INSTITUTE FOR PUBLIC POLICY AND BUSINESS RESEARCH
THE UNIVERSITY OF KANSAS

ENTREPRENEURSHIP AND INNOVATION: THE ROLE AND FEASIBILITY OF A SMALL BUSINESS INCUBATOR IN JOHNSON COUNTY

prepared for

JOHNSON COUNTY ECONOMIC RESEARCH INSTITUTE

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A. Introduction

As a fundamental shift from a product-based, industrial economy to a service-based, information intensive economy has occurred, the contributions of innovative small businesses and entrepreneurship to economic growth have been highlighted. Policy makers, particularly at the state and local levels, have realized that a healthy entrepreneurial environment must exist for these firms to succeed, and have responded by adopting initiatives to provide (or broker) financial, technical, and management assistance. Many of these new strategies are designed to create an entrepreneurial infrastructure which can reduce the effects of problems encountered during start-up and early maturation. An increasingly popular such tool for promoting long-term development objectives and nurturing "homegrown" entrepreneurs is the small business incubator.

Methodology

The Institute for Public Policy and Business Research was commissioned by the Johnson County Economic Research Institute (CERI) to conduct this study which examines the feasibility of the development of a business incubator in Johnson County. The extensive literature on incubators as well as the perspectives and experiences of several practitioners, were utilized to identify the relevant issues for consideration and to design the appropriate methodology for the project. From these sources, the following factors emerged as pertinent for consideration and evaluation: the nature and types of economic activity currently occurring in the area; the needs and problems of start-up firms in innovative industries and the degree to which these could be facilitated by an incubator; the economic development priorities of the community and the degree of community support that the facility might receive; the resources and potential linkages that could be utilized in the facility; and the factors critical to the successful development of an incubator.

After identifying the relevant issues, the next step was to examine them from the perspective of the local circumstances, using information compiled from a variety of sources, including published economic data, forecasts of economic and demographic variables, and surveys and interviews

with entrepreneurs, consultants, and local community business and political leaders. The data collected from all of these sources were synthesized in order to assess whether such a facility could reasonably be expected to enhance the entrepreneurial opportunities in Johnson County and the entire metropolitan community as well as offer significant benefits to its potential clients.

The Incubator Concept

The incubator "model" has been adapted to be an effective development tool with a variety of objectives and in a diversity of circumstances. For example, facilities have been opened as part of a renewed commitment by state and local governments to support enterprise development and job creation; by community organizations, to supply local business ownership and employment opportunities; by universities, to transfer their vast potential in knowledge and research into commercial products and services; and by private sector developers and business consultants to respond to the needs of the expanding small business sector. They have been cultivated in both urban and rural settings, and designed to assist small business formation of any type, or targeted to specific industries, areas or types of entrepreneurs. But the common purpose - to nurture fledgling firms into healthy small businesses - has produced some standard dimensions which are now identifiable with the incubator concept. A typical facility offers the following features:

(1) adaptable space which can be leased by small businesses generally on flexible terms and with affordable rents;

(2) a pool of office support services which are shared by the tenants to reduce overhead costs; and

(3) the availability of some form of business development services to provide assistance with accounting, marketing, and management, as well as access to government and economic development resources and assistance in acquiring seed capital.

Beyond these basic characteristics, there is no formula for the specific development of an incubator because each of the existing facilities has evolved from and in conjunction with the unique set of circumstances in the local environment, including the nature of economic activity, the business community's particular needs, its given endowment of resources, and

its long term development strategy.

Objectives and Advantages

According to research cited by the National Business Incubation Association, approximately 80 percent of companies nurtured in incubators survive, compared to an 80 percent failure rate after five years for all small businesses. Even given the appropriate qualifications, this is a striking statistic. However, in addition to this advantage, is the synergistic environment typically created in the incubator, which is induced by the sharing of equipment, administrative services, and business experiences among the tenants. Since it has been documented that other entrepreneurs provide some of the best and most useful advice, these interactions among the entrepreneurs generate, besides any inter-firm trade relations and/or joint ventures, an invaluable source of business consulting and counseling.

