.*

*An average driving speed of 45 miles per hour is used throughout when discussing accessibility to trade centers. On the straight, smooth, uncrowded roads of rural Saskatchewan, this speed is conservative. In the case referred to here, an 18-mile driving radius would amount to nearly 23 miles by road because roads are located according to the rectangular grid lines and are seldom truly radial.

TRADE CENTER SYSTEM 1961

10



Legend:
- Hamlet
- Convenience Center
- Partial Shopping Center
- Complete Shopping Center
- Wholesale-Retail Center

Table 10 gives the average density for all levels of trade centers and indicates the relative accessibility of each within a driving radius of one hour. Also given in this table is the relative accessibility for centers offering equivalent services at each level. The fairly small time-distance requirements needed to reach the higher level centers contributes greatly to the difficulties of survival of many smaller centers. With the further improvement of roads and the means of transportation the small centers will be even more susceptible to being by-passed in favor of larger centers that have a wider range of goods and services available.

It is important to note that the density of trade centers is not significantly different throughout most of the province. The general density figures apply to almost 85 per cent of the area under study, excluding only the southwestern corner and much of the northern fringe of the agricultural area. Thus, areas settled earliest (e.g., the southeast) are little different now, in trade center density from those settled much later (e.g., the west-central area). Nor is the density much different in areas where the farms average 1000 acres, as in west-central Saskatchewan, than it is in areas where the average size of farm is only half that, as in the east-central part of the province.

Within the area of relative uniformity in trade center density important differences occur regarding the densities of the various kinds of trade centers. In the western half of the

TABLE 10: Average Density and Accessibility of Trade Centers, Saskatchewan, 1961.

Type of Center	Centers in the Class			Centers With the Same Service	
	No. of Centers	Density[1] per 1000 sq.miles	Number[2] within one hour	No. of Centers	Number[2] within one hour
Wholesale-Retail[3]	11	0.1	1	11	1
Complete Shopping	29	0.2	1	40	1
Partial Shopping	85	0.7	3	125	4
Full Convenience	100	0.8	3	225	7
Minimum Convenience	150	1.2	5	375	12
Hamlet	404	3.3	13	779	25

Notes:
1. Based on total study area of 121,900 square miles.
2. Assumed speed of travel, 45 miles per hour over straight-line routes.
3. Both types of Wholesale-Retail centers combined for convenience.

province, for example, the general density of trade centers comprises relatively more Hamlets and less convenience-type centers than in the eastern half. Several areas are characterized by a dense clustering of Complete Shopping centers, as in the north-central portion of Saskatchewan. Other areas have no such configuration. The various arrangements of trade centers found in the province represent different ways of achieving a

spatial division of labor among centers. This may be due, on the one hand, to unique sub-regional conditions including the quality of soils, climate, transportation, non-agricultural resources, or the initiative of local residents. On the other hand, the differences may reflect different stages of development of the trade center system from one area to another.

The uniform trade center density does not hold true for those parts of the province with extremes in rural population density (see Figure 6). The lowest trade center densities occur in southwestern Saskatchewan where the agriculture tends to be characterized by cattle ranching rather than by grain farming. Rural population density is lowest in this area. The highest trade center densities occur in the northeastern part of the province where the greater rainfall and richer soils allow smaller-than-average economic farm units. The uniform density of centers is also disturbed by the presence of large areas of sub-marginal land, varigated topography, or forests scattered throughout the province.

Another facet of the density of trade centers not readily seen on Figure 10 is the lower density of small trade centers in proximity to large centers. Concentric zones described around Complete Shopping centers (and higher ranking centers) show the density of small centers to be two-thirds the provincial average within a ten-mile radius. The provincial average is equalled only up to 15 miles away from a large center, as shown in Table 11. J.H. Kolb, investigating Wisconsin trade

centers in 1923, noted that higher ranking centers, because of the large aggregate of services they provided, tended to reduce the trading area of adjacent lower ranking centers.[23] This also conforms with Reilly's "law of retail gravitation,"[24] where the retail pull of a center varies directly with the size of the center and indirectly with the distance from the center, and with more recent gravitation models. Not explained by any of these models is whether continued expansion of the range of services offered in the large center has a debilitating effect on small nearby centers leading to their eventual demise. This question is broached in the next chapter.

TABLE 11: Density of Small Trade Centers* in Relation to Distance from Large Centers, Saskatchewan, 1961.

Distance Zone	Number per 1000 sq. mi.
within 10 miles	4.0
10-15 miles	6.3
15-20 miles	7.3
Provincial Average All Small Centers	6.2

* Hamlets, Minimum and Full Convenience Centers, and Partial Shopping Centers only.

Spacing of Trade Centers

The spacing of trade centers in Saskatchewan today reflects the influence of the province's railway grain collection system that was established largely in the period 1900-1930. The railways located grain stops every six to ten miles along their routes and then encouraged other commercial development there, too. Over 95 per cent of existing trade centers are located on rail lines; only 38 out of 779 are not thus situated (Figure 10). The average distance between trade centers of all types is 7.4 miles.

The characteristic spacing for each class of trade center is given in Table 12. It shows the average minimum distance between like centers: Hamlets, on the average, are spaced 9.6 miles apart, Minimum Convenience centers average 13.5 miles apart, and so on. (Each center is also within 7.4 miles on the average from a neighboring center of higher, lower, or the same rank regardless of its own characteristic spacing.) The distances separating all classes of centers up to, and including, Complete Shopping centers are relatively small given automobile transportation and the generally good roads of rural Saskatchewan. Hamlets are less than fifteen minutes driving time apart; while Complete Shopping centers are about one hour apart.

The regularity of spacing trade centers in any class increases with the retail service level of the center. Table 12 gives the range of spacing for each level of center and it can be seen that

TABLE 12: Actual and Theoretical Spacing Within Trade Center Classes, Saskatchewan, 1961

Type of Center	Actual Spacing		Expected Spacing*
	Avg. Distance	Range of Spacing	
	(m i l e s)		
Primary Wholesale-Retail	144.0	---	260.0
Secondary Wholesale-Retail	76.5	99 - 185	150.0
Complete Shopping	39.5	20 - 87	86.6
Partial Shopping	22.4	6 - 43	49.9
Full Convenience	19.9	5 - 40	28.8
Minimum Convenience	13.5	3 - 29	16.6
Hamlet	9.6	3 - 228	9.6

* Expected spacing based on "root three" rule postulated by Christaller that the spacing within any class in higher by $\sqrt{3}$ than for the next lowest class.

the ratio of the highest to the lowest distances separating Hamlets and Minimum Convenience centers is just over 9:1. For successively higher level centers the spacing becomes progressively less variant; not only is the ratio between highest and lowest distances smaller for large centers, but the spacing between a greater proportion of centers falls closer to the mean for the class.

Also given on this table is the expected characteristic spacing for all classes of centers under a theoretical hexagonal scheme: i.e., the spacing within any class is higher by $-\sqrt{3}$ than for the next lowest class. The disparity between the real and theoretical spacing shown here further emphasizes the inappropriateness of such a spatial model for describing the Saskatchewan trade center system.

It also can be seen that despite a more or less regular linear arrangement of centers there is a variety of intervals existing between like centers along the rail lines. Even under the influence of transportation routes, a more regular spacing should have been expected much in the manner of the sequence postulated by Kolb and by Christaller. The latter's spatial model of a transportation-oriented system is shown in Figure 11.[25] The expected sequence of different types of centers along transport routes would be, for example, 5,1,2,1, 3,1,2,1,4 over half the distance between Complete Shopping centers (where 5 = a Complete Shopping center, 4 = a Partial Shopping center, etc.). Neither a sequence of this sort nor any other regular arrangement occurs in Saskatchewan; Figure 11 shows a typical portion of the province's trade center system. Within all classes of centers up to Complete Shopping centers there are at least several instances of two or more like centers situated adjacent to one another along rail lines and not separated by a center of either higher or lower rank. In such instances the spacing would seem to be insufficient to provide

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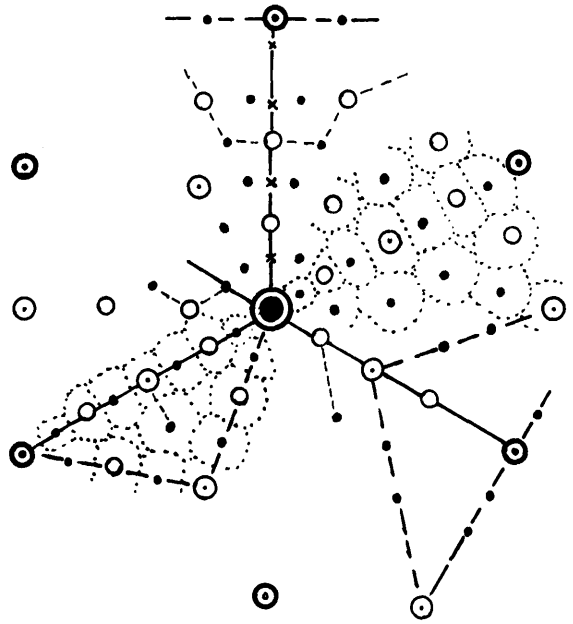
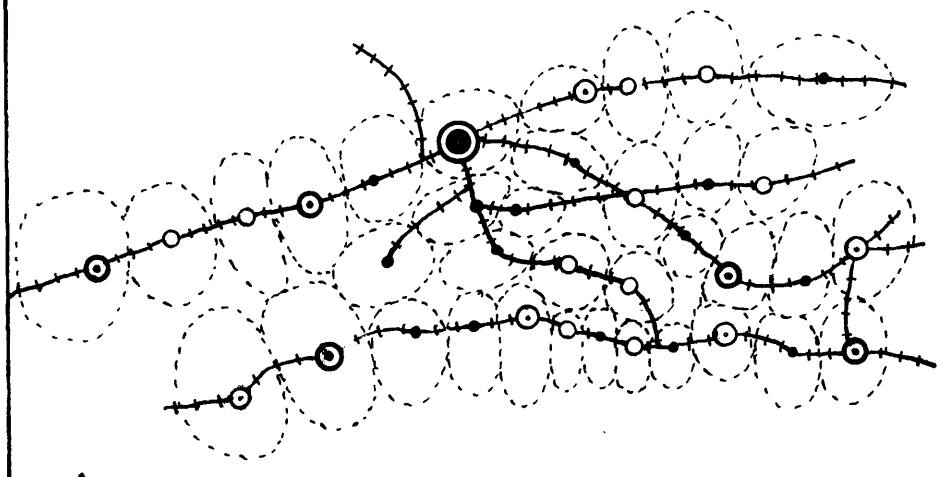


EXPECTED EFFECT OF TRANSPORT ROUTES ON TRADE AREAS (after Christaller)

LEGEND

- • Minimum Convenience Center
- O Full Convenience Center
- ⊙ Partial Shopping Center
- ⊙ Complete Shopping Center
- ◉ Wholesale-Retail Center



ACTUAL EFFECT OF RAILWAYS ON SASKATCHEWAN TRADE AREAS (after Royal Commission)

an adequate size of trade area. The importance of this facet of the spatial pattern for the growth or decline of trade centers is examined in the next chapter.

Size and Shape of Trade Areas

On the evidence thus far presented it is clear that the trade areas of Saskatchewan are generally not hexagonal in form, or even circular. Both the size and shape of trade areas have been affected by the railway orientation of the trade center system. For example, the average spacing of trade centers along rail lines is less (6-10 miles) than the typical spacing between rail lines (12-15 miles). This causes the trade areas of those centers located on railways to be elongated at right angles to the line. This phenomenon is seen in the portion of the trade center system reproduced in Figure 11. The trade areas shown are for convenience level goods and services; they encompass areas of approximately 320 miles each.

Table 13 gives the average sizes of trade areas for all levels of centers. They have been calculated in a similar manner to that described for Table 8, above. The areas indicated on the table are for all centers offering an equivalent level of services. If the trade areas were circular, Hamlets, for example, would be at the center of a circle of 7 miles radius, and so on. Average sizes and shapes vary somewhat due to the lack of complete symmetry in the rail pattern, the presence of natural barriers such as lakes and rivers, and the occurrence of provincial and international boundaries.

TABLE 13: Average Size of Trade Area for Various Types of Trade Centers, Saskatchewan, 1961.

Type of Center	Size of Trade Area[1] (square miles)
Wholesale-Retail[2]	11,090
Complete Shopping	3,050
Partial Shopping	975
Full Convenience	543
Minimum Convenience	325
Hamlet	157

Notes: 1. Obtained by dividing the size of the total area under study (121,900 square miles) by the total number of centers offering the particular level service (centers in the class plus all higher ranking centers).

2. Both types of Wholesale-Retail centers combined for convenience.

The elliptical trade area becomes a less distinguishing feature of trade centers at higher retail service levels. The irregular spacing of trade centers of any class, as noted above, causes trade areas of convenience centers and Partial Shopping centers to vary considerably in size and shape. Some are elongated along the axis of a rail line, others are nearly circular, and still others are a combination of these two shapes.[26/] The more regular spacing of Complete Shopping

centers brings a return to more regular sized trade areas. The latter trading areas still vary greatly in shape due to the effect of boundaries, submarginal land, natural barriers, and transport routes.

The pattern of trade areas for Complete Shopping centers, and for higher ranking centers offering this level of retail service, is shown on Figure 12. The trade areas have been defined by lines drawn at the mid-point along highways separating Complete Shopping centers, then adjusted for rivers, lakes, and differences in the size of competing centers. Larger cities, it was assumed, attract customers from a greater distance than the average Complete Shopping center. The boundaries of trade areas are drawn along the boundaries of rural municipalities, which accounts for the square corners and the somewhat distorted shapes of trade areas. However, the approximation of size and shape is assumed to be close and the use of the minor civil divisions allows the best possibility for comparisons between centers since it is the smallest areal unit for which data is generally available. Tables 14 and 15 present comparisons of these trade centers and their trade areas for a number of characteristics.

Complete Shopping centers serve as the local "downtown" for residents of farms and small towns in rural Saskatchewan. These centers are of growing importance in the trade center system as rural residents demand and are able to support centers offering more specialized goods and services. The median values reported

TABLE 14: Trade Center and Trade Area Characteristics of Complete Shopping Centers, Saskatchewan, 1961

Complete Shopping Center	Shopping Center Characteristics				Trade Area Characteristics		
	Center Pop. (000's)	Number of Firms	Retail Sales 1957 ($mill.)	Per Cent Trade Area Pop.	Trade Area Size (sq.mi.)	Trade Area Pop. (000's)	No. of Small Trade Centers
Assiniboia	2.5	73	5.3	14	5,120	18.0	29
Biggar	2.7	52	3.9	31	1,918	8.7	12
Canora	2.1	73	3.2	11	2,526	18.7	24
Eston	1.7	45	3.0	24	927	3.8	3
Fort Qu'Appelle	1.5	44	1.4	14	1,631	10.9	11
Gravelbourg	1.5	47	2.3	21	1,642	7.8	12
Gull Lake	1.0	41	1.5	43	1,282	3.0	2
Hudson Bay	1.6	41	1.6	22	3,333	7.3	10
Humboldt	3.2	79	5.3	16	2,317	20.1	20
Indian Head	1.8	53	3.0	15	1,674	11.9	13
Kamsack	3.0	70	3.9	35	1,147	8.4	5
Kelvington	0.9	41	1.5	20	965	4.5	5
Kerrobert	1.2	40	1.9	23	1,713	7.5	10
Kindersley	3.0	68	7.0	28	2,593	10.5	13
Leader	1.2	44	1.4	16	2,037	7.4	9
Maple Creek	2.3	65	4.7	44	1,919	5.2	3
Meadow Lake	2.8	71	4.3	26	4.358	11.0	8
Melfort	4.0	93	5.5	23	2,119	17.2	17
Moosomin	1.8	54	3.1	8	3.325	22.0	23
Nipawin	3.8	90	4.5	25	3,124	15.4	13
Outlook	1.3	44	1.6	18	1,454	7.6	13
Rosetown	2.5	67	6.3	14	4,950	18.0	29
Shaunavon	2.2	74	4.8	21	5,766	11.4	18
Tisdale	2.4	69	4.6	18	1,803	13.2	15
Unity	1.9	52	3.4	30	1,009	6.3	8
Wadena	1.3	51	2.2	11	1,724	11.6	10
Watrous	1.5	52	2.0	12	2,743	12.2	23
Wilkie	1.6	48	2.8	24	1,478	6.6	5
Wynyard	1.7	55	3.0	12	2,001	13.7	15
Median Values	1.8	53	3.0	21	1,919	10.9	13

in the table reflect the characteristics of the typical Complete Shopping center in the province. Complete Shopping centers have about 53 different retail and service establishments and a population of about 1800. The trade area they serve covers nearly two thousand square miles in which reside just over ten thousand people. A trade area this size, if circular in form, would have a radius of about 25 miles, or the equivalent of about three quarters of an hour in auto travel from the outermost limits. There are typically 13 small trade centers within such trade areas. The median value of retail sales in Complete Shopping centers in 1957 was 3 million dollars. It is noteworthy that older, well established centers tend to fall above the median values in all the characteristics cited. Centers new to this class, on the other hand, tend to have values below the median. Many of the new centers have developed in the interstices of previously established trade areas of Complete Shopping centers. It is significant that such growth is possible and that these new centers can be sustained on generally smaller trading areas and lower retail sales levels. It suggests the possibility for further filling in the pattern of Complete Shopping centers in areas now seemingly under-served. The southeast and northwest corners of the province appear most in need of such filling in of the pattern.

New Complete Shopping centers will emerge from Partial Shopping centers of today. Some 45 per cent of the latter centers presently are located on or near the boundaries between

COMPLETE SHOPPING CENTER TRADE AREAS*

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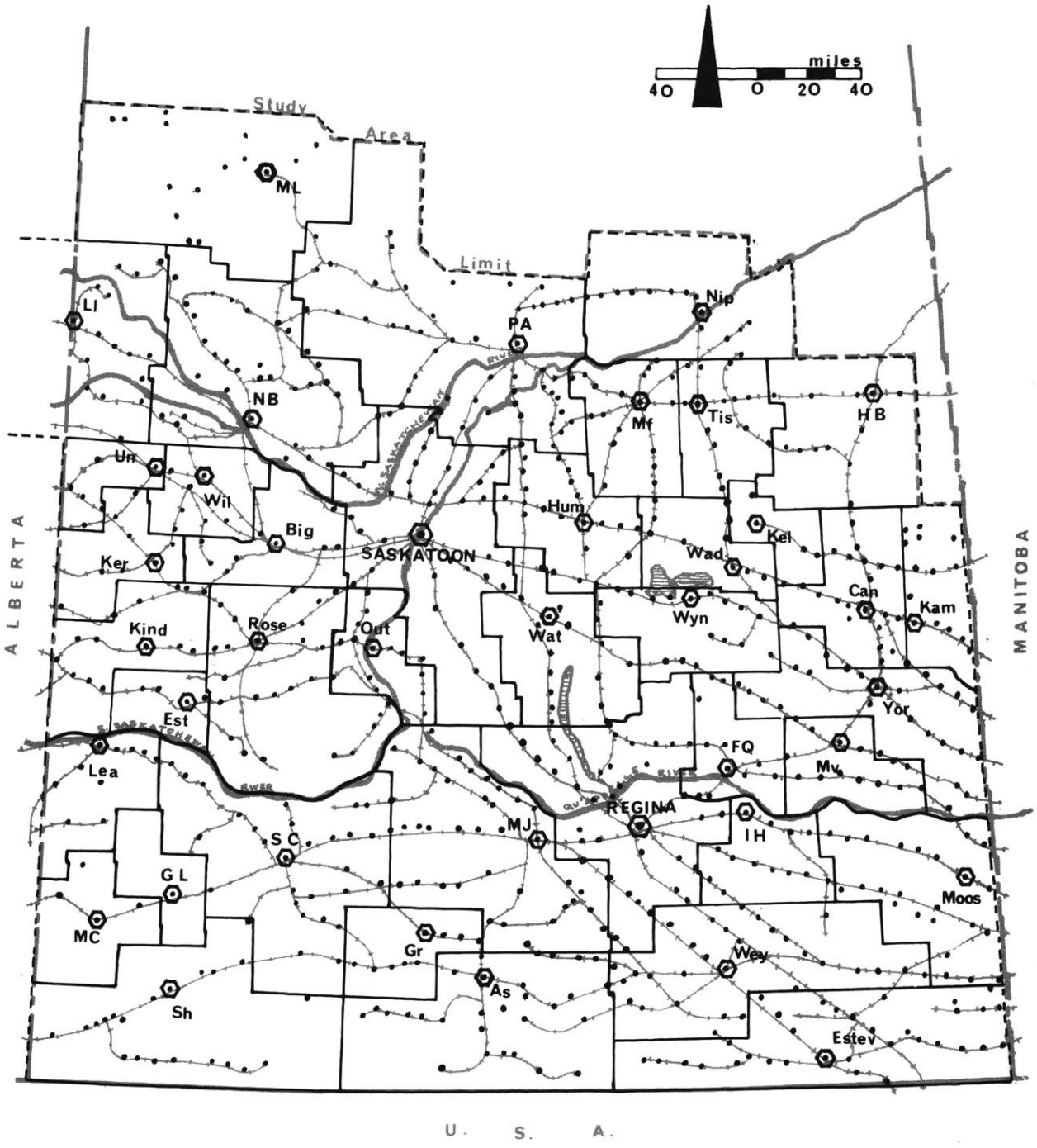


* See Table 14 for Names and Descriptions

Complete Shopping center trade areas. Such locations are advantageous for future development because they afford a maximum of isolation from competing higher level centers.

