Plant Location Selection Techniques

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PLANT LOCATION SELECTION TECHNIQUES

by

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PREFACE

This book ties together history, legislation and economics to create an awareness of what chances an individual will have when he selects a location for a plant. Key costs are discussed including those mandated by the environment and by legislation. The impact of cultures, both past and present, upon the opportunity for economic success are reviewed. It is a "How To" and a "Beware" presentation of plant location, both domestic and international.

The book is designed to provide chief executive officers, manufacturing vice presidents, chief engineers and engineers a checklist of things to do in analyzing a potential plant site. It is also designed to provide state and local industrial development staffs guidance in their efforts to obtain industry. New entrepreneurs will find this book to be useful in making presentations to financial agencies.

The do's and don'ts of plant location are dealt with from both the current and historical prospective. The impact of legislation upon manufacturing costs and thereby industry location is covered by both current and past examples.

Examples of failed locations from both industry and site planners perspectives are provided. The book shows how to choose the best location in a country through arraying the basic economic and social facts in an orderly manner. Both tangible and intangible cost analysis and factor weighing are covered. Included are the impact of customs, legal systems, ways of doing business upon costs, management style and plant efficiency.

Current legislation's potential impact upon plant location is evaluated. This review includes GATT, NAFTA, CBI and other international direct and indirect influences on markets and costs. Also the present and potential impact of OSHA, ADA, EPA and other national mandates is covered.

NOTICE

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Chapter 1

INTRODUCTION

BACKGROUND

Plant location and relocation are important options for established manufacturing industries to analyze for improving their cost structure and their customer service. Plant location is especially critical to a new firm entering a market or to an old firm introducing a new process or product. This book deals with those factors which minimize direct and indirect production costs, and ways to optimize short- and long-range profit potential within alternate economic climates.

Global competition dissolved national boundaries, and challenged traditional assumptions, particularly US industry's preoccupation with local markets. Shifting trade barriers opened new markets while making others less attractive. International competition and changing markets have expanded the number of potential locations available for plant location. Many US firms now routinely consider international locations when evaluating potential locations to see if their base cost structure can be reduced in a world market.

Scientific advances, new processes, new products, new raw materials, jet freight, automated factory equipment, and shifting consumer markets are important factors that influence firms to move, to close palnts or to expand production with new facilities. Much of US industry is in a state of flux. Some industry is shifting production overseas while at the same time European and Asian firms are opening

plants in the United States.

In the face of these seemingly conflicting positions, it becomes increasingly important that industry leaders and managers understand the total economic, legal, environmental and industrial background that affect plant location. Because of almost daily changes, these conditions must not only be evaluated but also forecast. Selecting a site to satisfy an international market potential has become increasingly complex.

Changing economic conditions within countries, states, and localities directly impact industrial development. Rising wages or taxes can increase a product's costs beyond a market's ability to absorb them. Civil disorder or high unemployment often becomes the basis for formulating legislation that changes the product's cost base.

Legislation designed to encourage industrial development is often structured to encompass the economic welfare of individuals at all levels in specified areas of economic distress. Firms that understand the fundamental causes for industrial development legislation and that are prepared to evaluate factually the industrial development efforts of nations, states, and localities, can benefit from these legislative efforts.

Since history shapes thought and influences community activity, inquiring into the background of an area becomes basic to plant location. Prior legislation may have established important legal liabilities for an unwary manufacturing executive. For example, a simple environmental audit of the site and the area could avoid a firm acquiring complex legal liabilities. Similar studies investigating movement of industry in and out of an area can generate useful direction as to the viability of a site.

This book devotes some space to the long- and short-term impact of legislation on the growth of cities, city-states and nations. Legislation devised in the past, often recurs in the present. By studying incentives used to encourage industry in the past, communities can guide their actions to attract industry now and firms can use this same information to broaden their negotiating base.

While geopolitics may seem abstract to an engineer charged with locating a plant, understanding the movement of people, their origins and their customs can be important to engineeers and plant managers building a sound manufacturing organization. By studying which groups of people work well together and how they respond to various

incentives many labor pitfalls can be avoided.