As the successful firms mature, they create opportunities for employment, investment, technology development and transfer, diversification of the local economic base, and expansion of the tax base, as well as create markets for other products and professional services. Consequently, many researchers have described the incubator experience as a "win-win proposition" since entrepreneurs receive the support and services they require, investors receive the opportunity to profit on investment in tenant firms, and the communities receive the benefits associated with economic growth.

B. The Local Economic Climate

Since a small business incubator with similar objectives to the one proposed for Johnson County is already operating in the Kansas City metropolitan area, it was important to ascertain for this study whether another such facility would enhance, or simply duplicate and replace, existing entrepreneurial opportunities in the community. To accomplish this task, the economic climate of the area was analyzed, including data describing the recent growth of business establishment formation, employment, per capita income, and population. The objective was to determine if there would likely be sufficient activity and benefits to justify the use of the area's resources to establish and maintain another facility.

The evidence supported the popular view that the Johnson County economy

has recently experienced exceptional growth both in absolute and relative terms, by generally out-performing the metropolitan area, the state and the nation. Tables ES-1 and ES-2 summarize some of the significant findings for the time period 1980-86.

Table ES-1
Selected Rates of Growth, 1980-86

	Johnson County	Kansas City	State of Kansas	United States
Rates of establishment growth, general	53.71%	25.71%	13.09%	27.82%
Rates of establishment growth, technology-oriented	75.06	35.72	24.10	34.29
Rates of employment growth, private nonfarm	40.99	9.46	5.64	11.41
Rates of per capita income growth	44.41	45.72	45.72	47.59

Table ES-2
Impact of Johnson County Growth, 1980-86

	Rates of Growth including Johnson County	Rates of Growth excluding Johnson County	Percent of Total Growth accounted for by Johnson County
Kansas City			
Establishments, all industries	25.71%	18.07%	44%
Establishments, technology-oriented industries	35.72	22.41	53
Employment, private nonfarm	9.46	2.67	77
State of Kansas			
Establishments, all industries	18.09%	13.29%	35%
Establishments, technology-oriented industries	24.10	16.31	41
Employment, private nonfarm	5.64	0.18	97

The number of establishments in Johnson County grew by 54 percent between 1980 and 1986, almost double the national rate. This growth accounted for 44 percent of the total net business formation in the metropolitan region, and more than one-third of the state total. For the same time period, total private nonfarm employment grew by 41 percent, almost four times the national and metropolitan growth rates and more than seven times the state rate. This increase of more than 41,700 employees in Johnson County accounted for 77 percent of the total net metropolitan

well as for 97 percent of the statewide increase.

Despite substantial gains in population, the rate of growth of per capita income in Johnson County was comparable to that experienced by the nation, state, and metropolitan area, throughout this period, while the absolute level remained several thousand dollars higher in Johnson County than in the other areas. Conservative population projections for Johnson County to 2010 show continued rates of growth three to five times the corresponding rates for the metropolitan area and the state, both including Johnson County.

Johnson County also experienced strong increases (75 percent) in net business formation in a broadly defined group of technology-oriented industries, although this growth was heavily concentrated in the services sector, particularly business services. Despite this impressive rate of growth in these industries, the portion of total Johnson County establishments characterized as technology-oriented in 1986 was only slightly higher than that for either the metropolitan region, the state, or the United States. Furthermore, as illustrated in Table ES-3, the growth in establishments attributable to increases in technology-oriented businesses is also not exceptional, although it is somewhat higher than that for the comparative areas.