The same set of trade center characteristics, except for retail sales volumes which were not available, is presented for Wholesale-Retail centers of the province in Table 15. These eleven cities have a median population just over 11,000 and a median array of more than 200 retail and service establishments. Their trade areas are larger than for Complete Shopping centers, thus reflecting the greater attractiveness of the cities. Each city also constitutes a larger proportion of its total trade area population.

TABLE 15: Trade Center and Trade Area Characteristics of Wholesale-Retail Centers, Saskatchewan, 1961.

Wholesale-Retail Center	Trade Center Characteristics			Trade Area Characteristics		
	Center Pop. (000's)	Number of Firms	Per Cent Trade Area Pop.	Trade Area Size (sq.mi.)	Trade Area Pop. (000's)	No. of Small Trade Centers
Estevan	7.7	165	26	4,611	30.1	31
Lloydminster	5.7	115	16	5,308	34.2	30
Melville	5.2	117	30	1,760	17.1	14
Moose Jaw	33.2	487	64	5,226	52.2	38
North Battleford	11.2	289	33	5,120	34.4	38
Prince Albert	24.2	352	43	6,991	56.2	45
Regina	112.1	1,518	82	5,086	137.9	42
Saskatoon	95.5	1,310	73	5,762	130.3	33
Swift Current	12.2	200	36	5,546	33.6	32
Weyburn	9.1	136	32	4,805	28.3	32
Yorkton	10.0	227	28	3,166	31.6	26
Median Values	11.2	227	33	5,120	34.2	32

D. THE PROSPECTS FOR STABILITY IN THE TRADE CENTER SYSTEM

The prevailing theme in this study is the effect of recent changes in agriculture and rural life on the trade centers and trade areas of rural Saskatchewan. The changes that most affect the trade center system are (1) rural depopulation, caused by increasingly larger farms; (2) an expanded physical mobility, due to improved means of travel and improved roads; and (3) an increased "worldliness" among rural people, encouraged by growing farm income levels, increased leisure time, and exposure to the many mass media. These changes have achieved considerable momentum in the past two decades and have affected the trade center system significantly, as the next chapter will show. Not only is it expected that these changes will continue, but the outlook is that some, at least, will be accelerated in the next two decades. What then are the prospects for the present-day pattern of trade centers and trade areas described above?

Rural population dropped by one-third in the two decades just past and was accompanied by a similar drop in the density of rural population and in the number of farms. Increased efficiency in farm machinery and improved farm technology are inevitable in the future, as they are in all walks of life, with the result that farms will get even larger. With more farm people forced off the land, trade area populations will further shrink. If depopulation continues its 1941-61 pace to 1981, the rural trade area population equivalent to every third trade

center will have left the countryside. Such a loss is more critical for small centers that tend to supply those goods and services of which people buy more or less regular amounts regardless of changes in their incomes or tastes. This also means that the trading area for small centers will have to expand by almost one-half on the average in order to encompass the same number of people as are presently in their hinterlands. The farther people have to travel to a small center the more likely they are to by-pass it altogether and patronize a larger center in the vicinity.

The physical mobility of farm residents in Saskatchewan effectively doubled in the decade 1941-51. Virtually no farm was without a car or truck by 1951, whereas ten years before only half the farm families were so equipped.[27] The team-haul community could no longer be a reality when the time consumed in travel by auto would cover six or more times the distance of equivalent travel time by horse and wagon. This increase in mobility, abetted as it has been by improved roads, has meant that equal travel time today gives rural people access to forty times more trade centers than with the previous mode of travel. Moreover, the increased ease of travel afforded by the automobile likely prompts longer trips to fulfill needs for goods and services.[28]

Despite the thinning out of trade centers that has already occurred, the present density of trade centers and their spacing

is still related to team travel. Within one-half hour's drive in rural Saskatchewan today there are at least six centers offering Hamlet-level goods and services, three offering Minimum Convenience level goods and services, and two offering the equivalent of Full Convenience centers. Given the accessibility of the automobile afforded today's rural residents, such densities seem unwarranted. For example, if we were to assume 15 minutes to be a reasonable maximum in travel time in rural Saskatchewan to obtain the daily necessities offered in Hamlets and convenience centers, it would mean that fully one-half of the small centers presently in these classes could be dispensed with. Furthermore, the future holds the high probability of two or more cars per family, which will further increase the number of centers that can be contacted and the distance that can be travelled without inconveniencing the entire household.

Saskatchewan farmers have experienced a continued bettering of their income level in the past two decades as well as decreasing its variability from year to year. Mechanization has permitted an increase in scale, effectiveness, and timeliness of farm operations resulting in higher output and income per operator and less fluctuation in yields and prices. Progress in agricultural science has added further to farm income stability, as has increased government participation in marketing of farm products. These influences on income will continue to apply in the future and incomes will continue to rise. This will tend to favor the purchase of more specialized goods and services

and thus the trade centers that can supply them. In areas lacking in readily accessible centers of the desired caliber it will act as an incentive for their establishment, or more likely for the expansion of already existing large centers.

Increased income of farmers will not directly affect the level or amount of commercial activity in small centers to any great degree. However, when higher income levels are accompanied by increased leisure time and facilitated by improved mobility the trip to the more specialized center to spend the added increment of income often leads to purchases that could have been made at a small, nearby center. The situation thus begins to resemble that in urban areas with the establishment of new "one-stop" sub-regional shopping centers. Local merchants tend to receive a smaller proportion of the sales they normally received in the past.

A rise in the income level also has implications for public services by raising the demand for them and the ability to pay for them. Many trade centers that presently lack a good system of public utilities, roads, etc. are still too small in population to accede to such demands. As a result they are likely to be by-passed as places of residence for farm families seeking more "urban" surroundings. This tendency will further concentrate activities in larger and more developed centers.

The prospects for trade centers and trade areas in light of the changes discussed are for substantial thinning out of

small centers as a result of depopulation and increased mobility. Consequently, there will be an enlargement of the trading areas of the remaining small centers. An almost opposite prospect would seem to be in store for larger centers. Partial and Complete Shopping centers, in particular, can expect to increase in number (with their average trade areas growing smaller as a result) due to increased incomes and mobility which will support more centers supplying specialized goods and services.

Although the tendencies expected in trade centers and trade areas seem plausible, an exact rendering of the extent and location of such changes is difficult to give. Since trends of the next twenty years have their origins in the trends of the past twenty years, among the best estimates of the future will be extrapolations of the 1941-61 changes in trade centers and trade areas. A view of these changes is given in the next chapter.

CHAPTER FOUR: CHANGES IN THE TRADE CENTER SYSTEM, 1941-1961

Since 1941, the trade center system of Saskatchewan has undergone a number of changes that stem from rural depopulation, increasing farm size, and expanded mobility and income. There has been the demise of a large number of centers and the decline of many more. In contrast, the twenty years prior to 1941 showed a continuing increase in rural population, farm size, and a net growth in the number of farm trade centers. Between 1921 and 1941 over two hundred centers emerged and were sustained, or an increase of almost one-third over the number of centers existing in 1921.[1/] There has also been a change in the distribution of trade center classes in the hierarchy of centers, as well as a change in the spatial distribution of trade centers. These changes are discussed below, and the portent for the future on the basis of an extrapolation of the 1941-61 trends is given. In the course of the discussion, the hypotheses posed in Chapter Two regarding changes in the trade center system are tested and the results presented.

A. CHANGES IN THE TRADE CENTER HIERARCHY

Changes in Absolute Numbers by Trade Center Classes

Since 1941, when Saskatchewan recorded its largest number of extant trade centers, there has been a decrease of 127, or 14 per cent, over the total twenty years ago. The decade 1941-51 was the first time the province experienced a net loss in trade center numbers; although 69 new trade centers emerged in that decade, 83 expired. In the succeeding decade the net loss was much greater. Table 16 presents the picture of aggregate changes in the province's trade center system from 1941-1961.

TABLE 16: Aggregate Changes in the Trade Center System, Saskatchewan, 1941-1961

	1941-1951	1951-1961	1961
No. of Trade Centers at the Start of the Period	906	892	779
No. of Trade Centers Emerging in the Decade	69	16	---
No of Trade Centers Expiring in the Decade	83	129	---
No. of Trade Centers Declining (but not expiring) in the Decade	142	148	---

Source: Dun & Bradstreet, Reference Book, 1940, 1950, 1961.

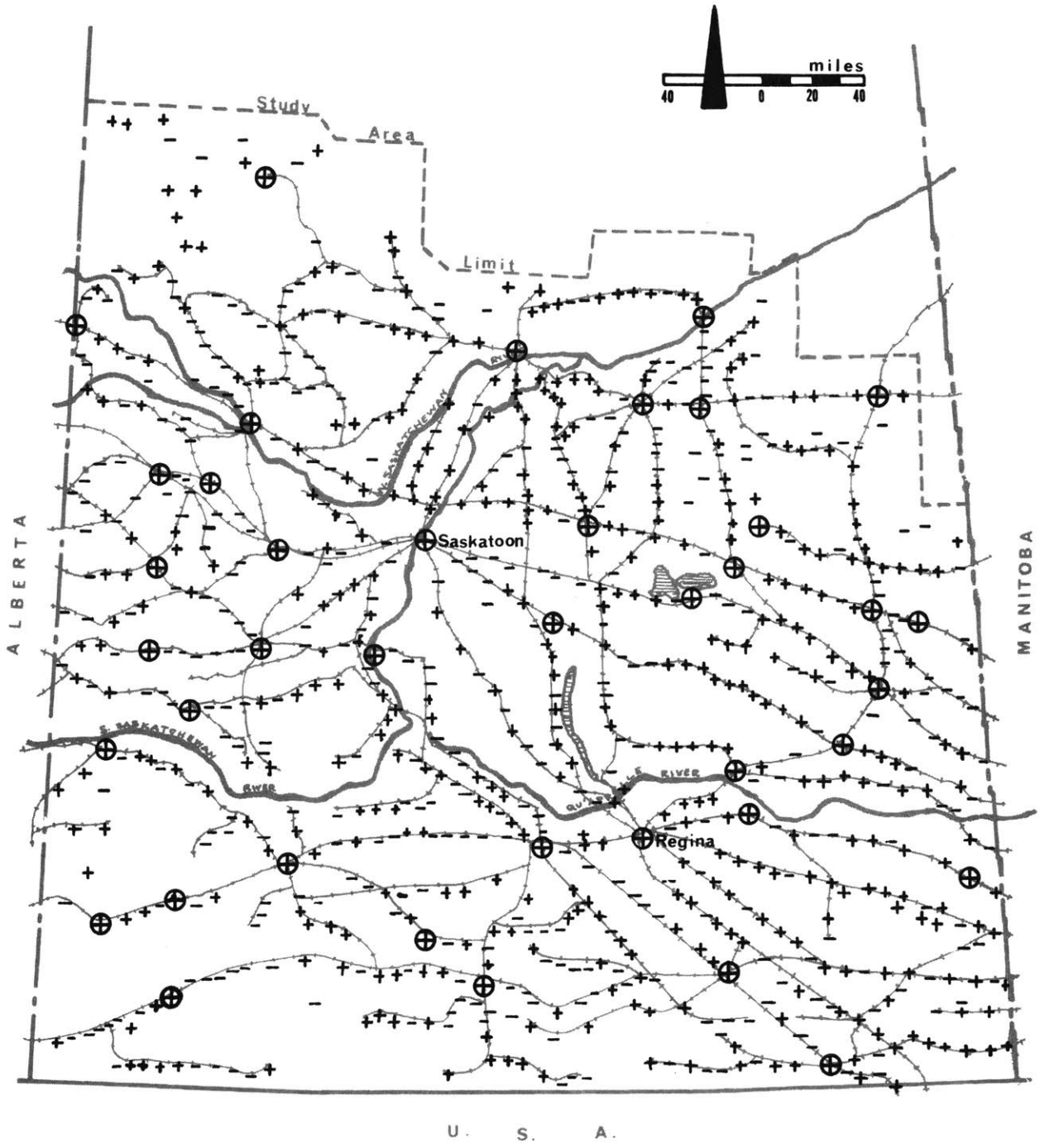
It can be seen from this table that besides outright disappearance of some centers, the system suffered considerable decline among its centers in the same period -- 142 declined in commercial status between 1941 and 1951 and 148 more declined in the following decade. Thus, the past twenty years have seen an increase in the rate of both demise and decline among centers in Saskatchewan. Furthermore, these changes have been general across the province as can be seen in Figure 13.

Viewing the changes in terms of trade center classes, four classes experienced net increases in numbers in the past twenty years, two classes had not decreased in numbers, and one class (that containing only Saskatoon and Regina) remained constant (Table 17). Of the four classes that had not gains in numbers--Secondary Wholesale-Retail, Complete Shopping, and Partial Shopping centers and Hamlets -- the unweighted average increase was 18 per cent. Of the two classes that had net losses in numbers -- Full Convenience and Minimum Convenience centers -- the average decline was 45 per cent.

The changes in the trade center classes were largely one-step changes of either growth or decline. Only 3 per cent of the centers that either grew or declined in trade center status moved through more than one class in the trade center hierarchy, and none moved more than two classes. The matrix of trade center changes presented in Table 18 indicates the proportion of centers in each class at the beginning and end of the period. Each row of the matrix gives the proportion in each class (as specified by the columns) at the end of the 1941-1961 period

TRADE CENTER CHANGES 1941 - 1961

13



given that they were in one class (as specified by the rows) at the beginning of the period. It is not unrealistic to think of these proportions as statistical probabilities of changes that might occur over the next two decades.[2/]

Altogether there are only four non-zero cells beyond the diagonals adjacent to the main diagonal, the latter of which indicate movements of only one class, in Table 18. The three classes in which two-step changes occurred include the Full and Minimum Convenience centers which experienced both growth and decline of this degree in some of their centers and the Partial Shopping centers which showed a few centers declining by this degree. The proportions of centers in each class which remained

TABLE 17: Changes in the Number and Proportion of Trade Centers by Functional Class, Saskatchewan, 1961-1961.

Type of Trade Center	1941 No.	1941 %	1951 No.	1951 %	1961 No.	1961 %	% Change 1941-1961
Primary Wholesale-Retail	2	0.2	2	0.2	2	0.3	0.0
Secondary Wholesale-Retail	5	0.6	8	0.9	9	1.2	80.0
Complete Shopping	26	2.9	23	2.6	29	3.7	11.6
Partial Shopping	57	6.3	66	7.4	85	10.9	49.2
Full Convenience	171	18.9	169	18.9	100	12.7	-41.5
Minimum Convenience	287	31.8	191	21.4	150	19.4	-47.8
Hamlet	358	39.3	433	48.6	404	51.8	12.8
All Trade Centers	906	100.0	892	100.0	779	100.0	-14.0

Source: Same as Table 16.

TABLE 18: Changes in the Proportion of Trade Centers in Each Class, Saskatchewan, 1941-1961.

Class of Center in 1961
(percentages)

Class of Center in 1941	Expired by 1961	Ham-let	Min. Conv.	Full Conv.	Part. Shop.	Comp. Shop.	Sec. W-R	Prim. W-R
New Center (1942-51)	48	52						
Hamlet	46	52	02					
Min. Convenience	02	63	27	07	01			
Full Convenience		06	28	39	26	01		
Partial Shopping			02	19	63	16		
Complete Shopping					12	73	15	
Secondary Wholesale Retail							100	
Primary Wholesale Retail								100

stable in the past twenty-year period are revealed through the percentages in the main diagonal. It can be seen that each of the three lowest ranking types of centers have the least stability: both types of convenience centers have proportions well below 50 per cent in the main diagonal, while the Hamlet class has only 52 per cent showing stability in the period. In each of these lowest ranking classes there are also large entries in the diagonal immediately to the left of the main diagonal thereby indicating that the lack of stability is due to substantial decline or demise occurring in these classes.

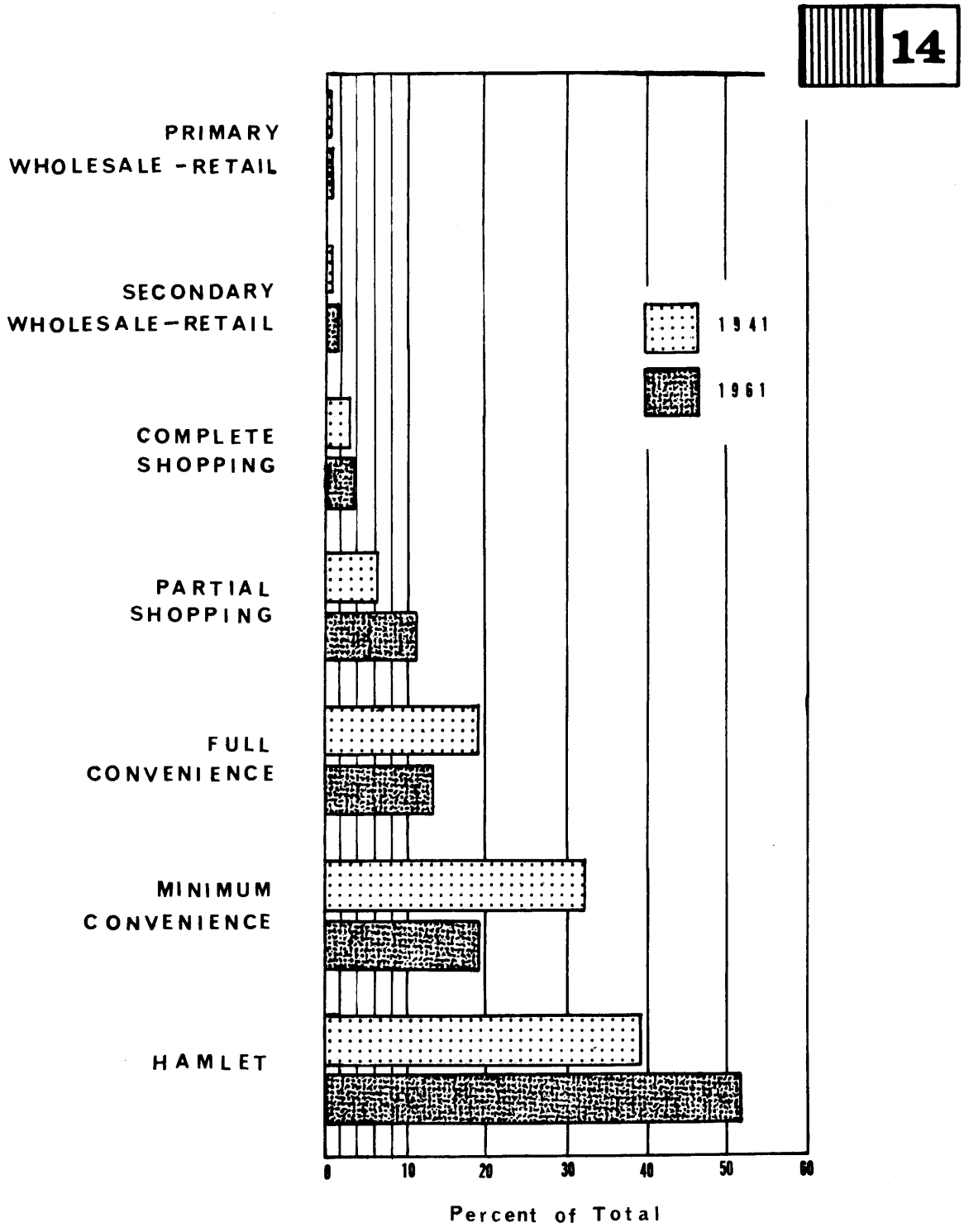
Two other facets of change in the Saskatchewan trade center system are revealed in this table. First, there is a somewhat ambivalent behavior among the centers at the middle of the trade center hierarchy. Full Convenience centers shifted equally in both directions; to some extent, but less pronounced, the behavior is repeated by the Partial Shopping centers and the Complete Shopping centers. This seems to be a clear indication of the state of flux in the current organization of the trade center system particularly in its middle range. The second aspect to be noted is the high mortality rate among the centers that emerged subsequent to 1941. Of the latter centers, which were shown to be present in 1951, fully 48 per cent had disappeared by 1961. Most of the recently appearing centers are very small which probably accounts largely for their high rate of early disappearance.

The Changing Distribution of Trade Center Classes

Along with the changes in the number of trade centers since 1941 has come a distinct shift in the proportion of trade centers accounted for by each class. These changes in distribution within the trade center hierarchy are shown on Figure 14 and in Tables 17 and 18. According to these data, three situations are developing in the trade center system. First, there is a growing number and proportion of the lowest level centers, Hamlets; Hamlets now account for more than one-half of all the

trade centers in Saskatchewan, although in numbers they have undergone a slight downturn from the high reached in 1951. The reason for this growing proportion of Hamlets is not the emergence of new centers but rather the decline among Minimum Convenience centers. Second, there is a very fast rate of decline among trade centers of the convenience type. For both Minimum and Full Convenience centers the rate of decline actually increased in the second of the two decades under study. And, third, there is a large increase in the proportion of trade centers accounted for by the four top classes. There were only 90 of them in 1941 and they accounted for 10 per cent of the total; now there are 125 of them and they account for 16 per cent.