Successful location requires one to pay attention to the history, theory and economic purpose that move people and events. Historically, manufacturers were beholden to traders to sell their product. In many respects this is still true. Yet today manufacturers have to deal with the environment and lawyers; disability legislation, unions and doctors; privacy, computers and new forms of corporate integration. While it is true that regulations make life more complex, it is also true that these times are not the first to be involved in similar activity.

KEY PREPARATIONS

Business Plan

A formal business plan represents a key ingredient of any plant location effort. Most firms maintain projected operating plans for five to ten year periods. The degree to which corporate plans are subdivided into markets, products, service requirements, production needs, and material sources, varies between firms. New firms starting up manufacturing operations, or old firms developing a new product line that utilizes new production processes, need to develop substantially more specific detail in marketing and production cost objectives than firms involved in a routine expansion due to increasing sales.

Reviewers of a business plan expect to see a profit goal. Profit, while not the only goal for an enterprise, is quantifiable, therefore useful for economic evaluation. Since profit is based upon a sales and product cost forecast, the forecast should estimate the probable or targeted marketing pattern, including the quantities expected to be sold to customers at various locations. This distribution pattern establishes a freight cost pattern, which is basic to the business-plan cost analysis.

Part of any business plan is an analysis of competition. Staff who are developing plant location data should collect product cost data on competitive or potentially competitive products. A competitor's market position should be established. Competitive products can be reverse-engineered to obtain basic material and product assembly costs.

The potential for product and service improvements may be obtained through interviews with retailers or distributors of the competitive product. These same interviews can pinpoint patterns of distribution and distribution service costs.

Plant location business plans should include detailed plant operations buildup projections. These projections include: levels of staffing, personnel training, equipment layout by buildup stages and by time period, projections of sales and potential profits, clearly stated production- and marketing-cost objectives, and a cash flow analysis. Capital requirements for plant and equipment should be detailed. Estimated power, water, fuel, and other related basic operating volumes should be calculated so that operating costs may be computed for each site evaluated.

Industrial Development Agencies

Early contact should be made with all available development agencies. This includes federal, regional, state, and local agencies. In addition, firms should investigate the promotional activities of banks, utilities, railroads, chambers of commerce, etc. These groups can play an important and useful part in the plant location process. Many firms use the competitive relationships between agencies to improve their cost of location and, in some cases, their product cost structure.

Shifts in plant location both within and outside the United States affect employment and use of resources at local, state, national, and international levels. When industry is lost from a community, counter-measures are taken by industrial economists and others to re-attract industry. These require industrial developers to plan alternate ways to develop their economic resources for generating new employment and tax base opportunities for their community.

Federal, state, and local expressions of concern about economic development are found in newspaper and magazine articles, in TV programs, in core city studies on employment of the unemployed, in the formation of industry study groups to make recommendations on counter-measures, and in the allocation of funds from industry, labor, local, state, and federal sources to find solutions to the employment problem. This often results in the passage of legislation to change the course of events by encouraging industrial growth. Changing the

economics of a community in respect to plant location may reflect an attitude of the people that evolved from consultation and discussion. Chambers of commerce often sponsor the passage of legislation to improve location economics.

Nations, regions, states, and communities are usually concerned with providing their citizens with an adequate standard of living. Industrial development is a prime strategy toward achieving this goal. Therefore, many national and international agencies have industrial development as their first objective. Among these agencies are the World Bank, the Economic and Social Council of the United Nations, the European Community (EC), the Ministry of International Trade and Industry (MITI, Japan), the Basic Research in Industrial Technologies for Europe (BRITE), the European Productivity Union (EPU), the Commodity Credit Corporation, Point Four, and the Export–Import Bank. In addition, a number of private foundations (e.g., Rockefeller, Ford, Carnegie) also devote resources to economic and industrial development both in the United States and foreign countries.