Table ES-3
Characterization of Technology-Oriented Establishment Growth

	Johnson County	Kansas City	State of Kansas	United States
Composition, by sector, of Technology-Oriented establishment growth:				
Mining	2.77%	0.54%	10.71%	2.63%
Manufacturing	13.15	6.25	11.57	10.67
Transportation & Communications	2.42	8.28	10.57	5.22
Services	81.66	84.93	67.15	81.48
Technology-Driven establishments as a percent of total establishments, 1986	6.71%	5.39%	5.55%	5.39%
Growth in Technology-Driven establishments as a percent of total establishment growth	8.23%	6.94%	7.03%	6.33%

Clearly, the record of recent economic activity in Johnson County is very positive, and is a continuation of the growth pattern that has occurred during the last 25 years or so. Undeniably, this has been a boost for both

the state and metropolitan communities. Yet, maintaining this dynamic environment in the future depends on continued growth and diversification of the economic base which in turn depends on responding to the needs of the business community.

C. Characteristics and Problems of Technology-Oriented Firms

Data used for the analysis of the needs of young technology-oriented Johnson County firms were obtained via a written survey conducted by the Institute. The "homegrown" entrepreneur hypothesis was supported since an overwhelming majority of the firms in the sample had been initiated in the Kansas City area simply because it was already home for the entrepreneurs. On average, these entrepreneurs had 10.3 years of experience in similar industries prior to starting their own businesses. The median sales reported by the firms in the sample was close to $1 million and the median employment was 10.5 employees. About 40 percent of the employees of these firms were classified as professionals in science/engineering or business. For the future, these entrepreneurs indicated a strong intention to expand their firms and to develop new products. More than one quarter of them also planned to spin-off new firms.

The respondents' overall evaluation of the Johnson County/Kansas City area as a place to conduct business was fairly positive, and most of the problems reported by these firms were typical for start-up enterprises universally. Based on the assessment of the responding firms, there appear to be particular area strengths in the availability of affordable building space, the existing infrastructure, the availability of business personnel and business support services, and the region's accessibility due to its central location and the availability of major transportation networks. The entrepreneurs responding to the survey expressed only moderate satisfaction with the available pool of professional science and technical employees, and with the educational opportunities that such groups require. On the negative side, significant dissatisfaction was expressed with the obtainability of risk capital, while the manufacturers in the sample were especially concerned with the lack of research and development facilities.

When asked to evaluate the types of problems that were the most severe and the types assistance that would have been most beneficial to their

companies during the start-up and early development phases, the survey responses reinforced the image of the technology-oriented entrepreneur who has limited business experience. However, this also suggested that the types of problems most frequently encountered by these firms during the initial stages of development coincide with the kinds of problems which could, in fact, be ameliorated with an incubator. The replies most frequently mentioned are summarized in Tables ES-4 and ES-5.

Table ES-4
Frequently Encountered Start-up Problems

Start-up Problem	Percent of Firms which Experienced Problem with moderate or major severity
Developing new products/services	59.3%
Finding qualified professionals	57.4
Obtaining financing	55.5
Finding qualified staff, other	55.0
Commercialization of product	52.9
Analyzing markets	50.8
Finding qualified managers/executives	50.0

Table ES-5
Most Requested Types of Start-up Assistance

Type of Assistance	Percent of Firms indicating that assistance would have yielded great benefits
Advertising and promotion assistance	50.7%
Market research and planning assistance	50.0
Financial planning/management assistance	43.6
Assistance with preparation/use of a business plan	41.2
General assistance with "starting a business"	34.9
Legal services	33.3

About half of the respondents expressed an interest in utilizing the services of an incubator if they became involved with another business start-up. Since it was reported that access to scientific equipment would have significantly benefited only a small portion of firms, the evidence suggests that the absence of a research institution in the immediate vicinity would not necessarily inhibit the incubator's ability to enhance the entrepreneurial climate for innovative firms, although some linkages would undoubtedly be desirable.

D. Operations and Networks

Researchers have identified several factors which can be associated with the successful development of an incubator. These can be categorized into two basic groups. The first type has emerged from the "on-the-job-training" and management experiences of facilities as various stages of maturity have been reached, and essentially involves recommendations for making operational policies and procedures explicit and unambiguous from the beginning.