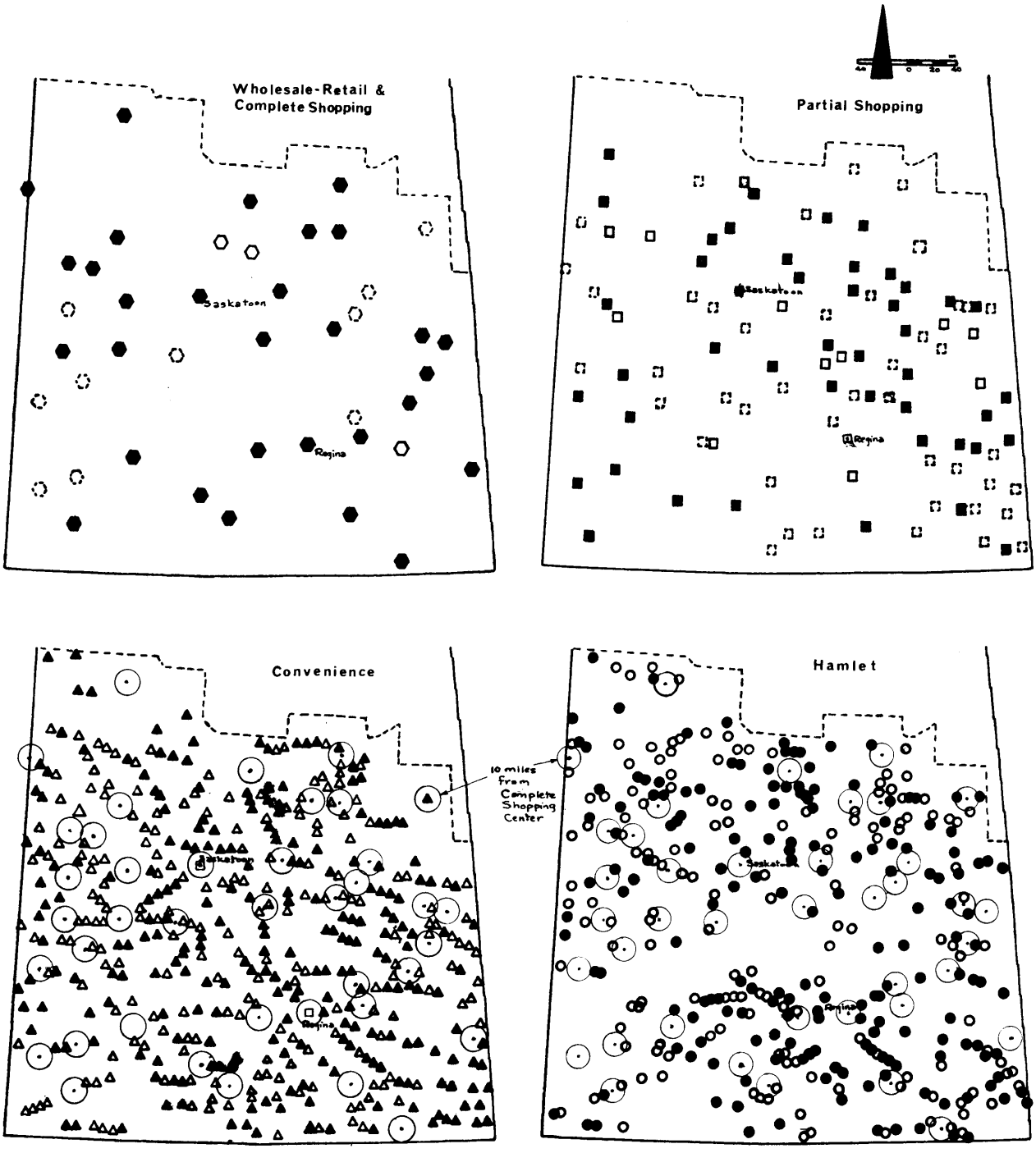
In the literature reviewed in Chapter Two inferences were drawn by several authors upon assessing changes in trade center systems that commercial needs of rural people were being served increasingly by only two types of centers -- those serving local, day-to-day needs and those serving specialized needs of large areas.[3/] This prompted the formulation of Hypothesis (2) such that this might be found to be occurring in Saskatchewan. The sharp decline of the convenience type of center heretofore known in the province may presage a pattern like that hypothesized (see Table 18). Local, day-to-day needs may be met adequately in centers much like present Hamlets, the majority of which will be convenience centers that decline in the next two decades. Today, there are one-third less convenience centers than Hamlets, whereas twenty years ago there



DISTRIBUTION of TRADE CENTER CLASSES: 1941-61

CHANGES WITHIN TRADE CENTER CLASSES 1941-1961

15



Symbols: Solid = Growing or Stable; Open = Declining or Expired; Dashed = New

were almost 30 per cent more.

The picture of changes in the upper end of the trade center hierarchy is not as clear as for the lower end. Excluding the two provincial centers, Regina and Saskatoon, there has been an increase in the number and proportion of Partial Shopping, Complete Shopping, and Secondary Wholesale-Reatil centers since 1941. There does not, however, appear to be any strong tendency for the convergence of higher ranking centers into one type of shopping center providing specialized goods and services to rural residents over large areas. Another possibility is suggested by the strong increase in the number and proportion (almost 50 per cent in both cases) of Partial Shopping centers. The latter centers may develop a special role as an intermediate level shopping center for rural residents much as do "community shopping areas" for residents in a large city. Partial Shopping centers have been emerging at remarkably regular intervals and their characteristic spacing is now just over 22 miles. Assuming half this distance to constitute the radius of their trading area, this puts them easily within twenty minutes drive of rural residents at the extremes of the trading area. A third, or upper, level of specialization in trade centers might then be postulated on the basis of the data presented. Both Secondary Wholesale-Retail and Complete Shopping centers have increased substantially in number and proportion with new ones emerging at intervals of 30-50 miles (see Figure 15).

Rates of Change Among Trade Center Classes

The aggregate changes in the number of trade centers in each class show only part of the picture of what has been occurring. Each class of center was experienced different rates of growth, and decline, and stability. In Table 19 are the results of grouping together those centers in each class that either shifted up one or more classes ("growing"), shifted downward one or more classes ("declining"), or remained in the same class ("Stable") over each of the two decades from 1941. Thus, the rates of change as well as the tendency for these rates to increase or decrease can be seen.

TABLE 19: Proportion of "Growing," "Stable, and "Declining" Trade Centers, Saskatchewan, 1941-1951 and 1951-1961.

Type of Trade Center	Growing		Stable		Declining	
	1941-51	1951-61	1941-51	1951-61	1941-51	1951-61
	(p e r c e n t a g e s)					
Primary Wholesale-Retail	--	--	100.0	100.0	--	--
Secondary Wholesale-Retail	--	--	100.0	100.0	--	--
Complete Shopping	11.5	4.2	77.0	95.8	11.5	--
Partial Shopping	5.3	9.1	75.4	78.8	19.3	12.1
Full Convenience	14.3	20.1	72.0	46.8	13.7	33.1
Minimum Convenience	11.0	6.3	53.8	48.7	35.0	45.0
Hamlet	3.7	2.1	73.6	68.5	22.7	29.4

Source: Same as Table 16

In each of the three lowest classes of trade centers there has been a marked increase in the rate of decline. This has been accompanied by a decrease in stability among these classes. However, these changes were not as great for Hamlets in the province as for the convenience type of centers. Nearly 70 per cent of the Hamlets remained in the class they were in at the beginning of each decade while for the convenience centers the figure was less than 50 per cent remaining stable. Similarly, Hamlets increased their rate of decline at a lesser pace than for the convenience centers. Growth among these lowest level centers was not as consistent as the picture of decline: both Hamlets and Minimum Convenience centers experienced a halving of the proportion growing to a higher class, but the Full Convenience centers increased substantially their ability to grow into Partial Shopping centers.

The foregoing data generally substantiates the thesis that small trade centers are declining at a faster rate than large trade centers, as posited by Hypothesis (1). However, what would have been expected -- an increasing rate of decline for each successively lower rank of center -- is not fully borne out by these findings. Hamlets are declining at a high rate, but it is only two-thirds the rate of decline of the Minimum Convenience centers and is less than for the Full Convenience centers, at least in the 1951-1961 decade. Apparently, the most unstable groups of centers are the two types of convenience centers.

Population Changes of Trade Centers

Although in this study population change is not considered a sufficient measure of trade center viability, it is interesting to note the population changes coincident with the changes in centers just described. It is not possible to derive a complete picture of trade center population changes due to the paucity of data regarding unincorporated centers, but for the more than half that are incorporated information is available. Population changes for 478 trade centers for the period 1941-1961 are presented in Table 20. The seven size categories used here closely approximate the ranges of population into which fall the seven trade center classes used previously: i.e., Hamlets are mostly less than 150 population, Minimum Convenience centers are mostly less than 300 population, and so on.

TABLE 20: Population Changes by Size of Incorporated Trade Center, Saskatchewan, 1941-51 and 1951-61.

Population Size Class[1]	1941-1951			1951-1961		
	No. Growing or Stable[2]	Declining No.	%	No. Growing or Stable[2]	Declining No.	%
40,000 +	2	--	0	2	—	0
5,000-39,999	5	—	0.0	6	--	0.0
1,000- 4,999	23	--	0.0	29	—	0.0
500-999	29	7	19.5	44	7	13.7
300-499	60	13	17.8	88	17	13.7
150-299	130	48	27.0	112	37	24.8
0-149	97	64	39.7	82	54	39.7
TOTAL	346	132	27.6	363	115	23.6

Source: Census of Canada.

Notes: 1. Population at the beginning of each decade.
2. Includes all centers experiencing no decline in each decade.

Again it can be seen that small trade centers are most susceptible to decline (population decline in this case). Almost 40 per cent of the centers with less than 150 residents declined in size in the 1941-1961 period, whereas for the next highest category the rate of decline was only two-thirds that pace. Among the larger centers, none over 1000 population in 1941 suffered a drop in population up to 1961. These data may be viewed in at least three ways: in the first place they show that no matter what the functional level of a center it is more likely to lose population if it is small in size to begin with. In the second place, since the size classes parallel retail service levels, they show that Hamlets are more likely to lose population than higher ranking centers. Undoubtedly, if data were available for unincorporated centers which comprise the bulk of Hamlets and which seldom exceed 100 population, these relationships would be even stronger. The third way of viewing these data is, however, not as consistent with previous findings: for example, the two types of convenience centers which fall almost entirely within the population categories 150-299 and 300-499 have not shown as much tendency to decline in population size as they did in retail service level.

B. CHANGES IN THE SPATIAL DISTRIBUTION OF TRADE CENTERS

The changes in the trade center system of Saskatchewan for the 1941-1961 period pictured in Figures 13 and 15 do not exhibit readily apparent spatial patterns. Indeed, it is the purpose of this study to determine if any such patterns exist. Hence, we now will analyze the changes that have been mapped here in terms of three spatial dimensions: density, spacing, and location of trade centers. Density is measured for all centers and for each type of center in the total area of the province. This allows, among other things, comparisons to be made of changes in the relative accessibility of trade centers. Density will also be measured for sub-areas of the province to determine if there have been regional differences in the pattern of trade center change. Density, combined with a measure of location, is used to examine the effect on small trade centers located in proximity to large centers. The spacing between trade centers in distance (and time) terms is investigated for the beginning and the end of the period. Spacing of centers of the same class is combined with a measure of location to determine the effect of below-average spacing on adjacent like-centers, a widespread spatial phenomenon in Saskatchewan.

The Changing Density of Trade Centers

The Province-wide Picture. The general density of trade centers in Saskatchewan declined at a similar rate to the decline

in the number of centers since 1941 (the same land base prevails in both cases). That is, there was a drop of 14 per cent in the density of all trade centers measured across the province which lowered the density from 7.4 to 6.4 per 1000 square miles. As a consequence, rural families today have access to one less trade center offering at least Hamlet-level goods and services within one-half hour (by auto) radius than they had in 1941.

Among the various classes of trade centers the changes in density differ according to the changes in number experienced by each class. These are reported in Table 21. This table shows the accessibility for each type of center relative to their general density throughout the province. Hamlets, as a group, are more accessible now than they were in 1941, and the same is true for Partial Shopping centers and all higher ranking places. Convenience centers, on the other hand, have become almost one-half as accessible as they were twenty years ago because of their much fewer numbers.

Also shown on this table, and possibly most important, is the relative accessibility of various levels of goods and services. Since, as we have seen, rural residents do not restrict their shopping for particular goods and services to a single center offering only that level, it is important to note the change in relative accessibility of equivalent-centers. Thus, it can be seen that each of the three lower levels of goods and services are less accessible today than in 1941, whereas for the four top categories the accessibility is greater today.

TABLE 21: Density and Relative Accessibility of Trade Centers, Saskatchewan, 1941-1961.

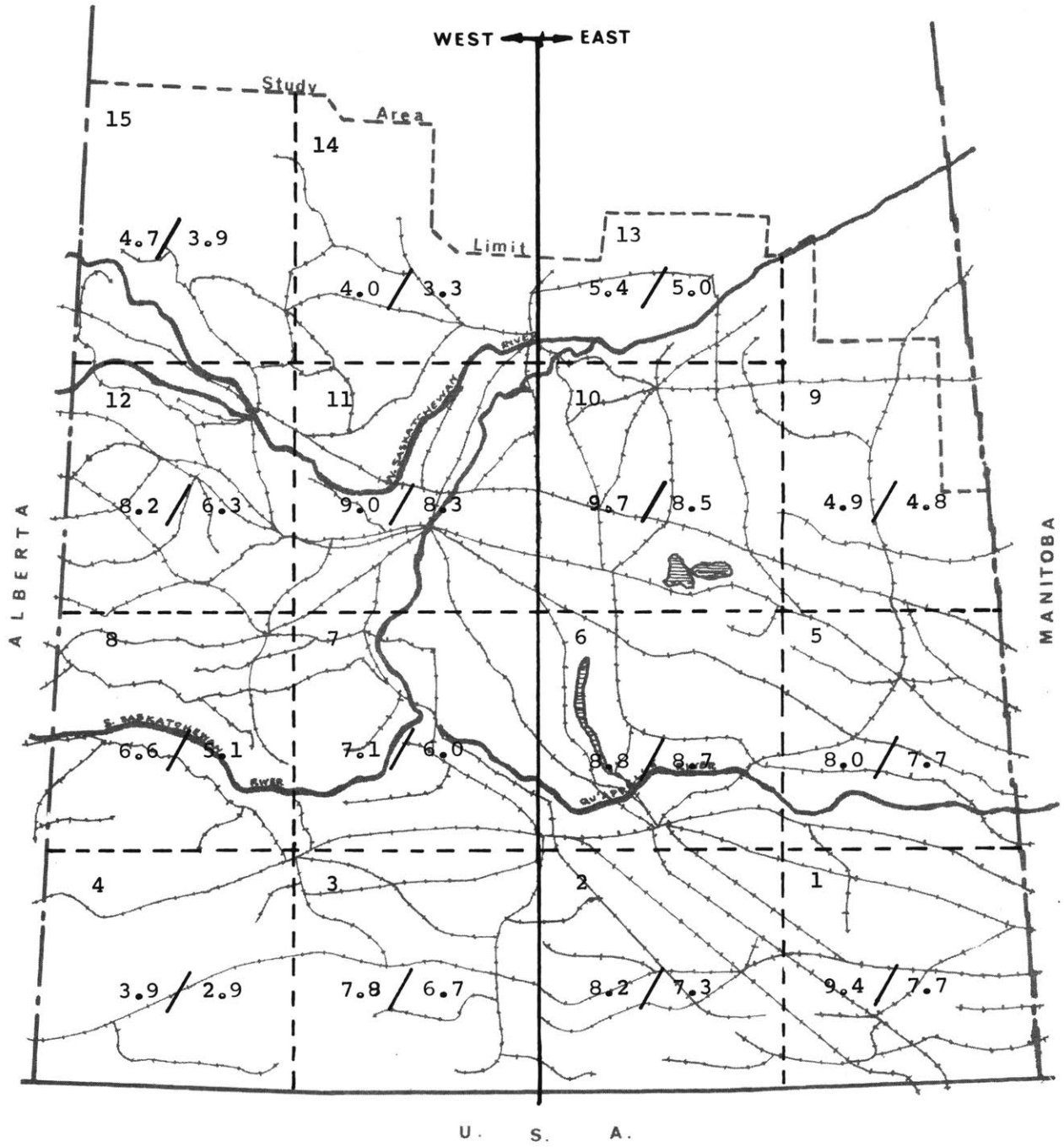
	Hamlet	Min. Conv.	Full Conv.	Part. Shop.	Comp. Shop	Wholesale Retail	All Centers
1941:							
No. of Centers	358	287	171	57	26	7	906
Density (No/1000 sq. mi.)	2.9	2.3	1.4	0.5	0.2	0.1	7.4
No. Within One Hour by Car	9	7	4	1.5	1	0.4	23
1961:							
No. of Centers	404	150	100	85	29	11	779
Density (No/1000 sq.mi.)	3.3	1.2	0.8	0.7	0.3	0.1	5.4
No. Within One Hour by Car	10	4	2	2	1	0.4	20
Centers Offering Equivalent Level Services:							
No. Within ½-hour by car							
1941:	7.4	4.5	2.1	0.7	0.3	0.1	---
1961:	6.4	3.1	1.8	1.0	0.3	0.1	---

This finding further emphasizes the difficulty small trade centers have in maintaining their competitive position in the trade center system.

Sub-regional Differences in Trade Center Density. The densities of trade centers in various parts of Saskatchewan for both 1941 and 1961 are shown in Figure 16. The province, as divided here into roughly 10,000 square mile sections, evidences a high degree of uniformity in the density of trade centers at both the beginning and end of the period, except for the south-western and northern fringe areas. The change in density did not, however, affect all areas to a similar degree. Southern and western parts of the province declined in trade center density between 11 and 26 per cent. Eastern, central, and northern Saskatchewan experienced only a 1 to 12 per cent range in the decline of trade center density. Further, if we divide the province into eastern and western halves it will be seen that average trade center densities declined by about 8 and 16 per cent, respectively. This is explainable largely by the fact that the western half of the province generally has suffered more and faster rural depopulation than the eastern half. In the twenty years prior to 1941, the western half of Saskatchewan increased its farm size almost 40 per cent faster and had a net loss in rural population of about 12 per cent compared to the eastern half which continued to show a net gain in rural population of 43 per cent in the 1921-1941 period. It is only since 1941 that eastern Saskatchewan has picked up the tempo of change of the western area in terms of depopulation and expanding farm size. Since it must be assumed that trade center decline and demise follow rural depopulation (probably after some lag as individual firms attempt to adjust), the differences just cited between

TRADE CENTER DENSITY
1941 and 1961

16



1941 / 1961 Trade Centers per 1000 sq. mi.

western and eastern Saskatchewan are understandable. Moreover, we should expect trade center densities in eastern parts of the province to decline more rapidly in the coming decades than in those just past.

There are also important sub-regional differences between eastern and western Saskatchewan in the mixture of trade centers that comprise the density distribution of each area. Western Saskatchewan's trade centers at the present time include an above-average proportion of Hamlets -- 57 per cent in the west compared to 52 per cent for the province and 48 per cent for the east. The same relationships prevailed in 1941 with Hamlets being relatively more numerous in the west than in the east. The converse was true for the two types of convenience centers, where in both 1941 and 1961 the west had proportionately less convenience centers among its trade centers than did the east. If this is indicative of a more advanced stage of development in the trade center system in the western part of Saskatchewan, then the eastern part of the province must expect a substantial lowering of its proportion of convenience centers and a raising of its proportion of Hamlets.

Changes in Small Trade Centers Situated in Proximity to Large Centers

Hypothesis (3a), posed in Chapter Two, contended that if large centers had a debilitating effect on small nearby centers,

then we should find the density of small trade centers to be decreasing with increasing proximity to larger centers. It has already been demonstrated (see Chapter Three) that this was the case in 1961. Table 22 presents data for both 1941 and 1961 on the density of small trade centers (Partial Shopping centers and smaller) within three concentric zones -- 0-10 miles, 10-15 miles, and 15-20 miles -- around all large trade centers (Complete Shopping centers and larger).

TABLE 22: Change in Density of Small Trade Centers in Relation to Distance from Large Centers,[1] Saskatchewan, 1941-1961.

Distance Zone	1941 No./1000 sq. mi.	1961 No./1000 sq. mi.	Per cent Change 1941-61
within 10 miles	5.2	4.0	-23.1
10-15 miles	7.6	6.3	-17.1
15-20 miles	8.2	7.3	-11.0
Prov. Avg. All Small Centers	7.2	6.2	-16.7

Notes: 1. Complete Shopping centers and above.

The data show that in 1941 as well as in 1961 the density of small trade centers decreased with increasing proximity to large centers. Not until the distance was between 10 and 15 miles was the average density for small centers reached in either case. That this is more than the phenomenon of large centers

having larger trade areas than small centers in the same goods, as noted by Kolb, is the fact that the density of the small nearby centers within the 0-10 mile zone decreased during the period. Furthermore, the decrease in density was 40 per cent faster than the decrease in density of small centers in the province as a whole. In the 10-15 mile zone the density of small trade centers closely approximates the provincial average, but even here there is evidence that attrition of small centers may be extended to a wider area soon.