INDUSTRIAL DEVELOPMENT ECONOMICS

Background

There is abundant evidence that industrial development has become one of mankind's primary concerns today. There is equal evidence that economists have failed to attack the practical problem of establishing a workable formula, or a workable method, whereby institutions and people at the need level can effectively satisfy their demand for industry. The supply of industry, and of capital to create industry, is less than what is required to fill this universal demand. This means that firms with sound business plans involving plant location can position themselves to obtain substantial economic advantage in the competition for limited resources.

Industrial development may be called a socio-economic process. The fundamental force impelling this process is the desire to balance opportunity with population. This leads to the following definitions:

(a) Employment Opportunity--The desire of a community is to expand sufficiently so that every youth arriving at an employable age has a job. This is rooted in family ties and the desire to maintain the integrity of the home in a turbulent world.

(b) Economic Opportunity--The desire of every person, regardless of background, is to live in a reasonably financially secure world, a world that enables one to maintain a family at a socially acceptable level of comfort. Economic opportunity in this sense reflects the desire to maintain a standard of living comparable to that of similar family units within any given area.

The standard-of-living criterion is an increasingly difficult measure; as education progresses and as the general intelligence of man is raised, the standard changes and increases. For example, in 1800, perhaps 85 percent of the population of the Western world lived in or very near poverty. By 1900, less than 30 percent of the Western population was still at that level. Today, efforts are being made to reduce poverty below 10 percent in the United States, and still further in many other Western nations; thus, the very concept of what is acceptable to society has changed substantially.

The goal of industrial development economics is to maximize the economic opportunity of each individual within a community, a region, a state, or a nation. Yet each economic area does not have equal, or even the same, economic assets. Each area is subject to decreasing marginal rates of substitution between the factors of production. All communities cannot have the most efficient unit of production for all types of industry.

Therefore, in order to maximize opportunity, and remain within a free democratic framework, communities must maximize the utility of each factor of production for creating the most efficient unit of production from their available advantages. Fundamentally, a community must know what its economic assets are, and must be willing to improve its physical plant (parks, schools, homes, roads, etc.) before it can progress.

Economic Assets That Affect Plant Location

Economic assets are the unit cost values with which engineers, industry, and industrial development economists concern themselves. Massive shifts in our growing population have changed traditional marketing patterns. The "Information Age" has affected standards of living throughout the world. Economists are examining community economic assets with unprecedented scrutiny. They are finding areas of high and low industrial costs. They are noting that peaks of costs for some industries represent lows of costs for others. The seven categories of community assets listed in Table I are those that most state planning agencies encourage communities to monitor and to present to industries that are evaluating a plant location.

The economic assets of a community affect production costs both directly and indirectly. Engineers planning a plant location determine whether an area has high or low costs for the particular industry being located. Conditions that favor an industry at one time may be reversed as conditions change. It is important to keep in mind, as a site is selected, both the short-term and projected long-term changes in costs or economic conditions that affect costs. Most plants are located with the objective of amortizing and profiting from the initial investment. However if costs increase, this may not occur.

TABLE I

Community Economic Assets

Population	Land
Type	Topography
Quantity	Mineral content
Character	Geologic stratification
Habits	Present values, based on
Skills	Use
Location	Availability

Table 1 (Continued)

Natural Resources	Fuels
Water	Coal
Quantity	Oil
Chemical content	Gas
Source	Electricity
Location	Fuel expandability
Quantity and quality of minerals	Fuel reserves
Agricultural	
Forest	
Transportation	Markets
Water	Local
Rail	Regional
Highway	National
Air	International
Access	
Intangibles	Intangibles
Climate	Services
Housing	Educational facilities
Compatibility	Concessions
Physical municipal plant	Finances
Community efficiency	Taxes

Industrial development activity acts as a catalyst between a community's capital and industry. Plant location activity should provide an accurate accumulation of factual data about the economic assets of the community being portrayed. The community and the state normally provide for the review, dissemination, and updating of this information. All data provided by a community on its economic assets should always be checked for accuracy and currency.