The second category pertains to the critical importance of the community's commitment and the involvement of its resources in the project in order for the incubator to meet its development objectives. Certainly, making the incubator a part of the local economic development process and a complement to other projects would be essential to its long term effectiveness.

Since most facilities do not have the financial resources to maintain full-time consulting staffs to provide the full array of services that they would like to offer, necessity has dictated that the typical (non-profit) incubator be linked into external, entrepreneurial networks in the community that can help provide quality services to its clients, access to financing and capitalization, and other in-kind financial support. These networks, however, also provide the incubator clients the opportunity to establish relationships with potential customers and suppliers, and to interact with other entrepreneurs who have encountered many of the same experiences.

In addition to its strong economic foundation, Johnson County has a rich endowment of resources which can and should be incorporated into an enterprise support network designed to complement the natural talents of the entrepreneurs in the community. The interviews of Johnson County political and business leaders conducted for this study did indicate that the proposed incubator project would fit in well with existing development programs and would receive the degree of community support and enthusiasm that would be necessary for its success.

Most successful facilities also have some tie to a university, whether formal or informal. Even though no major university is located in Johnson County, there are several potential affiliations for an incubator, including ties to Johnson County Community College, The University of Kansas, Lawrence

campus, Regents Center, and Medical Center. Interviews with various faculty and administrators from these institutions suggested that opportunities for cooperation and collaboration would indeed exist.

E. Conclusions and Recommendations

The expected benefits to the community of supporting a technology-oriented incubator should be significant, although much of this value may be intangible and consequently difficult to measure. In the short run, an incubator in Johnson County will provide a visible, positive statement about the community's commitment to entrepreneurship, and as the centerpiece of an enterprise support network, will heighten the awareness of entrepreneurial activities in the area. By integrating talent, technology, capital and business know-how in a nurturing environment, its tenant businesses will have a greater opportunity to succeed. As these firms develop and mature over time, other economic development outcomes will accrue, including expanded employment opportunities and contributions to a strengthened and diversified economic base.

The analysis of the economic data on business formation and other variables suggests that there is sufficient activity in the area to support an additional facility. Yet, despite the overall strength of the Johnson County economy, the survey of innovative young firms indicates that there are some serious barriers in the area to organizing and managing a business. This suggests that there is a genuine need for an incubator and that such a facility could contribute very positively to the successful gestation of new businesses and that these successful new enterprises would in turn contribute very positively to the local economic base.

Therefore, given this evidence and the potential benefits which would be derived by the entire community, the Institute has concluded that the establishment of an incubator in Johnson County would be both a feasible and a desirable enterprise if designed as part of a long-run strategy for development and if implemented in conjunction with the following recommendations:

1. The primary sponsor of the incubator should be a non-profit organization, with a private sector Board of Directors. As a 501(c)(3) corporation, the facility would be able to optimize opportunities for private and public support, as well as underscore the importance of the public/private partnership approach.

2. The incubator should be designed to stimulate economic development through a "value-added" approach, and should be geared to upscale, technology-oriented enterprises whose growth potential in jobs, revenues and profits is strong.

3. The incubator should have an active Board of Directors with a majority membership of prominent business leaders representing both small and large firms of various types. In conjunction with the management team, this Board would be responsible for designing and monitoring operational policies, evaluating and screening tenants, providing business and technical expertise, and implementing fund-raising objectives.

4. With the absence of a major university in the County, a strong connection to Johnson County Community College, particularly to the Business and Industry Institute and the Small Business Development Center, should be considered to be essential. In addition, a technical advisory board, or its counterpart, and an operative relationship with the University of Kansas is encouraged.

5. An effective, cooperative relationship with the Center for Business Innovation is also advocated. This would be mutually beneficial, and would likely emanate naturally from the shared objectives and the overlap of strategic Board membership and some common support linkages, but could be augmented with the establishment of a liaison.