The data show, conversely, that small centers beyond 15 miles from a large center are much less likely to decline in density than those that are closer. This condition holds despite the fact that the small centers are much closer together in the 15-20 mile zone than in the province as a whole.

Another way in which to view the effect of large centers on small nearby centers is to examine the rate of decline (and demise) in retail service level among the various classes of small trade centers in the same three concentric zones, i.e., Hypothesis (3b). The effect of proximity to large centers on the rate of decline of small trade centers is shown in Table 23. For all small centers within ten miles of a large center, 61 per cent declined in retail service level compared to a rate of decline of 51 per cent for all small trade centers regardless of location. In the 10-15 mile zone, decline of small centers was still above the provincial average for all small centers. Small centers continued to decline in the outer

zone, 15-20 miles, but the rate was considerably below the provincial rate of decline for all small centers or for any class of small centers.

TABLE 23: Rate of Decline Among Small Trade Centers in Relation to Distance from Large Centers,[1] Saskatchewan, 1941-1961.

Distance Zone	Hamlet	Minimum Conven.	Full Conven.	Partial Shopping	All Small Centers
	(p e r c e n t a g e s)				
within 10 miles	55	81	43	100	61
10-15 miles	51	65	50	29	55
15-20 miles	36	38	24	29	38
Prov. Avg. All Locations	46	58	34	23	51

Notes: 1. Complete Shopping centers and above.

Hypothesis (3) both as regards to falling density and a growing rate of decline among small trade centers that are situated in close proximity to large centers is borne out by the data presented here. To give an even more precise picture of the nature of trade center decline in Saskatchewan, these findings may be combined with the results of testing the first hypothesis, which showed that small centers in general had the greatest propensity to decline. That is, not only are small centers more susceptible to decline in retail service level, but also the closer they are located to large centers the greater are their

chances to decline. In a zone up to 15 miles surrounding large centers there is a probability of 0.55-0.61 that small centers will decline and even expire.

Changes in the Spacing of Trade Centers

Observations made of recent changes in agriculture and rural life -- of depopulation, increased physical mobility, and expanded farm incomes -- suggest the possibility of complementary changes in the spacing of trade centers. Depopulation reduces the number of consumers in any given trade center hinterland and thereby disadvantages those centers most dependent upon a certain volume of customers to support their businesses, that is, Hamlets and convenience centers. Increased mobility and income favor more distant centers offering specialized goods and services, such as the Partial Shopping centers and above. Hypothesis (4) suggested changes of this sort might be found to increase the distance between similar centers at the lower end of the trade center hierarchy while decreasing the distance between similar centers at the upper end of the hierarchy. Table 24 presents the data resulting from testing this hypothesis.

Small trade centers, according to the table, are farther apart today than in 1941 and large centers are closer together. The characteristic spacing between Hamlets increased by more than 5 per cent even though the density of such centers increased in the period. This is due to the decline of many convenience centers, with their greater spacing, to Hamlet level. Minimum

TABLE 24: Characteristic Spacing Within Trade Center Classes, Saskatchewan, 1941 and 1961.

Type of Center	1941	1961	Per cent Change
	(miles apart)		
Primary Wholesale-Retail	144	144	---
Secondary Wholesale-Retail	119.8	67.5	-43.7
Complete Shopping	40.4	39.5	- 2.2
Partial Shopping	25.9	22.5	-13.1
Full Convenience	15.4	19.8	+22.2
Minimum Convenience	10.3	13.5	+31.1
Hamlet	9.1	9.6	+ 5.5

Convenience centers are about one-third farther apart and Full Convenience centers one-fifth farther apart than either were in 1941. Partial Shopping and Complete Shopping centers and Secondary Wholesale-Retail centers are all closer together on the average. The Primary Wholesale-Retail centers of Regina and Saskatoon remain, of course, as before.

Other than for the general division into small and large trade centers just made, there is not a fully consistent pattern of change in the characteristic spacing of trade centers such as by increasing retail service level, by changes in density of

centers, or by changes in number of centers. In some cases changes in the spacing appear to have been affected by areally selective tendencies. For example, Complete Shopping centers, although growing in number by more than 25 per cent since 1951, tended to emerge in areas of the province where the spacing of such centers was already small, and thus the characteristic spacing of this class of centers was only decreased by 2 per cent. And, as already noted, small trade centers in proximity to large centers have declined in density faster than small centers elsewhere which adds further to the increase in spacing of small centers since those located close to large centers were already more widely spaced. In other cases, changes in spacing appear to be affected by local spatial tendencies, such as the closeness of like centers, or by non-spatial factors such as population characteristics. However, it can be said that where the changes in the characteristic spacing of a class of trade centers has been large, whether decreasing or increasing, there has been a definite tendency to more regular spacing of centers in the class.

Changes in the Linear Arrangement of Trade Centers

In Chapter Three it was noted for 1961 that there existed considerable variety in the sequence of different types of trade centers in the linear arrangements that characterize the spatial distribution of Saskatchewan centers. The variety was no less evident in 1941. Then, as now, there were many instances

of two or more like-centers situated adjacent to one another along transport routes and not separated by a center of either higher or lower rank.* It was suggested, therefore, that less-than-average spacing of like centers might prove weakening to one or both adjacent centers. The fifth, and final hypothesis regarding changes in the trade center system proposed examining the performance of adjacent like-centers relative to their spacing in 1941. Table 25 gives the results of this test on all adjacent pairs of the four types of centers at the lower and of the hierarchy where such spacing is found.

TABLE 25: Effect of Spacing on Adjacent Pairs of Similar Small Trade Centers, Saskatchewan, 1941-1961.

Type of Trade Center	No. Pairs Adjacent Centers	Pairs Spaced Below Mean[1]				
		No. Pairs	No Change No.	%	Decline[2] No.	%
Hamlet	91	87	25	29	62	71
Minimum Convenience	78	73	10	14	63	86
Full Convenience	26	26	5	20	20	80
Partial Shopping	5	5	--	--	5	100
Total	200	190	40	21	150	79

Notes: 1. See Table 24, above for characteristic spacing.
2. One center of pair declined or grew, or both declined.

*The presence of an intervening center of different class almost by definition means that like-centers are spaced at or above the mean for their class.

Two hundred pairs of trade centers of similar class were found for 1941, and of these 190 or 95 per cent were spaced less than the mean distance apart for their particular class. For those pairs with spacing below the mean, 79 per cent experienced growth or decline of one of the centers in the pair. In some cases, both centers declined and in other cases one center grew and one declined. The effect of such changes was either absolute decline for one or both centers in the pair or at least relative decline for one center as the other grew to a higher retail service level. The remaining centers spaced below the mean experienced no change in the retail service level of either center in the pair. Hamlets were less affected when situated at less-than-average distances from another Hamlet than centers in the other three classes in comparable situations.

It was also found that the rate of decline was considerably greater among like-centers spaced below the mean than for all centers in the same class. Of Hamlets thus situated, 66 per cent declined between 1941 and 1961 compared to a rate of decline of less than 46 per cent for all Hamlets in the same period. Similar differentials were found for the other types of centers, except that the sample of Partial Shopping centers found adjacent to one another was small and not strictly comparable to the class as a whole.

Changes in Size, Shape, and Population of Trade Areas

Since the present analysis does not address itself directly

to the changes in trade areas of Saskatchewan trade centers, little can be said except through inferences regarding the effect of other changes in the trade center system on trade areas. The change in the total number of centers and the numerical changes within each class of center since 1941 have affected the average size of trade area for each class of center by definition. Table 26 gives the average size of trade area in square miles for both the beginning and end of the period. Trade areas were calculated by dividing the total study area by the total number of centers offering the particular level of goods and services (all centers in the class and all higher ranking centers).

TABLE 26: Changes in the Average Size of Trade Area for Trade Centers, Saskatchewan, 1941-1961.

Type of Trade Center	Average Size of Trade Area[1] 1941 (sq. miles)	1961
Wholesale-Retail	17,400	11,800
Complete Shopping	4,690	4,200
Partial Shopping	1,360	980
Full Convenience	470	540
Minimum Convenience	220	330
Hamlet	130	160

Note: 1. Total study area divided amongst all centers offering the equivalent services at each level.

For Hamlet-level goods and services the average trade area has expanded 15 per cent over the past two decades, for example. The change in trade area size for each retail service level differs because of the varying rates of change within each class of center and in turn, the relation of these changes to aggregate changes. The trade area for Hamlet-level goods and services increased because the total number of all centers declined even though the number of Hamlets actually increased. These changes may be seen also as changes in the area of commercial dominance for centers, i.e., increases for Hamlets and convenience centers and decreases for shopping centers. The increase of dominance for Hamlets and convenience centers is somewhat illusory, of course, because despite an enlarged trading area the population within it is smaller on the average than in the 1941 trade areas. And today's rural residents have more ability and inclination to travel farther for retail services. For Partial and Complete Shopping centers it means that the rural population must be shared among more centers, and this brings them into even closer competition with smaller centers.

The increase in the characteristic spacing of the three lower ranks of trade centers means, inferentially, that the shape of their trade areas has become more circular than elliptical. This arises from the fact that the spacing between centers situated along rail lines has increased to become more nearly equal to the distance separating rail lines.

The changes in the number and distribution of trade centers since 1941, in conjunction with rural depopulation, have caused a general lowering of the number of rural people (farm residents and residents of unincorporated places) in trade areas. Table 27 reveals these trends for trade areas of the various types of trade centers. The variation in the changes occurs because not only has there been a general lowering of rural population density but there have also been changes in the number of centers from which the equivalent goods and services are available. Minimum Convenience centers appear to have suffered least in the decline of rural trade area population until it is revealed that the average trade area for such centers has had to increase by almost 50 per cent due to the large loss in number of this type of center. Partial Shopping centers have experienced the sharpest drop in trade area population due mainly to a large increase in the number of these centers which means a much wider sharing of the remaining rural population.

C. OUTLOOK FOR THE FUTURE TRADE CENTER SYSTEM

The data presented in the preceding sections regarding the period 1941-1961 established that a number of basic changes are occurring in the Saskatchewan trade center system. Changes are occurring in the number of centers, the distribution of

various types of centers, the density and spacing of centers, and in the performance of trade centers in certain spatial situations. These are key trends which, if they continue into the future, will significantly affect the organization of the Saskatchewan space-economy. In the following paragraphs, these trends are extrapolated to help provide a picture of the trade center system twenty years hence. First, however, it will be useful to review briefly the essence of past trends. Figure 17 portrays some of these trends graphically and includes projections for the future.

The major changes in the Trade center system of Saskatchewan since 1941 include:

(1) The number of trade centers has dropped by 127, or an equivalent of 14 per cent of the total in 1941, and a further 290, or 32 per cent, declined in retail service level.

(2) Changes in trade center classes were almost entirely one-step changes in the trade center hierarchy for either growth or decline.

(3) Hamlets grew as a proportion of the total, increasing from 39 per cent to 52 per cent in the period.

(4) Trade centers of the convenience type experienced a rate of decline between 33 and 45 per cent, while Partial and Complete Shopping centers and Secondary Wholesale-Retail centers all grew in both numbers and proportion.

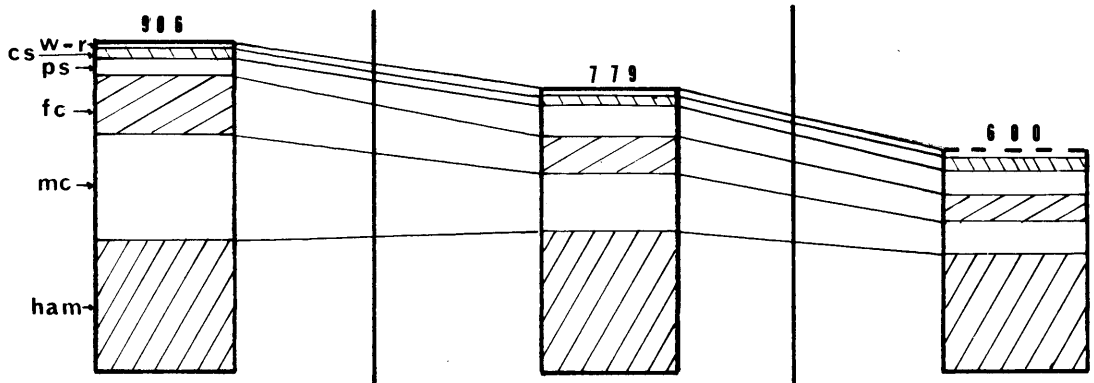
(5) Trade centers that were small in population size at the beginning of the period lost population more readily than centers with large populations regardless of retail service level.

(6) The gross density of trade centers declined from 7.4 to 6.4 per 1000 square miles, which is the equivalent of reducing the accessibility to Hamlet-level services within one-half hour's drive by 15 per cent.

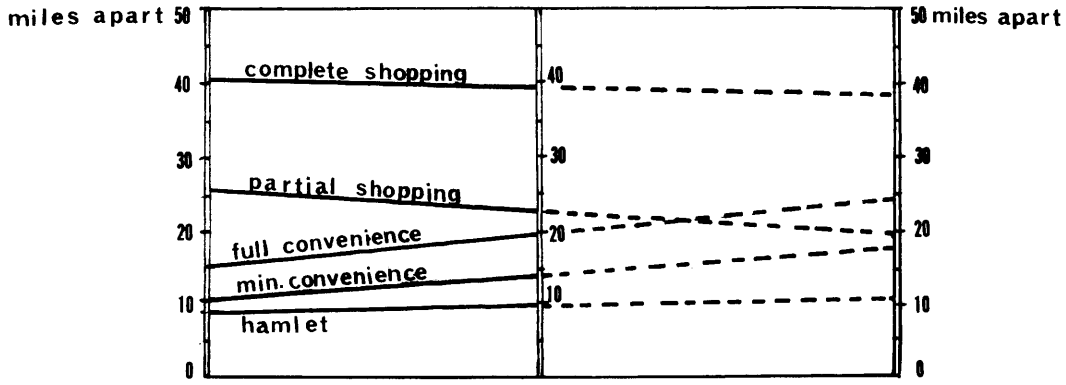
17

1941 | 1961 | 1981

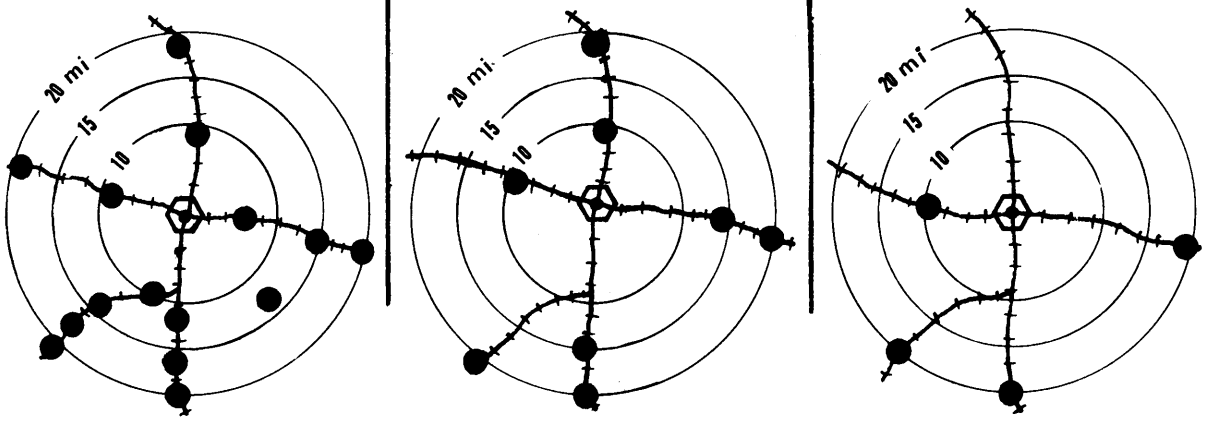
number & distribution of centers:



spacing of centers:



effect of large centers:



(7) Trade center densities in western Saskatchewan declined by 16 per cent compared to only 8 per cent in eastern parts of the province.

(8) Small trade centers within a ten-mile zone surrounding large centers experienced a nearly 40 per cent greater decrease in density than small centers in other locations.

(9) Small centers grew farther apart by between 5 and 33 per cent; large centers reduced their average spacing by between 2 and 44 per cent.

(10) Adjacent trade centers of the same class spaced less than the mean apart declined more rapidly than similar centers located elsewhere.

(11) The average size of trade area increased for the three lowest ranks in the trade center hierarchy by between 15 and 50 per cent and decreased for the top ranks by between 10 and 31 per cent; rural population in trade areas declined by between 10 and 60 per cent for all ranks.

Since the period of the above changes has also been the most dramatic period so far in terms of rural depopulation and expanding farm size, and since the pace of these changes appear not to be slackening, at least a comparable rate of decline in trade centers must be looked for over the next two decades. Trade centers would, therefore, be lower in numbers by a further 110 in another twenty years according to this criterion.

It is likely, however, that the aggregate rate of disappearance of trade centers will increase in the next two decades because the rate of decline among Hamlets has been increasing. "Decline" among Hamlets, it will be remembered, means demise for centers of that type; thus, the future number of trade centers can also be estimated from a projection of the rate of decline among Hamlets. From Table 18 it can be seen that

46 per cent of the Hamlets extant in 1941 did not exist twenty years later. Extrapolating this rate of decline for the next two decades would mean that as many as 186 fewer Hamlets would exist compared to the present total. It does not seem unreasonable to expect the number of trade centers to decline by an amount somewhere within the range of the latter estimate and that arrived at from a projection of aggregate decline, that is between 110 and 186. It can be assumed that there will be few if any new centers emerging in the forthcoming twenty years (see Table 16); any tendency in this direction would likely be balanced out by the demise of a small number of Minimum Convenience centers (see Tables 16 and 18).

The trade center hierarchy exhibited the tendency in the 1941-1961 period to become concentrated among classes at the top and bottom. Minimum and Full Convenience centers experienced the greatest proportionate decline of any of the seven types of trade centers thereby causing a tendency to polarization within the hierarchy. By projecting the average rates of growth and decline (Table 18) for each class of trade center, the future distribution of trade center types in the hierarchy can be estimated. Figure 17 presents the results of such an estimation procedure. This picture of the future trade center system indicates a slight increase in the proportion of Hamlets from 52 to 54 per cent of the total, but also includes a decline of 17 per cent in numbers in this class.

Minimum Convenience centers, in the coming twenty years, will likely decline from 19 to 12 per cent of the total as well as experiencing almost a halving in numbers. The proportion of Full Convenience centers will continue to fall (from 13 to 10 per cent) due to decline of many of these centers as well as to the growth of many others. Partial Shopping centers will be the recipients of the latter growth trend. An increase of more than one-quarter in the proportion of Complete Shopping centers and almost one-half in the proportion of Secondary Wholesale-Retail centers is also indicated. The growing urbanization of the province's population supports these general projections.

Large centers were found to have a debilitating effect on nearby small trade centers. Within ten miles of large centers, in the period 1941-1961, small centers of all classes suffered decline at a rate of 61 per cent. The few small trade centers still remaining in this zone will likely disappear almost completely in the next twenty years. There is also evidence that the zone of attrition around large trade centers will soon extend outward as much as 15 miles (see Tables 22 and 23). Moreover, the emergence of as many as eight new Complete Shopping centers in the projection period will bring even more small centers within range of the debilitating effects of large centers.

Data presented in support of the Hypothesis that spacing was increasing for lower level centers and decreasing for upper level centers can also be extrapolated to provide an idea of spacing in trade center classes in the future. If the trends in

trade center spacing shown in Table 24 continue apace in the next two decades, important disjunctures will occur in the trade center system. First, the spacing of Full Convenience centers could increase so that this type of center will be less accessible than Partial Shopping centers presently are. Whereas, a continued decrease in the spacing of Partial Shopping centers would bring them as close to rural residents as are Full Convenience centers now. This suggests that there is no longer much need for the Full Convenience type of trade center and that they will either grow into Partial Shopping centers or decline to lower ranking types. By these extrapolated trends Partial Shopping centers would average about 19.5 miles apart, or encompass the equivalent of a trade area with a maximum 15-minute time-distance radius by auto. Second, if the spacing of Minimum Convenience centers continues to increase at the 1941-1961 pace, it will nearly equal the expected spacing for Partial Shopping centers by the end of the next two decades. This convergence of characteristic spacing will serve to bring the Minimum Convenience centers into sharper competition with higher ranking centers, a competition which even now convenience centers are hard pressed to withstand.

Complete Shopping centers, as has been the case in the past two decades, can be expected to emerge in the interstices of the Wholesale-Retail centers and, thus, decrease their average spacing very little. The prospects for changes in the spacing of Secondary-Wholesale-Retail centers must be judged on the prospects for urban growth at Complete Shopping centers. Urban growth is widespread, however, and is more prevalent in larger

centers of the province which does increase the possibility of two or three new Secondary Wholesale-Retail centers emerging. Again, it is expected that the latter type of centers will emerge in areas not now adequately served by small and medium cities.