6. In addition to the reduced overhead costs associated with the affordable space and shared office support services, the management team will contribute on-site business consulting, and establish extensive linkages to other organizations in the community to provide technical and financial support.

7. The importance of the enterprise support networks cannot be overemphasized, particularly since the ability of the facility to provide the types of quality assistance that these fledgling young firms need will depend on the strength of these linkages. Widespread community support is also thought to be vital to success, although initial indications suggest that this backing will exist.

8. Since risk capital is notoriously difficult for start-up firms to access, it would enhance the incubator's ability to assist its tenants if it were connected to one or more such funds. Some of the clients could qualify for the KTEC fund. Other possible sources include the establishment of a small fund exclusively for the incubator, ties to a community fund (if one existed or were formed), and/or a linkage to the fund currently being established by CBI.

9. Ownership of a structure is not considered to be essential for successful development, particularly if to do so would place a burdensome debt on the management team and sponsoring organizations. A workable alternative to this would involve a subsidized lease arrangement in an office park or other suitable location that would require minimal renovation. Since rent will likely be an important source of operating revenue for the facility, but must also be maintained at relatively low levels, it would be desirable to have a minimum threshold of 30,000 square feet.

10. Without core operating support for several years, the project will be vulnerable. During this time period, while the facility itself is a start-up enterprise, there must be extensive public/private contributions. Experience has shown that if the real estate function is not subsidized during this time, then the project will become real estate driven.

    Rent will be an uncertain source of financial support until the facility reaches maturity, which will likely take several years. Even then, it is unlikely that an incubator of the type proposed would be self-sustaining on rent alone. Other revenues could be generated internally through user charges for some services, and through minority equity options in tenant companies in exchange for the value-added by the incubation process. The latter is an alternative that has been implemented in similar facilities, but due to the infancy of the industry, it is difficult to evaluate with certainty its long-term viability.

11. With few exceptions, the overall strength of the Johnson County economy will disqualify the proposed facility from accessing funds from several federal programs which have been responsible for significant support for incubator development in other areas. Furthermore, the state of Kansas has placed its current emphasis on the development of other initiatives to assist the development of small businesses, so that it is improbable that significant funding through the state will be forthcoming. Consequently, it is likely that the community will be asked to provide the bulk of the support, either through public or private means.

12. If the project is indeed initiated with economic development objectives then the commitment should be made so that these goals are not compromised while awaiting the results. Unreasonable expectations should not be raised concerning the accomplishment of the chosen long-term objectives. At the same time, other milestones for achievement should be recognized, including the creation of responsive business consulting network, the establishment of a financial network for capitalization of tenant companies, the creation of a synergistic atmosphere, and eventually, the existence of graduate tenants.

I. INTRODUCTION

Economic development policies at the state and local levels have undergone a virtual revolution in focus and commitment during the last decade or so. This redirection has been influenced by the convergence of two very significant characteristics of the current economic environment:

(1) the superior job creation and spin-off performances by small businesses;

and

(2) the evolution of the so-called "thoughtware economy" which relies on innovation - i.e., the process of using resources in novel ways to produce new goods and services.

As policy makers have acknowledged the increasingly important role technological and entrepreneurial development play in economic growth, they have also realized that too many start-up businesses fail or never get initiated because, even though the entrepreneurs may be technically competent, they lack the experience to transform their ideas into successful small businesses. Since a healthy entrepreneurial environment must exist for small businesses to succeed, states and communities have responded to this imperative with new strategies designed to nurture and promote "homegrown" entrepreneurs. These new programs which often provide (or broker) financial, technical, and management assistance hope to reduce the effects of problems encountered during start-up and early development, so that long-term development objectives, such as job creation and expansion of the economic base, can be achieved.