Finally, with regard to the spacing of small centers spaced less than the mean distance apart it was found that such centers had a high tendency to decline. The results of these observations further testify to the importance of spacing and location in the continued commercial vitality of trade centers. Not only are small centers in close proximity to large centers more susceptible to decline, but also centers spaced too close to like-centers must be expected to experience decline, in either an absolute or relative way.

The projections of the future trade center system presented above are aimed at satisfying the initial objectives of this study -- to predict the amount of trade center decline and the kind and location of centers most vulnerable to decline. To the extent that this is possible using an aggregate analysis of all centers or groups of centers, the data is presented here. It is apparent that this type of analysis cannot predict with precision, for example, which center of a pair spaced less than the mean distance apart will decline. It also cannot tell us which Full Convenience centers will grow into Partial Shopping centers and which will decline to a lower rank. Nor can such an analysis tell us which traits of trade centers, other than

size and location, make them more conducive to growth or decline. To achieve the latter answers in the deductive analysis would have meant framing and testing innumerable hypotheses, many of which cover only unique situations. In order to broaden the perspective on declining trade centers, a Factor Analysis for 473 incorporated centers has been performed and is reported in the next chapter.

TABLE 27: Changes in Rural Trade Area Population for Trade Centers, Saskatchewan, 1941-1961.

Type of Trade Center	No. of Rural Residents in Trade Area[1] 1941	1961
Wholesale-Retail	115,000	46,000
Complete Shopping	30,700	16,400
Partial Shopping	8,750	3,850
Full Convenience	3,010	2,150
Minimum Convenience	1,430	1,280
Hamlet	870	620

Note: 1. Derived from density of rural population on occupied farm land and applied to average trade area size from Table 26.

CHAPTER FIVE: COMMUNITY ENVIRONMENT AND TRADE CENTER VIABILITY

When reviewing the literature about trade center decline, the issue arose that the relationships governing changes in trade centers derive from a variety of environmental influences in the community of the trade center. That is, trade center decline may be more dependent on other factors than its position in the retail-service or population-size hierarchies, or its relative location. A trade center's survival, according to some arguments noted in Chapter Two, is dependent upon such elements as the possession of a high school, a hospital, a high ratio of non-agricultural employment, good accessibility to rail and highway transportation, and a high level of education of the population, among other things. The deductive analysis of trade center decline reported in the foregoing chapter reveals limitations in explaining fully, much less precisely, the nature of trade center changes. Hence it seems reasonable to pursue the issue that there are strong and explicable associations between the environment of trade centers and their pattern of growth and decline.

The essence of the argument that the relationships governing trade center change are rooted in the environment of communities is that trade centers differ from one another in

strategic ways that affect their ability to survive. This immediately opens up a wide realm of conjecture about the relevant influences in the environment affecting trade center decline. Indeed, in discussions in Saskatchewan preliminary to choosing a method to analyze trade center viability, over fifty environmental variables were suggested as important to the question. The analytic problem is to determine in what "strategic and relevant" ways trade centers differ from one another, given the many possible variables against which community differences can be measured.[1] Then it will be necessary to determine to what extent trade center decline is related to community differences. This chapter reports on the multivariate analyses employed to examine these questions.

A. DIMENSIONS OF TRADE CENTER COMMUNITIES

The great amount of data available from numerous community studies justifies the assumption that the socio-economic environments of communities are somehow structured. A community is not a "patternless mosaic of an infinite number of elements without functional groupings," to paraphrase Thurstone.[2] We expect, and find, a high degree of order and uniformity among observable characteristics of communities: for example, a large population is usually associated with a

high population density, a well developed system of utilities, an efficient local government, a large number of public services, a large proportion of employment in non-primary industries, a high level of transportation accessibility, and so on. But to recognize that such relationships exist is not to specify the nature and strength of them, or how they are associated with trade center change. The procedure of factor analysis was used in this study to help clarify the structural relations among observable characteristics.

Potentials and Limits of the Factor Analysis

With factor analysis it is possible to analyze systematically the relationships among a large number of variables. Moreover, it can proceed with a minimum of presumptions about these relationships, for factor analysis is designed to discover whether any underlying order is present in the data gathered about the problem.[3/] Factor analysis can thus be used to determine whether community differences on a variety of tests are attributable to common factors, or traits, possessed to one degree or another by all communities. It is a means of classifying trade center communities on the basis of not only more complete data (than the deductive analysis used) but also of the intercorrelation of this data. This is done by expressing a great number of measures in terms of a relatively small number of linearly independent factors, or dimensions as they are sometimes called.

In this study, thirty-five measures of community environment in the Saskatchewan region were selected for analysis. They were subsequently condensed mathematically to three dimensions against which individual trade centers could be compared. The factor analysis did not simply sort the thirty-five measures into three groups containing a certain number of characteristics in each. Rather each factor gathered together community characteristics on the basis of their intercorrelation.

Before proceeding to describe the method used here and the dimensions that were derived, it will be useful to point out the limits of this type of analysis. As a general limit the choice of relevant variables depends largely upon the investigator's intuition and previous knowledge, as well as on the availability of data. Measures were chosen for this study that were assumed to have a substantial relationship to the question of trade center decline because, as Wood has noted, one gets nothing more out of factor analysis than what is put in. A more specific limit concerns the coverage of the data. The data for Saskatchewan are limited to incorporated centers, for otherwise many of the measures would have to be sacrificed. The data is also limited mostly to measures of a single year since few data are readily available for extended periods of time. Probably the most important limit of all stems from the fact that the analysis is based on <u>correlations</u> among observed community characteristics. One cannot assert positively that the characteristics "cause" trade center decline, they may in fact only be "symptoms" of the decline of centers. The factor

analysis can, however, help us make considerable headway toward determining causal relations. Finally, the number of factors deemed to be appropriate involves a judgement factor despite certain procedures designed to furnish objective criteria. In brief, factor analysis as used here is not as objective as the uninitiated may think, and is exploratory in contrast to explanatory techniques like regression analysis.

The Analytical Procedure

The Variables. Many variables appear to play a part in a trade center's growth or decline and over fifty were investigated initially. Many had to be rejected for lack of data despite their apparent relevance (i.e., community leadership, farm income, non-farm employment). Others were discarded to avoid including duplicate measures of community environment. Thirty-five variables finally were selected and they are listed below with a brief definition and an indication of their source. They are designated by the prefix "x" and a subscript number; a strict numerical sequence by subject matter was not possible due to the initial methods used to collect and collate the data. Unless otherwise mentioned, the measure refers to the area within the municipal boundaries of incorporated centers. The sources consulted for the various data are appendixed.

x_1, Population Size, 1961.

x_2, Population Density, 1961, defined as the ratio of the 1961 population to the area (in acres) of the center which is sub-divided for urban purposes.

x_3, Population Change, 1951-1961.

x_4, Dependency Ratio I, 1961, defined as the proportion of the population under 15 years of age.

x_5, Dependency Ratio II, 1961, defined as the proportion of the population over 65 years of age.

x_6, Sex Ratio, 1961, defined as the ratio of males to females in the population.

x_7, Private Physical Investment, 1961, defined as the ratio of total taxable assessment (in dollars) to the total population.

x_8, Public Utilities Investment, 1960, defined as the ratio of dollars invested in water and/or sewerage systems at the time of their installation to total population.

x_9, Level of Public Utilities, 1960, defined from a weighted index of the quality of the utilities system(s).

x_{10}, Quality of Buildings, 1961, defined as the ratio of taxable assessment on improvements to the area of land sub-divided for urban purposes.

x_{11}, Level of Retail Service, 1961, defined as the number of separate retail establishments.

x_{12}, Retail Dominance, 1961, defined as the percentage deviation from the average distance separating centers of a similar class as measured by the distance to the nearest neighboring center of the same class.

x_{13}, Rural Population Growth, 1951-1961, defined as the change in population in the Rural Municipality surrounding the trade center.

x_{14}, Local Government Payroll, 1960, defined as the ratio of expenditures for salaries of all municipal employees to total population.

x_{15}, Physical Assets of the Community, 1960, defined as the ratio of the installation value of all capital investment of the local government to total population.

x_{16}, Local Government Services, 1960, defined as the ratio of local government expenditures for all except capital expenses to total population (not including services provided by senior governments or special districts).

x_{17}, Efficiency of Local Government, 1960, defined as the ratio of expenditures on administration to total expenditures.

x_{18}, Rural Population Density, 1961, defined as the ratio of rural population (1941 Census definition) in the surrounding Rural Municipality to the total area of the municipality.

x_{19}, Agricultural Land Potential, 1961, based on an index of agricultural land productivity and location in the surrounding Rural Municipality as used by provincial assessors.

x_{20}, Average Farm Size, 1961, defined as the mean size of "commercial farm" in the surrounding Rural Municipality.

x_{21}, Average Wheat Yield, 1940-1959, defined as the mean annual yield of wheat in bushels per acre on farms in the surrounding Rural Municipality.

x_{22}, Regional Location I, 1961, defined as the direct distance to the nearest neighboring trade center.

x_{23}, Regional Location II, 1961, defined as the direct distance to the nearest "regional center."

x_{24}, Regional Location III, 1961, defined as the direct distance to the nearest provincial center, Regina or Saskatoon.

x_{25}, High School Quality, 1962, defined as the number of teachers in the high school(s).

x_{26}, Hospital Quality, 1962, defined as the ratio of hospital beds to total population.

x_{27}, Participation in Cooperatives, 1961, defined as the number of members in community service cooperatives (as distinct from producers' cooperatives).

x_{28}, Manufacturing Employment, 1961, defined as the number of persons employed in manufacturing plants.

x_{29}, Grain Shipments, 1958, defined as the dollar value of all grain shipped through the center in a typical (non-drought) year.

x_{30}, Railroad Accessibility, 1962, defined by an index of rail service derived from type of service and frequency of call.

x_{31}, Highway Usage, 1961, defined as the annual average 24 hour daily traffic volume on highways serving the center.

x_{32}, Fund of Professional People, 1962, defined as the total number of professional people resident in the center.

x_{33}, Educational Attainment I, 1961, defined as the proportion of the population over 15 years of age with grade 8 or better education in the center.

x_{34}, Educational Attainment II, 1961, defined as the proportion of the population over 15 years of age with grade 8 or better education in the surrounding Rural Municipality.

x_{35}, Social Aid Case Load, 1961, defined as the proportion of the population receiving social welfare during a typical (November) month of the year.

Each variable was transformed into quantitative terms such that it maintained linear properties. In some cases the variables lent themselves to numerical transformation easily, as with population size or value of grain shipments. In others, the numerical measures were derived from two facets of the variable, as with the many percentage and per capita measures. Still others required new scales to be devised for the occasion as in the railroad accessibility and level of utilities measures. Ordinal scales were sufficient for the latter case. In such an exploratory analysis it is understood that the means selected for measuring a variable may only be a close approximation of what the variable is intended to encompass; it may even encompass meanings beyond the designated variable. This is the prime reason multiple regression would prove an unsatisfactory

model at this stage of the investigation, for there are latent characteristics in the problem area which cannot be accounted for adequately in a regression equation.

The Universe of Trade Centers. The trade centers studied in the factor analysis were 473 incorporated cities, towns, and villages within the province of Saskatchewan. The four largest cities, Regina, Saskatoon, Prince Albert, and Moose Jaw, were excluded from the analysis because, essentially, these centers are provincial wholesale centers rather than service centers for local rural areas. They are many times larger in population than the centers immediately below them and, moreover, there appears to be little doubt of the viability of the large cities. The most populous of the 473 centers studied had just over 12,000 residents (Swift Current) and the least populous had just over 30 residents (Ardill). Three-quarters had less than 500 residents. One center, Tate, had become unincorporated in late-1960 but since data was still available it was included in the sample.

This sample of 473 trade centers represents nearly 61 per cent of the total number of trade centers recognized in this study as of 1961. The remainder are unincorporated, which means they are excluded from most of the formal data sources relied on by this study. The primary difference between these two groups is that among the incorporated centers there are found six types of trade centers, from Hamlets to Secondary

Wholesale-Retail centers. Among the unincorporated centers are found only Hamlets and Minimum Convenience centers; for the sample chosen, only 52 per cent are of the latter two categories. This should be sufficient, however, to give proper attention to the study of the environment of small trade center communities. The basic limitation of using any sample less than the total universe of trade centers is that those not studied would have to be similarly factor analyzed in order to derive factor scores placing them on the dimensions developed in this analysis. It was presumed the inclusion of the generally smaller unincorporated centers, had this been possible at the time, would not have significantly altered the results of the factor analysis.

In order to determine the effects of the local agricultural base and rural population base on the trade center several measures were included for the rural municipality in which the center was located. Rural municipalities in Saskatchewan are about 18 miles square, on the average, or about 284 square miles. This makes them about one and one-half times as large as the average size of Hamlet trade area (Table 26) and, thus, suitable for reporting locality characteristics of the agriculture and rural population.

The Computational Method. A rank-order matrix was constructed from the original data matrix; that is, each of the 473 communities received a ranked position equivalent to its numerical score on each of the 35 variables. Rankings were used

for a number of reasons: first, several different kinds of measures were used, including those derived from ordinal scales as well as from ratio scales; second, many of the data had log-normal distributions, since most centers were small and of generally the same size; and third, ranked data are not highly demanding statistics, which was more consistent with the level of precision known to exist for many of the data.[4] By ranking the data, each distribution was treated as if communities occurred evenly spaced along a linear continuum as well as reduced the reliance on the precision of the original data, many of which were known to be approximate even if correctly ordered. Rank-order correlations were calculated for each pair of variables according to Spearman's technique and this constituted the input for the factor analysis[5]. The complete rank-order correlation matrix is given in Appendix C.

Principal Axes factor analysis using Hotelling's Iterative Procedure was employed in the final calculation of the factors. The correlation matrix, 35 x 35, was reduced to nine principal axes.[6] The nine factors were, according to this technique, orthogonal or independent of one another. Together these nine factors accounted for 71.1 per cent of the variance present in the original correlation matrix.[7] Among the individual variables the explained variance was similarly high: 34 of the 35 items had more than 50 per cent of their variance explained by the nine factors; twelve variables had over 80 per cent of their variance explained. The Principal Axes factor

matrix is also given in Appendix C.

A further refinement of the factor matrix was achieved by rotating the factor loadings to orthogonal simple structure, according to the varimax criterion.[8/] This process results in a maximization of the variance of the factor loadings of the variables on a factor. The procedure renders a new factor matrix in which each factor is described in terms of only those variables with which it is most highly correlated. The result is a further economy in the number of relevant variables, compared to the original principal axes, and thus affords greater ease of interpretation. For instance, the principal axes solution extracted six factors that appeared relevant and the varimax rotation reduced these to three factors. The Varimax factor matrix is presented in Table 28. Thus, the three factors derived from the factor analysis provide almost as much information about Saskatchewan's trade centers as did the original 35 items. The remaining factors were judged to be terms of uniqueness and/or error.

Interpreting the Factors

The factors extracted in the analysis resulted from the "collapse" of highly correlated items into distinctive clusters of variables. Each factor is made up of a linear combination of all the variables and, to paraphrase Thurstone again, is somewhat similar to a linear regression equation in which the factor loadings are analogous to the regression coefficients.

TABLE 28: Rotated Orthogonal Factor Loadings for Trade Center Variables

	VARIMAX FACTORS								
	Urban Size	Farm Size	Urban Density						
Trade center variables	V_1	V_2	V_3	V_4	V_5	V_6	V_7	V_8	V_9
x_1 Population	67	-16	11	-23	-03	48	28	-16	-08
x_2 Population Density	31	-07	13	-16	04	82	01	01	04
x_3 Population Growth	19	15	38	-35	14	42	38	13	02
x_4 Pop. 15 and under	-02	09	88	07	13	-04	-01	04	22
x_5 Pop. 65 and over	08	-09	-86	-06	07	-08	08	15	13
x_6 Sex Ratio	-24	18	-01	-05	60	-16	04	-08	-14
x_7 Physical Investment	17	28	-45	53	04	06	-27	-04	19
x_8 Utilities Investment	72	23	-01	13	-21	08	13	09	01
x_9 Utilities Quality	88	14	03	10	23	21	24	00	20
x_{10} Building Quality	29	10	-11	14	-01	82	-14	-01	11
x_{11} Retail Services	67	-21	-03	-21	-01	52	19	-16	-06
x_{12} Retail Dominance	-02	05	00	00	-05	-03	11	07	79
x_{13} Rural Pop. Growth	07	64	09	18	16	02	16	02	06
x_{14} Local Govt. Payroll	79	06	-15	07	-01	04	-05	-10	-06
x_{15} Community Assets	75	23	-12	25	-20	07	08	06	-05
x_{16} Local Services	45	-06	-05	13	11	-01	-11	-66	-05
x_{17} Local Govt. Admin.	25	12	-07	-02	26	-33	-10	63	-05
x_{18} Rural Pop. Density	13	-82	09	21	19	-03	16	00	-02
x_{19} Agric. Land Potential	17	-12	19	76	15	05	11	11	-25
x_{20} Average Farm Size	04	89	00	-14	12	00	-09	03	19
x_{21} Average Wheat Yields	16	-76	02	33	27	01	00	-06	01
x_{22} Dist. Nearest Center	-05	07	-14	-04	15	16	39	-27	38
x_{23} Dist. Regional Ctr.	37	-01	-06	-55	25	12	-19	12	-01
x_{24} Dist. Prov. Center	11	-03	13	-18	24	08	-28	-17	55

TABLE 28 cont'd.

Trade center variables	V_1	V_2	V_3	V_4	V_5	V_6	V_7	V_8	V_9
x_{25} High School Quality	65	-11	10	-22	-01	43	18	-14	-09
x_{26} Hospital Quality	69	01	03	-04	39	35	14	-08	20
x_{27} Coop. Participation	22	04	07	09	76	16	11	07	27
x_{28} Manufacturing Emp't.	79	-02	04	04	35	23	21	-07	15
x_{29} Value Grain Shipped	32	13	-05	35	-01	58	06	-18	-04
x_{30} Rail Accessibility	29	-03	-04	09	13	02	66	05	05
x_{31} Road Accessibility	31	-06	03	05	08	-04	68	-03	-04
x_{32} Professional People	66	-22	03	-16	-03	37	22	-14	-09
x_{33} Educ. Attain't. Town	22	65	17	19	18	-06	-07	11	-09
x_{34} Educ. Attain't. Rural	10	76	04	22	16	01	05	11	-07
x_{35} Social Aid Load	36	-22	15	-14	13	-06	01	-57	10
Absolute contribution[1]	692	394	208	208	183	319	186	151	154
% contribution of factor	28	16	8	8	7	13	7	6	6

Note: Decimal points have been omitted.

1. The sum of the squared factor loadings.

The factor loading is the measure of the degree of closeness between the variable and the factor. The largest factor loadings, either positive or negative, suggest the meaning of the dimension; positive loadings indicate the variable increases as the dimension increases, while negative loadings indicate a decrease in the variable as the dimension increases.

The highlights of the three new dimensions are discussed below. An attempt is made to name them, but this should not be considered binding. It is in the nature of factor analysis that the real meaning comes from how well extant community relationships are described by the factors. The names that have been affixed are, therefore, descriptive labels. Each factor is, indeed, a mathematical statement of relationships of all the environmental variables used in the analysis.

Dimension 1, Urban Size (V_1): This dimension has significant loadings on 11 of the 35 measures. High positive loadings on the items of Population Size, Level and Investment in Utilities, Level of Retail Services, Quality of High School and Hospital, Manufacturing Employment, Number of Professional People, Assets of the Community, and Local Government Payroll clearly indicate this dimension to be structured around a syndrome of urban characteristics. Lesser loadings on Population Density, Community Services, and Social Aid Case Load lend further support to this interpretation. Moreover, it would seem to point up distinctions between centers more or less on the basis of size. The absence of high loadings on the various

measures of agricultural development suggest that a high degree of urban development is not dependent upon the local agricultural base.

Dimension 2, Farm Size (V_2): Another dominant dimension distinguishes those communities in which there has been a high degree of adaptation to the exigencies of a highly mechanized and commercialized agriculture as exemplified by the large farm. High positive loadings on Average Farm Size, Rural Population Growth, and Educational Attainment of both country and town indicate a willingness and ability to make adjustments. High negative loadings on Farm Population Density and Average Wheat Yields, indicate, respectively, that density decreases with increasing farm size and that the adjustment to larger farms is more advanced in areas of low yield.

Dimension 3, Urban Density (V_6): This dimension is characterized by high loadings for Population Density and Quality of Buildings (the value of buildings per acre). Also closely associated with this factor, and significantly different from the urban size dimension, are the variables of Population Growth and Value of Grain Shipments; the variables of Population Size, High School Quality, and Number of Professional People also show up as closely associated with the factor. This dimension appears to describe another aspect of urban development. It is by definition orthogonal to the dimension of urban size, although some variables are sollinear. Trade centers characterized by this trait would display a more

compact development as well as possess a range of residential and commercial buildings which represent relatively higher private investment than for other centers. Such centers are growing in population and are focal points for grain shipments.

The three dimensions distinguished by this analysis account for most of the variance in 24 of the original 35 variables. They also account for nearly 60 per cent of the variance in the factor matrix. The remaining factors that were extracted each contain no more than two variables with significant loadings and, furthermore, they resist easy interpretation on other than the grounds that they reflect unique trade center situations. Also from these results we can say that as many as eleven of the original variables play little or no important role in distinguishing among trade centers in Saskatchewan. Interestingly, the four location variables and three population variables are in the latter group. Hence, we are left with three factors in terms of which each trade center in the study may be classified; each center will be more or less closely associated with each of the three factors.

Whether these three dimensions are actually elements of some fundamental structure underlying trade center communities or merely mathematical conveniences requires testing in terms of existing trade centers. To facilitate this it is necessary to provide values for the 473 trade centers on the new dimensions. Such values, often called "canonical variates," are

obtainable for each center using the original rank of the center on each variable and the factor loadings of the variables. Thus, a center's value on Dimension 1 = (0.67) (rank of center in population size) + (0.31)(rank of center in population density) + (0.19) (rank of center in population growth), and so on through all thirty-five variables. The same procedure is followed to obtain center scores on Dimensions 2 and 3. Ranks of centers are used in this computation because rank-order correlation coefficients made up the original data matrix.

Having established the relative position of centers on the three dimensions, an examination was made of these values, first of all, using personal knowledge about the trade center system. It was apparent from this examination that Dimensions 1 and 3 each mirrored the Saskatchewan pattern of urbanization: the largest and most well-developed places fell high on these two scales and the converse was true for typical small Hamlets. Furthermore, there was a strong and direct correlation (r=0.87) between the position of the centers on these two scales. Dimension 2 upon examination reveals centers arrayed by agricultural regions such as soil and climatic zones. Centers in the southwest, or Prairie region, tend to fall high on the scale while those in the northeast, or Park region, tend to fall low on the same scale. When the values on each dimension were plotted on maps, the tendencies just described were corroborated. The center scores for Dimension 2 provide the basis for a map that shows a gradient of values from southwest to northeast in zones that

closely approximate zones of rural population density as well as soil zones (see Figures 2 and 6). When the values for Dimensions 1 and 3 are mapped there is very little regularity in terms of zones. Nor should this be expected since the arrangement of centers is regular only with respect to the rail lines. It may be, as a later section in this chapter will explore, that for various ranges of scores a fairly regular pattern of spacing exists. This is, of course, a problem in scale calibration. The evidence seems abundant, however, that these three dimensions do in fact represent basic structural features of Saskatchewan trade center communities. Two of them describe urban aspects of trade center development and the third describes trade center relationships to the local agricultural base. Factor scores for each center in the sample are given in Appendix C.

B. COMMUNITY DIFFERENCES AND TRADE CENTER CHANGE

The three apparently valid dimensions of trade center communities may now be tested to determine whether, and to what degree, they are associated with trade center change. If, as claimed at the outset, trade center change is dependent upon certain structural relationships in the community environment, then the canonical variates for the centers may be treated as independent variables in a regression model which tests this hypothesis. A regression model in the typical form,

$$Y_i = b_0 + B_1x_1 + B_2x_2 + B_3x_3$$

would combine the elements as follows: the Y_i are the dependent variables of trade center change and the x_j are the canonical variates on each of the three dimensions.

Two regression analyses were completed: one to determine the ability to predict change in retail service level (Y_1) and the other to predict change in population (Y_2).[10] Changes in retail service level for the regression analysis were measured in terms of changes in the number of business firms in the trade center from 1941-1961. The latter scale was used because it could be more finely calibrated than that using just change in class of trade center. Population change was also measured for the twenty years 1941-1961. For each dependent variable an index was constructed on which 100 equaled no change from 1941-1961, less than 100 equaled decline in the period, and greater than 100 equaled some degree of growth in the period. The variables used in the two regression analyses are listed in Table 29.

The results of the regressions show a rather inconclusive picture regarding the relationship of community differences as measured by the factor scores and trade center changes in the 1941-1961 period. Table 30 presents these results. On the one hand, they indicate several highly significant statistical relationships (i.e., at less than 0.001 level) between the independent and dependent variables. The position of centers on the urban density dimension is highly significant in terms of both change in number of retail firms and change in population.

TABLE 29: Variables Used in Two Regression Analyses

Y_1,	Index of change in number of retail and service establishments, 1941-1961.
Y_2,	Index of population change, 1941-1961.
X_1,	Canonical variates for trade centers on factor one (V_1).
X_2,	Canonical variates for trade centers on factor two (V_2).
X_3,	Canonical variates for trade centers on factor three (V_6).
b_0,	The intercept of Y at X=0.
B_j,	Amount to be added to an estimate of Y_i if trade center has a value of unity on X_j variable.

The position of centers on the farm size dimension is also highly significant (at the 0.05 level) as is the relationship between centers on the urban size dimension and the two dependent variables. On the other hand, the coefficients of determination (R^2) obtained in both regressions were not overly large. The regression model was slightly more powerful in predicting change in the number of retail firms (0.3308) than change in population (0.3175). Insofar as the latter are presumed to be measures of the power of the regression model to predict these trade center changes, it cannot be considered a powerful predictive tool. However, given the exploratory nature of this investigation, the tentativeness of the hypotheses leading up to it, and the fact that several highly significant relationships were found, seems to justify pursuing it further. It will be useful, first, to examine the substantive aspects of

the regression relationships and, then, to determine the coincidence of results obtained by this method and those obtained through the deductive analysis of trade center change.

TABLE 30: Results of Two Regression Analyses

Independent Variables	Regression Y_1 Change in No.Firms		Regression Y_2 Change in Population	
	B_j	T.Value	B_j	T Value
X_1, "Urban Size"	0.1396	1.7888*	-0.1728	-2.0927*
X_2, "Farm Size"	-0.1458	-3.8306**	0.0385	0.3869
X_3, "Urban Density"	0.4161	5.3084**	0.0789	8.8872**
Intercept b_0	42.74		84.79	
R^2, Coefficient of Determination	0.3308		0.3175	

** indicates B_j is significant at the 0.1 per cent level and

* that B_j is significant at the 5 per cent level.

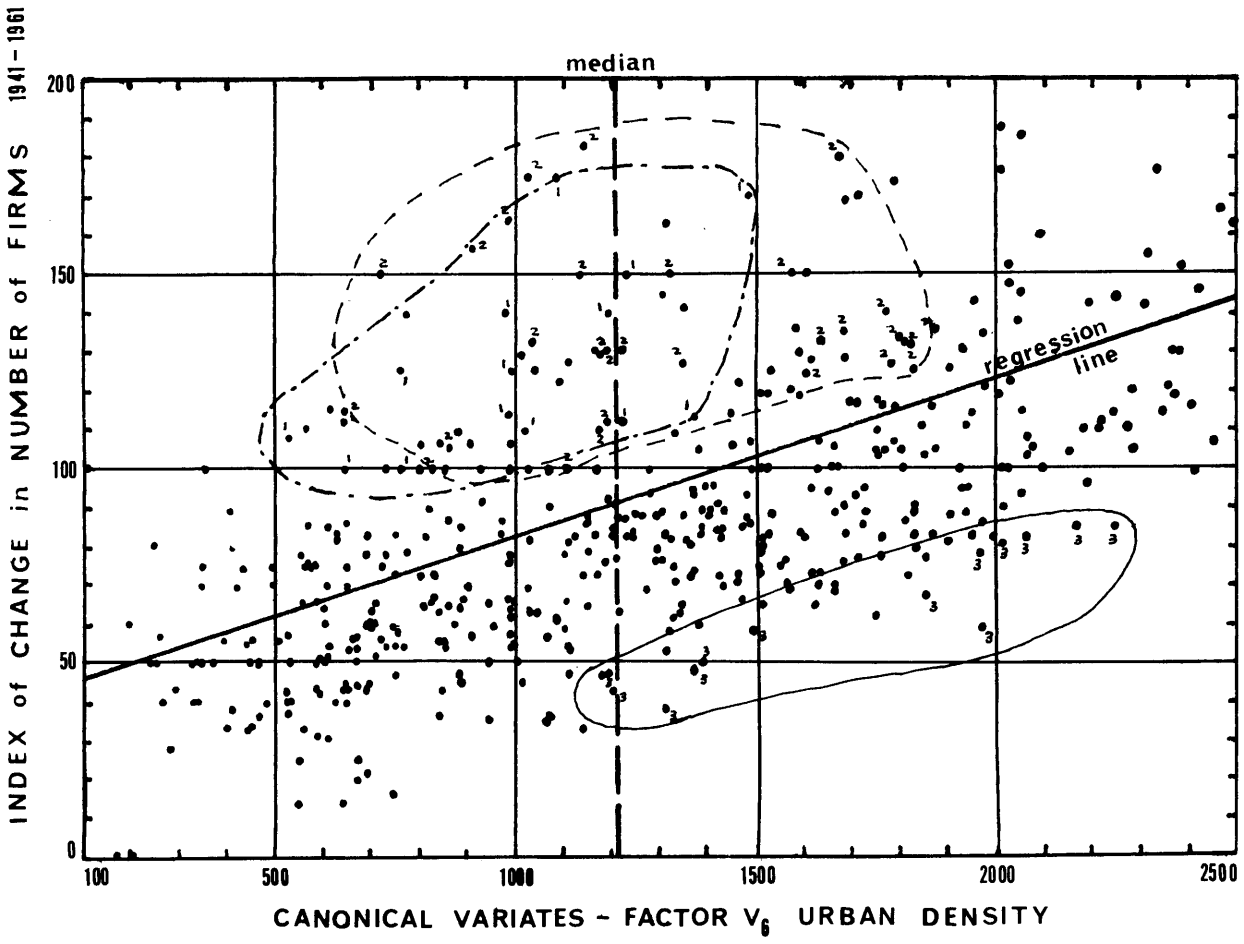
The Substance of the Regression Relationships. The first of the regressions involved the prediction of change in retail service level. In this case, the position of a trade center on the urban density dimension is more closely related to trade center change than its position on either of the other two scales. A comparison of the Beta values confirms this and

the linear relationship that can be derived from these results -- $Y_1 = 42.74 + 0.4161(x_3)$ -- is plotted in Figure 18. A center's position on the urban size scale is also significantly related to trade center change in this regression. These results suggest that the level of urban development of a trade center may be closely associated with its performance in maintaining its position as a commercial center.

More specifically, the regression analysis suggests that it may be a particular aspect of urban development as measured by the urban density scale that is important in determining trade center growth or decline. The latter scale, it will be remembered, is dominated by two items -- the gross population density of the built-up area of the center, and the assessed valuation (or physical investment) per acre over the same area. The scale is also structured on several other items of an urban or central place nature -- the level of retail service, the value of grain shipped through the center, the population size, the population growth (1951-1961), the quality of high school and hospital, the number of professional people, and the efficiency of the local government. Although several of these items are also found highly weighted on the urban size scale, this cluster of urban variables is statistically and substantively different from that scale.

The generally weaker relationship of the urban size scale to trade center change suggests that size of a trade center alone is not sufficient to guarantee its viability.

18



1 Northern Fringe Communities

2 Natural Resource Communities

3 Communities with Early Urban Development

The ability of a trade center to hold or increase its population from 1941-1961 is also associated with its position on the urban density scale, according to the second regression. Again, it is this cluster of variables that is highly significant in trade center change rather than the urban size cluster. But since none of the relationships derived in either regression analysis can be said to be conclusive with regard to explaining trade center changes, it is possible the explanation lies in some general dimension of urbanism which did not emerge from these analyses. Or, alternatively, variables other than those which were able to be included here may prove to be significant in explaining change among trade centers, although this is less likely given the large number and wide variety of variables used here.

However, it is not surprising that there is considerable association manifested between the degree of urban development as measured by the urban density scale and performance of a trade center as a commercial place. We have become, even in agricultural regions, a highly industrialized and urbanized society. Economic development in North America acts to intensify the possibilities for growth at urban places. But it is almost axiomatic that not all centers can expect to share in the possibilities for growth; many, whose urban accoutrements are meagre and quality of physical development is not high, start with a handicap in attracting investment and population. The particular qualities of urban development that are associated with trade center viability must be determined and the

status of communities measured. The dimension of urban density seems to provide important clues in this direction, even if it does not provide a definitive answer.

Coincidence of the Inductive and Deductive Analyses. The usefulness of the urban density scale in making predictions about trade center viability may be given further credence upon comparison of its results with those obtained in the deductive analysis reported in the previous chapter. There are two ready ways in which the coincidence of results can be viewed: first, it can be ascertained how well the scale distinguishes the classes of trade centers we know to be experiencing decline, and second, it can be ascertained if the scale distinguishes centers known to be in vulnerable locations according to the deductive analysis. In both cases, low scale values on the urban density dimension by definition reflect a low level of urban development in a center, and vice versa.

Given in Table 31 are the results of these two tests. The two classes of trade centers known to be experiencing the greatest proportion of decline in the twenty years 1941-1961 -- i.e., Minimum Convenience centers and Hamlets -- in most cases have factor scores on the urban density dimension below the median.* Hamlets, in 85 per cent of the

*Reference is made to the median of the sample size of 473 trade centers at all times, rather than the median factor score.

cases, fall into the lowest two quintiles of trade center scores; 50 per cent of the Minimum Convenience centers are also in these two quintiles and a further 37 per cent is no higher than the third quintile. Full Convenience centers, in apparent reflection of the tendency of the class to experience both growth and decline, have substantial proportions with factor scores below as well as above the median. The remaining higher classes of trade centers have factor scores mostly in the top two quintiles. Only 11 per cent of the Partial Shopping centers have scores below the top two quintiles; all of the Secondary Wholesale-Retail centers in the sample fall easily within the top quintile.

The deductive analysis showed that small trade centers, Partial Shopping centers and below, in close proximity to large centers were more vulnerable to decline than when located farther away. The trade center scores derived from the factor analysis for centers located within the 0-10 mile zone around large centers shows that two-thirds have scores in the lowest two quintiles and 95 per cent have scores no higher than the third, or middle, quintile (see Table 31). In the 10-15 mile zone, again, two-thirds of the centers in the sample thus located have scores in the lowest two quintiles; but because centers in this zone are also less subject to decline, especially if they are of a higher order, almost twenty per cent in this zone are in the top two quintiles. The 15-20 mile zone shows no regular pattern of scores much as it shows no regular pattern of trade center changes in the deductive analysis.

TABLE 31: Trade Center Scores on the Urban Density Scale in Relation to Trade Center Classification and Distance from Large Centers,

	Quintiles of Urban Density Scale				
	1 (top)	2	3	4	5 (bottom)
	(p e r c e n t a g e s)				
Type of Center					
Wholesale-Retail	100				
Complete Shopping	82	14	4		
Partial Shopping	56	33	10	1	
Full Convenience	15	44	29	12	
Minimum Convenience		13	37	37	13
Hamlet	1	2	12	27	58
Distance Zone (miles)					
0 - 10		9	24	29	38
10 - 15	7	11	14	34	34
15 - 20	16	18	24	22	20

The fairly high coincidence of results between the deductive analysis and the factor analysis seems to justify one imputing considerable validity to scale of urban density regarding the measurement of trade center viability. The inherent usefulness of such a scale in this question is that it allows precise ordering of individual centers in terms of urban density and, possibly, in terms of trade center viability as well.

However, the overall analysis carried out in this study does not justify designating the urban density scale as a definitive tool. Rather, its use would be best qualified by results obtained from deductive analyses. Or, conversely, the viability of centers which are known from the deductive analysis to have a high probability of decline by virtue of their position in the retail service hierarchy, their relative location to large centers, or their spacing could be more precisely identified by determining their factor scores; scores below the median would seem to confirm the likelihood of a trade center's decline.

This leads naturally to the question of calibrating the scale of urban density in relation to trade center viability. For it to be useful we would like to know which points on this scale set off different degrees of viability so that individual centers could be rated. It must be remembered that this is an ordinal scale and that scale values reflect only an ordering of centers from highest to lowest degrees of urban density. In deference to the limits of ordinal scaling as well as to the tentative results of the inductive analysis, a division of scale values only into quintiles has been chosen. Table 32 presents the results of such a division of the scale. It is of interest that the quintile divisions coincide closely with values on the index of change in the number of retail firms that are meaningful in describing growth and decline.

In the lowest quintile, the average index of retail change is only 55, or the equivalent of 45 per cent loss in the number

of firms between 1941 and 1961. An index of 70 on this scale represents a 30 per cent loss in the number of retail firms in the period, and a loss of this extent would cause a center to shift downward at least one class in the retail service hierarchy.[11] In other words, the majority of centers with factor scores in the lowest quintile actually experienced "decline" as we have previously defined this term in the deductive analysis. For centers in the second lowest quintile, the average retail change index is only slightly above the position that would constitute almost certain "decline." The two highest quintiles exhibit the opposite picture to that of the lowest two quintiles and, as expected, the middle quintile represents a transitional group of centers many of which are growing and many are declining.

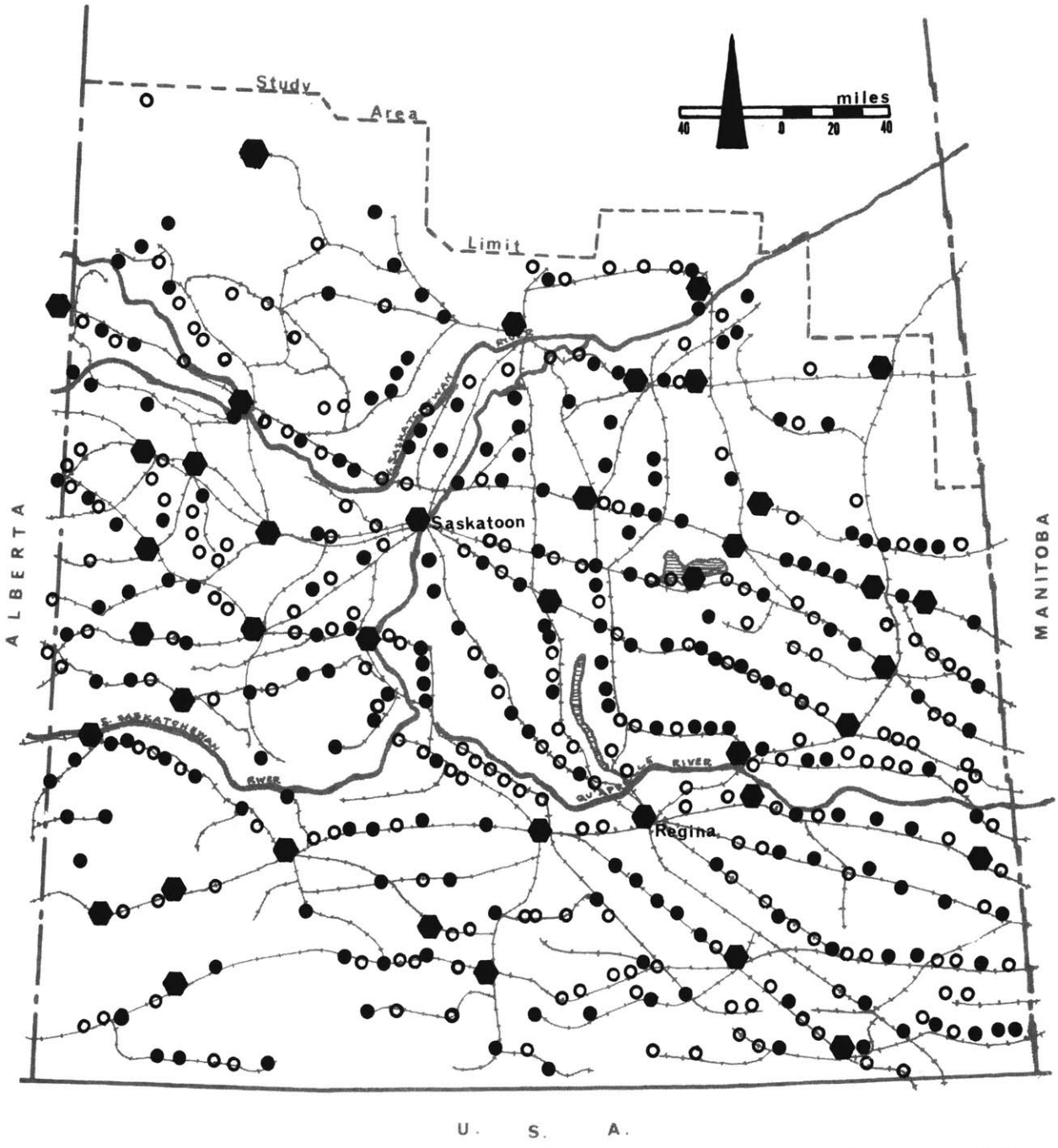
Many of the apparent inconsistencies of high index of change values among centers in the low quintiles and low index values in high quintiles can be explained by differences in sub-regional development and by unique local conditions (see Figure 18). For example, most of the centers exhibiting a high rate of growth in the number of retail firms but also having low scores on the urban density scale are likely to be one of two types: they are either centers that are located in recently developed areas of the northern fringe of the province (such as Choiceland), or they are centers that have been subject to recent expansion due to the exploitation of oil or other minerals in the vicinity (such as Carragana). In both such situations, the demands on the community to expand its range

of retail services has outstripped its ability to acquire urban accoutrements. A number of centers that have high values on the urban density scale combined with a low index of change in number of retail firms are known to be centers that reached a fairly high degree of urban development before 1941 but have since declined in retail level because of the competition of nearby cities (e.g. Battleford and Bienfait).