An increasingly popular development tool designed to establish such an entrepreneurial infrastructure is the small business incubator. Although probably better defined as a program than as a facility, the following

definition offers the four key dimensions as identified by Allen which make the incubator concept unique:

> A business incubator is generally understood to be a facility with (1) adaptable space which can be leased by small businesses typically on flexible terms and with affordable rents; (2) a pool of office support services which are shared by the tenants to reduce overhead costs; (3) the availability of some form of business development services, providing assistance with accounting, marketing, and management, as well as access to or assistance in acquiring seed capital. Since the basic purpose in establishing the incubator is to enhance the survival of young businesses, the incubator can (4) act as a focal point for resources available in the community for small business development.

Business incubators, which are designed to assist the growth and development of new enterprises, are themselves a growth industry. The increase in the number of incubators opened since 1983 is staggering, but with this growth has come a diversity of structures, purposes, and services that incubators can provide. There is no formula or optimal paradigm for development of an incubator because each has evolved as a response to the needs and resources within the local environment. Facilities have been opened as part of a renewed commitment by state and local governments to support enterprise development and job creation; by community organizations, to supply local business ownership and employment opportunities; by universities, to transfer their vast potential in knowledge and research into commercial products and services; and by private sector developers and business consultants to respond to the needs of the expanding small business sector. They have been developed in both urban and rural settings, to assist small business formation of any type, as well as targeted to a specific industries, areas, or types of entrepreneurs within a local economy.

This study, to determine the feasibility of a small business incubator in Johnson County, was initiated in October, 1988 at the request of the Advisory Board formed to plan and create such an incubator. In order to investigate this issue, the Institute identified several relevant factors to be addressed in order to determine whether such a facility could offer significant benefits to its potential clients and to the community. These considerations included: the nature and type of economic activity currently occurring in the area; the needs and problems of start-up firms in the area and the degree to which these could be facilitated by an incubator; the economic development priorities of the community and the degree of community support that the facility could receive; the resources and potential linkages that could be utilized in the facility; and the wisdom offered by the experiences of existing incubators and their managers.

In Section II, an extensive analysis of the Johnson County economic climate is presented. This includes data on the types and magnitudes of net business formation, the levels and growth of employment, per capita income, and population, with comparisons to the Kansas City metropolitan area, the State of Kansas, and the nation.

The Institute also conducted a survey of relatively young technology-oriented enterprises in Johnson County to determine, from their perspective, the start-up needs that such businesses face. These businesses provided data with which to evaluate the entrepreneurial climate in Johnson County and to determine the extent to which an incubator might be utilized by fledgling young firms. The results from this survey are presented in Section III.

To understand the incubator concept, both in theory and practice, the Institute conducted an extensive review of published materials regarding incubators, including studies authorized by the National Business Incubation Association, the Small Business Association, and the Economic Development Administration, as well as several interviews of individuals involved in designing and implementing incubator programs. While much of the elicited information was anecdotal in nature, or specific to one of the eight facilities visited (see Appendix A), taken collectively, it provided much insight into the challenges that will face the prospective sponsors and manager of the proposed Johnson County incubator. This qualitative data has greatly influenced the research perspective, as has published quantitative data, summarized in Section IV, from five comprehensive surveys of incubators nationwide. Among these were surveys conducted by some of the major contributors to the incubator literature, including Candace Campbell, David Allen, and Raymond Smilor.

The last two chapters are devoted to the Institute's evaluation of Johnson County's ability to support the development of a small business incubator. This assessment evolved from a synthesis of the background research on incubators with the circumstances existing in Johnson County. The particular resources and linkages that Johnson County has to offer an incubator are analyzed in Section V. These features are discussed in the context of ten factors identified in the literature as critical to the long-term development of an successful incubator. Section VI presents an examination of the issues of particular concern to the Advisory Board, as well as a discussion of the Institute's conclusions and recommendations.