Finally, it is possible to map the incidence of trade center viability as defined by positions on the urban density scale. Figure 19 presents the graphic picture of trade center viability for the 473 incorporated trade centers used in the factor analysis. They have been classified in terms of "viable" and "non-viable" according to factor scores above and below the median, respectively. While this does not provide a rating for all trade centers in the province, it is reasonable to assume that the remaining unincorporated centers, which are generally very small and poorly developed, would be rated as non-viable by this scale. The map's most striking feature is the amazing regularity in the spacing of the "viable" centers. They are approximately 15 miles apart on the average. According to the map there are no regions of non-viability in the province, rather there appears to be a "filtering out" of non-viable centers in all areas resulting in this regular spacing. There is reason to believe, referring to the forecast of trade center changes in Chapter 4, that the pattern portrayed here reflects the emerging pattern of Partial Shopping centers, with its complement of larger centers.

SPATIAL INCIDENCE of TRADE CENTER VIABILITY[1]

19



● "Viable" Trade Centers ○ "Non-viable" Trade Centers ⬢ Complete Shopping Centers

1 Incorporated Places Only

C. SOME POLICY IMPLICATIONS OF THE INDUCTIVE ANALYSIS

In conclusion, it is appropriate to point out briefly a few of the public policy areas called to attention by the factor analysis. The input of the analysis was a large number of variables which describe the environment of Saskatchewan trade centers. Many of the variables are measures of environmental situations that are amenable to public policy determination, such as the location of a high school, a hospital, roads, or railways. The scales that are the output of the factor analysis comprise the same variables but in specially weighted combinations which we may examine to determine those attributes that are most indicative of the scale's properties.

The urban density scale which proved to be the most significant of the scales derived here for the problem of trade center change is constituted by several variables that impinge on important public policy areas. For example, the scale is dominated by two measures of density -- one for population and the other for the value of buildings -- both of which are areas of direct concern in community planning. Since most trade centers in Saskatchewan are too small to afford their own planning staff, the provincial government is empowered to make such services available, and as such is in a position to influence the compactness of trade center development. The importance of the trade center as a grain shipment point is also important to its viability according

to the scale. This point should be thoroughly considered, therefore, in policy decisions regarding branch rail line abandonment now under discussion because, at present, the grain collection and storage system is based on railways. Lastly, the importance of a high school and a hospital to a trade center as evidenced by the scale suggests the need for a location strategy regarding these facilities. It will have to be a strategy that allows both the possibility of decline of trade centers housing such facilities as well as the allocation of the facilities to bolster the position of centers which it is wished to sustain.

TABLE 32: Calibration of Urban Density Scale in Terms of Changes in Retail Services Level.

Trade Center Quintile		Index of Change in No. of Retail Firms[1]		Scale Value Urban Density	Suggested Level of Viability
No.	No. Centers	Range	Mean	Range	
1	94	58 - 226	115	1771 - 2501	GOOD
2	95	50 - 169	96	1381 - 1770	MODERATELY GOOD
3	95	33 - 183	89	1031 - 1380	INTERMEDIATE
4	95	16 - 300	78	690 - 1030	MODERATELY POOR
5	94	1 - 116	55	107 - 689	POOR
Comp. Scale	473	1 - 300	87.6	107 - 2501	

Notes: 1. Index of 100 equals no change, 1941-1961, more than 100 equals growth, less than 100 equals loss in number of firms.

CHAPTER SIX: LOCATIONAL POLICY IN SASKATCHEWAN DEVELOPMENT

A. THE LARGER CONTEXT OF TRADE CENTER DECLINE

The issue that is central to this entire study is the need to recognize the basic changes that have been occurring in the spatial distribution of social and economic activities in Saskatchewan in recent decades and to respond to them so as to ensure continued progress in the region's development. For major transformations have occurred in the social, economic, and political fabric of the region, but within a spatial framework for activities laid down by the "planners" of Western Canada starting almost a century ago. The dispersed and isolated farmsteads, the numerous small service centers, the grid survey system, and the vast railway net that constitute this pattern of the past have proved, in many ways, to be inconsistent with providing a reasonable living environment at reasonable cost to rural people in Saskatchewan today.

The components of the space-economy in rural parts of Saskatchewan have changed radically in only twenty years and this is forcing a re-assessment of the efficacy of spatial arrangements for local government, education, health care, and so on. There are fewer farmers and fewer, but much larger, farms;

and the farms have become highly mechanized and commercialized with a consequent altering of the volume and kind of goods and services needed to support them. Improvement in the means of movement has literally doubled the accessibility of rural people, thus making them less dependent upon goods and services dispensed locally. Increased mobility and expanded farm incomes combined, in turn, with more urban attitudes of rural residents have led to demands for improvement in a whole range of public and private services from schooling to grocery shopping. As previous chapters have indicated these changes have also brought dislocations in the space-economy, particularly in the system of trade centers. Many have disappeared or otherwise declined due to want of customers or changed demands or both.

The social and economic changes in Saskatchewan have not been limited to rural areas of the province. The image of Saskatchewan as a predominantly farming province must be re-cast in terms of its present socio-economic base which is mostly urban in its population and mostly non-agricultural in its production. Since 1941, the proportion of the population living on farms or in small rural settlements has dropped from 67 to 43 per cent, and the proportion of the labor force engaged in agriculture has dropped from about 60 per cent to 40 per cent. Although the products of agriculture still dominate the Saskatchewan economy, in recent years they have accounted for only 40-50 per cent of the total net value of commodity production compared to 65-75 per cent on the average just two decades ago.

The problem of trade center decline must be seen within its larger context; it must be seen as part of the problem of re-defining the space-economy of the entire province, albeit a most important part. The larger problem is essentially one of developing the optimum spatial distribution for the activities and functions of the nearly one million people in the province over the little more than one hundred thousand square miles they occupy.[1] It is a problem that must be approached within the setting of prevailing values and policies and available controls; its solution will be formed from presently on-going trends in the population and the economy. The spatial organization of activities in the agricultural sections of the province will, of course, be of prime importance for the reasons that almost all the territory is taken up by farming operations and that this sector of the economy is now, and will continue to be, the dominant one. In light of the present trends in the provincial economy to more urban occupations and because of the strong linkages being formed between rural Saskatchewan and the province's urban areas, both the rural and the urban sections must be taken together in any new conception of the space-economy.

The path to the development of an optimum spatial distribution of activities and functions for Saskatchewan is through the formulation of "locational criteria" and "locational policies."[2] There will be needed reasonably specific criteria, or standards, by which, for example, the size,

density, and distribution of urban centers can be related to the costs of "social overhead" in the centers. The analysis presented in preceding chapters is an attempt to provide a basis for developing locational criteria regarding the size, spacing, and location of farm trade centers. There will also be needed some way of synthesizing the many locational criteria required, including those for industrialization, grain collection and storage, urbanization, and farm residence patterns, as well as for farm trade centers. Locational policy would then indicate how the space-economy would be regulated in order to foster an optimum pattern of development.

In this concluding chapter, the aim is to explore a possible approach by which responsible authorities in Saskatchewan might develop a conception of the space-economy of their province that is in tune with current and emerging conditions and to broach the possible institutional framework for implementation of such a concept. In other words, the aim is to outline the task of planning and the tasks of the planner, but not to do the planning. The nature of change in the space-economy will be described briefly at first to indicate how this shapes the task of planning in Saskatchewan. A framework for planning and implementation will then be presented, including some possible measures for influencing the future spatial organization of Saskatchewan. Wherever they are relevant, the results of the analyses reported in earlier chapters will be brought to bear on the planning problem.

B. THE NATURE OF CHANGE IN THE SASKATCHEWAN SPACE-ECONOMY

The space-economy of Saskatchewan is largely a self-adjusting system that is able to adapt itself to both exogeneous and endogenous changes in the population and the economy. Moreover, it is the dynamic kind of self-adjustment that characterizes developed societies in contrast to the static kind of adjustment that occurs in under-developed societies unable to break out of "vicious circles" of ignorance, poverty, and disease. There has developed in the Saskatchewan space-economy a series of responses to changes in such things as population migration, price fluctuation in agricultural products, technological and scientific improvements, and so on. There is, however, no assurance that a self-adjusting system such as this will produce desired changes without interference, particularly in the public sector.

It will be appropriate now to re-examine the Saskatchewan space-economy and to pay particular attention to the mechanisms by which it makes adjustments and to the values that apparently motivate the kind of adjustments that are made.

It has been noted earlier that the agriculture of Saskatchewan has been organized for commercial rather than subsistence farming since the first days of settlement. Not only were settlers encouraged to take advantage of free land and to grow wheat for export, but also when the settlers found the free homesteads too small to adapt to the farming techniques

of the Plains they proceeded to acquire additional land. When labor-saving machinery became widely available, these improvements were adopted extensively by the province's farmers. When in more recent times the Saskatchewan farmer has been caught in a cost-price squeeze involving high fixed costs for machinery and land and stable prices for his produce, the manner of adaptation has been to acquire more land over which to spread the fixed costs. Throughout the history of agricultural development in the province the spirit of innovation has been fostered by the farmers, and the values of adaptability and efficiency in farming have been supported by the provincial government in its many services to agriculture. These values were in turn, nurtured by the actions of the railways and grain elevator companies which supplied easy access to markets, by the system of land tenure that allowed acquisition of additional land, by the machinery companies and their dealers that urged new improvements upon the farmers, and by the many different entrepreneurs who established outlets in the small trade centers to offer goods and services to make the lot of the farmer more efficient or more amenable or both. It was natural for these values of efficiency and adaptability to have received widespread support, for success for the farmer meant success for the whole provincial economy. Adherence to these values in agriculture was construed to be instrumental in achieving growth and stability in the province's development. And, indeed, they have been.

The social life and living environment of Saskatchewan farmers received considerable attention, as well as their economic life. Among the first types of local government found in the province were the local school districts. The quality of rural education has been of special concern both to rural people and the provincial govenment and, over the years, has brought forth a variety of spatial and administrative arrangements for securing high standards in rural schools. The attainment of hospital facilities in rural areas through the joint cooperation of several adjacent municipalities finds encouragement in provincial legislation dating before 1920. The formation of rural telephone companies to help compensate for the isolation of farm living has legislative bases back to 1910. These are but a few of the areas in which there has been both encouragement and assistance given to rural people to help improve their living conditions. In general, the principle of equalization of costs has prevailed as between urban and rural areas of the province under the aegis of a value that rural people deserve a "parity" of public services. It should also be noted that many efforts to improve the living environment of farm families in the rural areas have been aimed at maintaining the strength of the so-called "family farm." The family farm as an institution that represents the strength and vitality of individual initiative in Saskatchewan society draws wide support from both rural and urban quarters.

The space-economy that evolved out of the social and

economic situation just described is still in evidence today. It was moulded on the isolated farmstead which represented the basic unit of export production. The residence pattern of those engaged in agriculture and their families was similarly dispersed. An extensive system of surface transportation (roads and railways) was developed to bring the dispersed population and farm units into contact with farm markets, and educational, cultural, and shopping services. The limits of horse and wagon travel prompted the establishment of a dense pattern of small commercial centers in close proximity to farm families. The same criterion of travel prevailed in the establishment of local government boundaries and of cultural, religious, and educational facilities many of which were located in the open countryside. The latter nodes of activity and the commercial centers constituted activities designed to serve the needs of those engaged in the export industry of the province. There was no highly developed urban pattern (no city reached 50,000 population until 1931) and the small cities that existed were largely geared to servicing the nearby farm trade centers. Industrial development for export or otherwise was meagre in the cities or elsewhere.

This is the space-economy that prevailed until about 1941, and although many of its patterns of activities and facilities still remain it has been undergoing considerable change since that time. The surge of mechanization that followed the end of the 1930's drought and the onset of World War Two led to an absolute decline in rural population and a

large increase in the average size of farms. The trends in farm mechanization, rural population decline, and farm size increase continue to this day, and have thereby reduced the number of customers for farm trade centers, the number of farm production units to be served, and the number of people demanding educational, religious, and other social services in the rural areas of Saskatchewan. This has been accompanied by the increase in mobility afforded rural people through the widespread availability of automobile travel. The wider range of contacts enjoyed by rural people increased their awareness of and desire for a higher level of amenity and of public services on farms and in small towns.

Institutional changes were also occurring to affect the prior organization of the space-economy. In merchandizing, especially, it recognized not only that there were important economies to be gained through larger size units but also that widening product lines could be handled. The supermarket is, of course, the most obvious example of this trend, but it also occurs among the farm machinery parts suppliers in Saskatchewan, for example. It also came to be recognized that economies of size and greater specialization were possible in providing the variety of public services needed in the rural areas. Thus, there has been widespread school and hospital consolidation and efforts to obtain more. Similar arguments for efficiency and service have been used in recent years by the railway and grain elevator operators to justify their requests to be allowed to make contractions in

their now-extensive systems for grain collection and storage.

Changes have also occurred in the non-rural side of Saskatchewan society. Today, there are two cities with well over 100,000 population in the province and over one-third of all the population live in cities of over 5,000 people. The two largest cities are now no more "farm cities" than they are manufacturing centers for the region and for export. Several smaller cities have an economic base in the exploitation of petroleum in their locale. The recent discovery of the world's largest deposits of potash within the province have led to several large mines that now outweigh agriculture as the most important economic activity in the rural areas where they have established. And much attention is being given to the development of a system of provincial parks (and highways to reach them) to provide for the recreational needs of the province's urban dwellers, as well as to promote a tourist trade from other provinces and states.

If we were to design a space-economy for Saskatchewan to fit with today's needs and conditions, it would be a great deal different from the pattern that was established for the situation of two decades and more ago. We would want to take advantage of the greater range and mobility provided by the automobile, the economies of scale and the possibilities of better service in larger public and private enterprises, and the potential for expanding farm income through the use of large farms. We would have a space-economy, in the words of a perceptive

observer of the Great Plains, Karl A. Fox, "laid out on a larger scale than the old one, with fewer and larger central cities, fewer major consumer shopping centers, and fewer business functions remaining to villages of a few hundred people."[3] This is, of course, what has been happening to the space-economy of Saskatchewan, and other parts of the Great Plains, in the past two decades. In the perspective of slightly more than twenty years, the departures from the old pattern have been radical in many instances, including that of the trade center system.

That the present space-economy is a mixture of old and new elements reflects in part the normal inertia in changing facilities and services in spatially extended systems and in part the constraint of the prevailing value system. On the one hand, the physical facilities from which derive various public and/or private services represent a capital investment that often cannot be easily written off. This is a major reason for the persistence of many marginal business firms in rural trade centers. On the other hand, the prevailing value system sanctions only certain changes in the eyes of its interpreters at any one time. Thus, small trade centers are given aid to improve their level of amenity in public utilities even though there may be little certainty that the center can be sustained. It is also the reason that many one-room schools still exist. And, apparently, the out-moded system of grain collection by branch line railroads and country grain elevators will not be allowed to pass out of existence until it can be assured that the efficiency and

prosperity of the farmer will not be unduly impaired. Though change occurs and has occurred in the space-economy of Saskatchewan it does so within a principle of allowing a superfluity rather than a deprivation of any components, at least within a period of transition. Thus, there are still more miles of roads and railroads, more small farms, more hospitals,more small trade centers, and so on, than would be necessary under a system predicated solely on present-day needs and conditions.

C. THE TASK OF PLANNING THE MODERN SPACE-ECONOMY

By all appearances, the Saskatchewan space-economy will remain viable and perform reasonably well in the future with no more than normal interference from the public sphere. The basis of the province's growth, the perennial wheat economy and the more recent additions of oil, potash, and manufacturing, are strong and tend to assure progress. The changes in the space-economy that are bound to accompany further progress in the level of economic development will, in turn, be mediated by the institutional agencies of the political economy. The pricing system for farm inputs and outputs will tend to determine the size of farms that are economically necessary, and the generally open, contractual form of land tenure will help to determine the practical size of farm. The pluralistic

decision-making processes of the various levels of governments, national, provincial, and local, will work to obtain consensus in public decisions such as the removal of branch rail lines or hospital consolidation. Intermediary forces such as the farm producers' organizations, the merchants' groups, and the local government associations will seek to aid the interpretation of the various issues with which they are concerned from local government reorganization to rail line abandonment. Finally, the commitment of the populace to a pattern of growth and innovation among its industries tends to assure continued functioning of the system.

To state that the system is largely self-adjusting is not to impute either the nature or the pace of the changes that occur are always at an optimum. Dislocations do occur and often are accompanied by social costs, as the problem of trade center decline amply illustrates. The difficulties usually arise because of the nature of change at the present in contrast to change of the past (pre-1941). In the past, change was dictated by the desire to improve the economic potential of Saskatchewan farmers as well as to improve the level of living of both rural and urban people of the province. Continued improvement then was usually accompanied by the need for a greater density of population and of facilities for disbursing services to the population. Current change is still dictated by the desire for improvement in agriculture and rural and urban life, but the recent trends

in the organization of public and private activities and the increased mobility of the population mean that a much less dense configuration of population and facilities is needed.

As new spatial terms of réference are worked out for providing, for example, educational, grocery shopping, or grain collection services a variety of social costs are incurred: some children may have to remain in out-moded country schools while others are forced to travel excessive distances by bus to remote schools, or as trade centers disappear much investment in commercial facilities is lost to a locale and the remaining population is also inconvenienced by extra time and distance they must consume to obtain once familiar local services. Undoubtedly, it is not only a question of social costs, for there are also social gains from these changes: for example, the loss of business investment in small trade centers may be more than made up by increased investment in large centers that can better take advantage of economies of scale, and larger schools and hospitals able to offer more specialized services are important new assets for the region.

Difficulties also arise from the fact that the timing of the various changes in the space-economy does not coincide. Arising as they do from various sources in the society and the economy and initiated by a variety of agencies, the changes occurring in the current space-economy present problems in programming the pace and incidence of those changes: depopulation, decline in local trade centers, closure of schools and so

on. This represents one type of programming problem where the changes are generally endogenous and sequential. Another type of programming problem arises with those changes that are exogenous and not sequential, as for example those deriving from the discovery of new natural resources, from efforts to effect savings and make improvements in education or medical care through the centralization of facilities, or from the plans of the national railway companies to effect economies of operation by abandoning branch lines.

The task of planning as applied to the space-economy of Saskatchewan given the above conditions is threefold. First, it is needed to assist in the smooth and orderly transition of the space-economy, including regulating the pace and incidence of change particularly in reference to the public sector. Second, it is needed to assist in devising means for alleviating the social costs of transition in the space-economy. Third, it is needed to act as an ever-present monitor of the behavior of the key variables of change and to provide an evaluation of this performance against agreed upon standards. The task of planning is seen here as a public function which will comprise a framework whereby the various public and private decisions affecting the space-economy can be viewed and assessed regarding their consistency with the goals of Saskatchewan society. The ultimate objective of the task of planning in this situation is to formulate "locational policy" that would help ensure the attainment of an optimum pattern of development in spatial, economic, and social terms.

D. TOWARD A LOCATIONAL POLICY FOR SASKATCHEWAN

It is not within the scope of this paper to develop a complete system of planning for the Saskatchewan space-economy nor even to make recommendations on specific policies for the spatial distribution of activities. Having raised the question of the need for planning, there is however the obligation at least to outline an approach to developing a system of planning that would be appropriate for Saskatchewan. This final section will consider briefly some of the major tasks facing "planners" in Saskatchewan if a system of planning were instituted to deal with changes in the space-economy.

The tasks of the planner are numerous, many are general or of an advisory nature to policy-makers, while other tasks are specific and may even involve executive functions associated with implementing plans. Since it is not possible to discuss all the tasks here, three major ones have been selected. The first concerns the question of defining goals for the space-economy and the translation of these goals into standards by which performance can be assessed. The second concerns the question of establishing an institutional and informational framework in which the task of planning can be performed adequately. The third concerns the question of possible public measures for influencing the pace and incidence of change in the space-economy. Specific references will be made to the trade center system and the changes in it that might be dealt with in terms of these three tasks, in lieu of discussing all aspects

of the space-economy.

Defining Goals and Performance Standards

Seldom, if ever, does the planner find himself presented with a clear, concise set of goals directed at the problem in question. Indeed, it is not unreasonable to characterize the entire planning process as one of refining goals to a point where a single solution, which reflects the goals, can be agreed upon. Thus, in planning for the Saskatchewan space-economy it is necessary, for example, to define the goals that most clearly express the desires of the provincial populace regarding the kind and distribution of activities in rural Saskatchewan. Such general goals for rural areas would then have to be refined to a level of abstraction that would allow the consequences for trade centers to be determined. These more specific, spatial goals can then be translated into standards against which the performance toward the attainment of the goals can be measured. It will be useful to attempt to delineate the system-wide goals for the Saskatchewan space-economy and to trace through the chain of those that might apply to the future of trade centers and the formulation of possible performance standards.

Although no thorough analysis has been carried out to determine the complete range of goals that are endorsed in Saskatchewan, it is possible to discern the major value-orientations on the basis of the experience gained during this study.

Among those to be discussed it will be readily seen that they have their roots in the value-orientations that are conspicuous in North American society: i.e., achievement, work, efficiency and practicality, progress, material comfort, equality, freedom, democracy, secular rationality, etc.[4/]

A prime value-orientation in Saskatchewan is marked by the stress put on the activity of farming. Not only is it endorsed because of its economic importance but also because of its social importance as an occupation that allows the maximum freedom of opportunity for individual initiative, and achievement. The espousal of the value of the "family farm," that pervades the reports of the Royal Commission on Agriculture and Rural Life for example, is one way in which this value-orientation is manifest. There are, in addition, a host of government and university extension activities in agriculture that buttress the position of the farm family and its independent farming enterprise. In contrast, there is little support for the notion of the "corporation farm." The primacy given to farming in Saskatchewan dictates that close attention be given to the spatial organization of this activity in the space-economy.

A second major value-orientation is the importance accorded growth and stability in the Saskatchewan economy and in its social life. There is a faith in the future and a feeling of adequacy in dealing with it. There is probably no more apt

example of this than that provided by the original homesteaders of Saskatchewan; their image is still revered. A belief in progress seems always to have prevailed with its acceptance of change and the idea that the change is tending in a definite direction that is good. Where brakes have been applied on the idea of growth and progress it has been to modify the pace of growth in order to provide some stability in cherished institutions. Change in the space-economy will, therefore, be accepted if it is predicated on achieving growth and stability. Change will not be sanctioned, it is reasonable to assume, where it militates against the Saskatchewan farmer being able to enlarge his holdings, for example.

Efficiency and adaptability identify another important value-orientation for Saskatchewan. It has long been applied to the approach of the farmer to his operation and implies technological innovation, practicality, up-to-dateness, expediency, and particularly, economic expansion. This is the stuff out of which progress is made in Saskatchewan, it is felt. In general, these values have been applied mostly to the farm firm and are less explicit for other sectors of the economy or for social life. Their importance for a changing space-economy is that modifications tending to impair efficiency and adaptability of the farmer would not receive sanction.

The avowal of amenity and parity in the rural living environment has been a persistent theme throughout Saskatchewan history as attested by the references to early legislation made

in previous paragraphs. It is not surprising that these values should have received so much support, for as late as 1941 two-thirds of the province's population were classified as "rural." But it is still a persistent theme: it constituted one of the main terms of reference for the Royal Commission investigations into agriculture and rural life in the 1950's. Out of the latter investigations evolved a series of new programs designed to improve the social conditions and amenities in rural Saskatchewan from the construction of a main market grid road system, to rural electrification, and aid for the installation of sewer and water systems on farms and in small towns. Many of these programs have been carried out under a principle of ensuring parity of public services (if not complete equality) between rural and urban areas and through the equalization of costs where possible. Efforts to modify the space-economy must be especially cognizant of these values since in many instances they involve the location of public facilities including transportation systems.

These are the "ultimate" values, as Williams has called them, of Saskatchewan.[5] They must be reckoned in any planning situation for the province. They will, however, be translated into "instrumental" values, or goals, for the particular planning situation. Here we are concerned with planning for the space-economy and may, for illustrative purposes, suggest some likely goals. The suggested goals are limited to those associated with development of the space-economy of rural areas to

simplify the discussion. A final selection of goals would be a highly political venture which it cannot be presumed to anticipate here.

The following set of goals seems reasonable and would likely come into contention if planning for the space-economy were actually undertaken. They derive from the major value orientations already described -- the primacy of farming, growth and stability in agriculture, efficiency and adaptability in economic and social life, and amenity and parity in services and facilities for rural people. No hierarchy is implied in this set of goals, but it must be stressed that they are considered to be strongly interlocked. No matter which one is deemed to be the most important to attain, the others would have to receive careful consideration in planning the rural space-economy.

1) To encourage the creation and development of economic-size farm units through the expansion of land holdings, or greater mechanization, or both.

2) To promote the modification of the present grain collection system so as to achieve a reasonable balance in incurred transport costs between producers and distributors and such that collection points coincide with functioning trade centers.

3) To maintain a system of viable trade centers in reasonable proximity to farm residents.

4) To develop functional groupings of key public facilities such as schools, hospitals, and libraries in conjunction with the trade center system and with the cognizance of its capacity for change.

5) To develop a system of road transportation that allows maximum ease of travel and minimum travel time for rural people to have access to a full range of commercial and public facilities.

The first goal recognizes the need for continued improvement in farm incomes and the fact that this is most likely to be achieved through the advocacy of enlarged farm units or more machine agriculture. Diversification in Saskatchewan agriculture is not seen as a ready solution to the spatial problems aggravated by large farms, except in a few areas of the province. Moreover, large farms are not considered inimical to a continued bettering of rural life given the greatly increased mobility and choice of residence available to farm families. The second goal recognizes the logic of making contractions in the extensive network of branch rail lines and country grain elevators. Modifications should be predicated upon the determination of relative costs and benefits to the farmers, the railroads, and the grain elevator operators that would be attendant upon such decisions. The important function of grain collection should also devolve upon functioning trade centers rather than upon open-country locations as is the case with one-third of the grain collection points at present. The third goal is self-explanatory in light of the discussion and analysis in previous chapters. The fourth goal recognizes the right of rural people to a high level of public services and facilities but would make this policy contingent upon using such location decisions to help develop an optimum pattern of trade centers. A greater degree of consolidation of various public facilities seems essential if both economies are going to be achieved and a staff of competent professional people is to be sufficiently attracted to operate

such services. The fifth goal recognizes the need to link the various centers of activities -- farms, trade centers, schools, hospitals, etc. -- in an efficient and reasonable way so as to ensure as wide a range of opportunities as is possible for social and economic interaction within easy reach of rural people.

If such a set of goals as this were acceptable, the next step would be to derive a more definitive set of objectives that are operational in spatial terms. Take the goal of maintaining a system of viable trade centers in reasonable proximity to farm residents as an example; this would require a policy covering the desired size, location, and arrangement of trade centers. A possible formulation of this might be to proclaim the desirability of maintaining at least two centers of Partial Shopping center level in every one thousand square mile area of the province and at least one center of Complete Shopping center level in every two thousand square miles. This would put the former type of center within a service area of 20 minutes driving time in radius; the larger, Complete Shopping centers would be within 35 minutes radius. Moreover, the analysis performed for this study has indicated that both these types of centers are the most viable of the local trade centers. Since there is a high degree of interrelationship within the set of goals posited above, it then becomes necessary to make operational at least the goals on road system development and functional groupings of public facilities so that they are consistent with and/or mutually reinforce the goal of trade center development. This would not

seem difficult to do: Partial Shopping centers might become secondary nodes in the road network, for example; Complete Shopping centers would be located at primary nodes and also be the location for sub-regional facilities.

Since planning is concerned with attaining goals as well as setting them there remains the task of describing how the performance toward desired ends may be determined. It should be possible at all times to obtain a clear comparison between the level of development sought in the planning goals and the current level of attainment. But it is not just a measure of progress that is needed; it is necessary to be able to evaluate the progress to ascertain if the level of development avowed by the goals is actually attainable. In other words, we shall need performance standards, or norms, that are applicable to various levels of development. In this way, progress can be monitored so as to help make judgements about action in the public sector that might be used to speed up, slow down, or divert the pace and incidence of change, in the space economy.

Returning, again, to the goal of a system of viable trade centers, the performance standards will have to be of two kinds. On the one hand, it will be necessary to determine whether "reasonable proximity" is being maintained. In Saskatchewan, the problem is not one of trade centers being too sparsely situated, but rather the opposite. However, with the high rate of trade center decline and disappearance that has been experienced, close watch must be kept on trade center changes to assure that

no areas become significantly under-served either in number of trade centers or variety of types. Performance standards based on a density concept for each type of center in conjunction with map records would provide a possible approach for monitoring these changes. The use of either provincial sales tax data or information from Dun and Bradstreet Directories would allow progress for as small a period as yearly quarters to be assessed.

On the other hand, the goal also calls for the maintenance of "viability" in the trade center system. There are a number of ways in which we could monitor the viability of trade centers. It could be done by working out ratios of retail sales per capita, assessed valuation per capita, volume of entering traffic per capita, for example, and comparing these with current provincial averages or other norms. A more elaborate task, but not a difficult one given electronic computers, would be to run factor analyses periodically to determine the position of a trade center on scales such as those described previously. The "dimensions" thus obtained would have to be calibrated to different levels of viability.

Suggestions for an Institutional and Informational Framework

The planning of the space-economy of Saskatchewan is of such paramount importance to the economic development of the entire province that it is a task which demands central direction from those in government who are ultimately responsible for

progress in the region. On the other hand, the diffuseness of the agencies whose decisions affect the space-economy combined with the effectiveness with which change has been worked out in the past demands decentralized implementation of planning. The organization for planning of the space-economy should, therefore, promote a high degree of compatibility between these two principles. A laudable objective of planning in our open and diffuse society is to have the many decisions of planning taken in a more or less routinized way by all those involved. Not planning by central edict, but rational public action on as broad a basis as possible would seem to be the most desirable goal.

Discussion is limited here to the organization of that part of the planning function in the provincial government and its agencies that applies to the space-economy. There are, of course, other aspects of provincial planning -- social welfare, finance, cultural activities -- that would have to be given due consideration and weaved together with that of planning for the space-economy. A discussion of the total structure of provincial planning is, however, beyond the confines of this study. The discussion, by design, also does not deal with the role played by many private and semi-private organizations in shaping the space-economy. The decisions of the public agencies are the focus because they are central to many issues regarding the future space-economy and it is also through their good example that the notion of planning may be proliferated.

If planning of the space-economy is to become accepted

as a natural part of the process of government decision-making, it must have the endorsement and support of the leaders of the government. It must be "more nearly a natural product of the social needs and pressures," than a "rational instrument engineered to do a job."[6] To be effective in a very vital way, the arrangement for planning must become institutionalized, that is, to quote Selznick again, the government will have to "infuse (it) with value beyond the technical requirements of the task at hand." Hence, it is suggested that the space-economy planning function be established, first of all, as an adjunct to the office of the premier of the province. This not only gives the planning function stature, but also demands the professed support of the function by the highest elected representative of the provincial populace.

Such a central planning group would have four main tasks with regard to shaping the space-economy. One, they would provide the substantive basis for defining the system-wide goals and locational policies espoused by the government. It might prove desirable for the planning group to receive guidance on goals and policies from a provincial planning commission appointed by the premier and composed of representatives of the major public and private interests of the province. A commission such as this might provide continuity for planning during changes in government.

Two, they would be responsible for regular "regional capital budgets" for the province as a whole.[7] The task

would consist essentially of transferring the capital expenditure intentions of all provincial government departments and agencies into a form in which the regional incidence of capital expenditures could be seen and evaluated. "Development maps," as Rodwin calls them, could be prepared and continually updated which showed where capital expenditures have taken place in the past and where they are being planned. This would provide a way of assessing progress toward development goals. It is anticipated here that the central planning group would have free and easy access to the provincial bureau of the budget.

Three, they would prepare studies and forecasts of trends in population, agriculture, industrial development, urbanization, and so on. Such reports would be for general use by all public and private agencies. It might also be found useful to permit the central planning group to do special studies under commission from other agencies.

And, four, the central planning group would act as a clearinghouse for information relevant to the question of development of the space-economy. Information would be collected from all public and private agencies, processed in terms of the performance standards set for the space-economy, and redistributed to those agencies concerned. Information of this sort should also be readily available to as wide as possible a range of groups that make decisions affecting the space-economy: e.g., councils of churches, cooperatives, boards of trade, local governments, school boards, etc. This task could well be the

most important of the four outlined above, for it would help enlarge the scope of rational public action. Public action based on a widely available common fund of relevant information will more likely be public action that is consistent with public goals.

There is already precedent in Saskatchewan for a central planning agency. For some time there has been in existence the Economic Advisory and Planning Board. However, its functions have been limited primarily to assessments of proposed government legislation in terms of economic impact. It has not had an orientation toward the definition of goals for the space-economy, nor been especially concerned with the spatial ramifications of public action in general. Its functions would have to be greatly enlarged under the suggestions made above.

The central planning group would have counterparts in each provincial government department and agency. The departmental planning groups would be responsible for making operational the system-wide goals described by the government. They would also be required to frame departmental budgets in regional terms as well as functional terms. This would not only be done to assist the central planning group, but would also serve constantly to alert government departments to the spatial consequences of their decisions in programming capital expenditures for various facilities. As the government departments are the repositories of most of the information needed to develop targets and performance standards for planning, the planning groups would be responsible for systematizing the collection of relevant data and

for channeling it to the central planning group. A major portion of the data collected by each department or agency will derive from the efforts of field officers of the department. It is important that the latter personnel be well apprised of the meaning of the data gathering task and be supplied with concrete evidence of its usefulness. They must be in possession of meaningful performance standards and be able to gauge their decisions against them in a more or less routine way.

Public Measures for Influencing Change in the Space-Economy

Although it will probably be desirable to allow the Saskatchewan space-economy to change largely under its own impetus, the process does not have to be left entirely to chance. The provincial government has at its disposal several direct and indirect means by which it can influence both the pace and incidence of change in the Space-economy. As direct means the province has control over the location of certain vital public facilities for which it provides most or all the funds, as well as control through various institutional arrangements such as taxation, the organization of local government, and the licencing of natural resource development. As indirect means the province has power to persuade the agencies of private development to channel investment to one locale or another, including the possible use of various incentives.

The most explicit means of influencing change that are

possessed by the government are the decisions by various departments to expend public funds for physical facilities. This includes the power to withhold expenditures to maintain old facilities or to build new ones. The range of such facilities is large and even a short list of them will indicate how vital they are to the functioning of the space-economy: highways and roads, schools, hospitals and libraries, electric power and telephone systems, (the last two services are provided by government agencies), other public utilities, and housing for the aged. In some cases the control of funds is entirely in government hands as with the construction of provincial highways or the extension of the electric power grid. In other cases the government controls development by basing its contribution (for school construction or for hospitals) on local authorities meeting certain standards of adequacy. In still other cases the government may withhold its participation in schemes administered jointly with the federal government such as housing the aged or rural development under the new Agricultural Rehabilitation and Development Act.

The above powers lend themselves to thoughtful application through various locational criteria the government may deem appropriate to further the optimum pattern of development. For example, if it were desired to develop a system of local hospitals and high schools of adequate size for economy, for providing some specialized services, and which were within reasonable commuting time of the most distant user, the following criteria might apply. Dr. Conant has noted for the

United States that an adequate high school should have a minimum of 400 students (this figure is assumed to be much the same for Canada). This takes a population base of 5,000 people, approximately. A hospital of 25 beds also requires a population base this large, according to the criteria of 7.5 beds per 1000 population used in the recent Saskatchewan study on hospital services. Our previous analysis has shown that this amount of population, on the average, resides within the trade area of a Partial Shopping center. Moreover, the trade area for this level of center has an average maximum radius of less than one-half hour driving time. Thus, for example, it would seem possible to develop a policy whereby any new funds for school construction would be allocated only to centers of the Partial Shopping center level and provincial aid advanced for conveying children to the new facilities who now attend small or out-moded schools.

The hierarchical pattern of trade centers could also be utilized when considering the design and utilization of road systems: a hierarchical pattern of business implies a hierarchical pattern of consumer movement and, in turn, a like transport network to support the trade center system.[8] These are but a few ways in which the location of public facilities in rural areas could be approached using the powers of capital expenditures held by the provincial government. It should also be noted that as an adjunct to this power of <u>where</u> public funds are spent, it is also possible to influence the <u>scale</u>

(or size) of public facilities at particular locations and the timing of construction.

Through various institutional arrangements the provincial government can influence changes in the space-economy. One example of this is in power held by the government in the field of natural resources development. The mining of minerals, drilling of oil, the use of water resources all require official sanction by means of licences and permits and the land resources in the surrounding territory in any such undertaking are under ultimate provincial jurisdiction. Oil exploration and production in the past decade has affected the growth pattern of trade centers in large portions of the southeast and west-central parts of the province. Although some communities in these areas more than doubled their populations since 1961, the general pattern of growth due to oil was one of diffusion. That is, the new population growth has spread among a number of small communities, but lacking any policy for such growth few of the communities have been able to build up to a respectable level. In other words, such development can be used to help bring about a desired change in the organization of activities in the locale of the natural resource.

The Province of Alberta, which borders Saskatchewan on the west, has instituted legislation under its New Towns Act to deal with problems brought on by sudden urban growth and has used it successfully in its Pembina oil field to concentrate developments in the new towns of Drayton Valley, Lodgepole, and Cynthia.[9]

This method is open to the Saskatchewan government, too, and might also be used to control development in the areas affected by the recent advent of potash mining. Mining development tends to have concentrated effects on urban growth, affecting only one or a few places near the minesite.[10] But a single center mushrooming from a few hundred persons to a few thousand can upset the established balance in the trade center hierarchy of the locale. Such growth and investment, while undoubtedly useful to the entire province, can have disadvantages for the local area unless properly controlled. The high density of small trade centers that exists in the province's rural areas offers, for example, the possibility of several choices of centers to receive the prime development. It also offers possibilities for diverting some growth to surrounding towns to allow them to share in the new-found prosperity. The provincial government could affect such decisions by providing for areas of controlled natural resource development and by proclaiming townsite development provisions in legislation.

An unintentional consequence of the recent proposals to reorganize local government boundaries in Saskatchewan could be to influence the growth of certain centers in the trade center system to the disadvantage of others. The proposals generally call for the establishment of about 65 counties to take over the local government responsibilities now held by villages and rural municipalities. Each county would have a county seat and by virtue of the many new functions accruing to such centers,

county seats would acquire a special impetus for growth if U.S. experience is applicable. Nesmith comments that few if any of the towns in the U.S. Great Plains that are viable are not county seats.[11] This factor has not been considered either as a desirable or undesirable feature of the Saskatchewan county system.[12]

Finally, any government has substantial power to persuade private interests to observe criteria of development that is most suitable to all the populace. It can do this through the scope of possible personal contacts it possesses as well as through the use of its informational and financial resources. Two brief examples will suffice. First, one of the major instruments of change in the shopping patterns of rural farm and small town people is the establishment of supermarkets. Since most such firms are being advanced by either nationwide foodstore chains or the provincially-based cooperative movement, their decision-making processes are more accessible to government information on suitable locations. According to some recent studies, a medium-size supermarket (not as large as found in regional shopping centers around cities) requires a population base of 4-6000 people.[13] This size of population base is not found below the level of Partial Shopping centers as we have noted. Studies might be made by government planners with the explicit intention of providing information to influence the location decisions of supermarket operators, preferably in advance of the decision.

Since the province is also undergoing considerable industrialization, this could constitute a second area in which

government information resources might be brought to bear on industrial location decisions. It might even be desirable to use financial incentives to attract industry to those parts of the province not participating in the recent progress. The decentralization of industry could serve not only as an alternative employment source to farming or agricultural service, but could also act to build up smaller centers to a size where they could provide a wider and more modern range of goods and services to all in the locale. This is not to suggest a complete dispersion of industry into every small town, even if that could be accomplished. However, within a radius of 50 miles (one hour's commuting) of twenty good size towns located on main rail lines it is possible to cover three-quarters of the settled part of the province. The communities selected correspond to the now-designated Complete Shopping centers. If it were found difficult to persuade industry to these centers, a system of locational incentives such as used in Puerto Rico might prove a useful tool. This is all within the Provincial government's power.

E. SUMMARY

The problem of trade center decline must be seen within the larger context of the problem of re-defining the space-economy of the entire province of Saskatchewan. Dramatic changes

have occurred in the province's agriculture and rural life in the past two decades, but they are no less significant than the changes that have led to a more urban economy and population. The larger problem is essentially one of developing the optimum spatial distribution for the activities and functions of the nearly one million people who inhabit the southern one hundred thousand square miles of Saskatchewan.

If we were to design a space-economy to fit with today's needs and conditions, it would be laid out on a much larger scale than the old one. But to create a new space-economy requires building on the past pattern and being guided by prevailing values and policies and controls as well as by the trends in the economy, in mobility, and in population. The task of planning a new space-economy must also account for the self-adjusting nature of the system. Thus, planning in the Saskatchewan situation does not require a revolutionary approach so much as an evolutionary one. It is needed to assist in the smooth and orderly transition of the space-economy, so that progress continues to be made and any social costs of the transition are alleviated. Indeed, its most important task in Saskatchewan may be to monitor the key variables of change and provide an evaluation of the performance of the space-economy in terms of agreed upon standards and thereby provide a basis for decision making, particularly in the public sector.

Among the most important tasks facing "planners" in Saskatchewan if a system of planning were instituted to deal with

changes in the space-economy would be the definition of goals, the establishment of an institutional framework, and the identification of the most effective public measures for influencing change. The definition of goals must start with a clear conception of the system-wide goals and then proceed to make them operational in locational policies for the optimum space-economy. Also needed are norms by which we can gauge the performance of the system to the desired ends. Institutionally, the best arrangement for planning in Saskatchewan would be compatible with central direction and decentralized implementation. The whole setup would emphasize the need to enlarge the scope of rational public action through a much broadened supply and transfer of information about the space-economy and its prospects. Action in the public sector could be vital to shaping the pace and incidence of change in the system. The power to make allocations of public funds for physical facilities from roads to schools and also to control the scale and timing of such expenditures would be among the best measures open to the government. But they could also use licencing powers and persuasion in order to influence private development into the most desirable locations.