II. ECONOMIC and BUSINESS CLIMATE IN JOHNSON COUNTY and KANSAS CITY

Without question, Johnson County has enjoyed exceptional economic growth for more than 25 years. In fact, by most economic measures, Johnson County is the most affluent and fastest growing county in Kansas. But, also without question is the fact that the nature of that current growth is an important factor in determining what opportunities will exist in the future, and in suggesting appropriate direction and goals for economic development efforts. In this section of the report, data for key economic and demographic variables are presented to document and describe the magnitudes and types of expansions that have occurred in Johnson County since 1980. The analysis includes data describing the growth of the following: business establishment formation, employment, per capita income, population, and office space. In order to put the significance of Johnson County's economic development in perspective, the patterns of growth which have emerged in the County are compared to those experienced by the Kansas City metropolitan area, the State of Kansas, and the nation.

Since the Kansas City metropolitan area was expanded from seven to ten counties during the period analyzed, a methodological note is in order. The current specification of the MSA (metropolitan statistical area), adopted in 1983, includes Jackson, Clay, Cass, Ray, Platte, and Lafayette counties in Missouri, and Johnson, Wyandotte, Leavenworth, and Miami counties in Kansas. In order to minimize any distortion that might arise in the analysis from this change, Lafayette, Leavenworth, and Miami counties were, unless otherwise indicated, also included in the metro-wide totals for the earlier years.

A. Net Business Formation: General

An important indicator of the degree of economic activity occurring in a region is the growth in the number of businesses, as well as the types of businesses, being formed. Interest here is in the net rate of formation, not just the number of new businesses, since some existing firms may fail, at the same time that others are being formed. According to U.S. Bureau of the Census County Business Patterns data presented in Table 1, between 1980 and 1986, there was a net increase of 7844 in the number of establishments in the ten-county Kansas City metropolitan area. This is a rate of growth of almost 26 percent, slightly less than the national rate of about 28 percent, but substantially more than the 18 percent rate of growth experienced by the state of Kansas.

Johnson County grew about twice as fast as the entire metropolitan region, and alone, accounted for 3512, or 45 percent, of the total net gain in establishments. Furthermore, Johnson County accounted for more than one-third (35 percent) of the growth in the number of establishments for the State. In fact, if Johnson County growth were ignored, the Kansas City metropolitan area would have experienced only 18 percent growth in the total number of establishments and the State's rate of growth would have been only 13 percent. This suggests quite a high level of activity with new business start-ups and net business formation in the county, both in absolute terms and relative to the areas chosen for comparison. Most of the net increase in businesses - 89 percent in the entire metropolitan area, and 85 percent in Johnson County - occurred in small establishments with fewer than twenty employees.

Table 1
Growth in Number of Establishments, 1980-86, by Sector
Johnson County, Kansas City MSA, State of Kansas, & United States

CBP Code	CBP Description	Johnson County Growth	Kansas City Growth	Kansas Growth	U.S. Growth
-	TOTAL	53.71%	25.71%	18.09%	27.82%
07--	Agricultural Services, Forestry, Fish	70.13	32.04	44.97	47.64
10--	Mining	115.38	15.94	19.70	17.85
15--	Contract Construction	38.66	24.62	2.23	17.75
19--	Manufacturing	56.05	11.37	9.15	11.30
40--	Transportation & Other Public Utilities	58.17	24.32	15.79	25.16
50--	Wholesale Trade	37.56	7.80	6.08	14.32
52--	Retail Trade	34.41	15.83	8.32	17.85
60--	Finance, Insurance, & Real Estate	49.94	16.71	10.30	19.73
70--	Services	73.72	37.99	34.61	41.71
99--	Unclassified Establishments	102.40	83.46	58.75	76.14

Source: U.S. Department of Commerce, Bureau of the Census, County Business Patterns, 1980 and 1986

Sector-by-sector, the data illustrates that Johnson County was clearly the leader in the metropolitan region during this period. In each sector, the growth in the county exceeded that recorded for the entire metro area, the state, and the nation. Furthermore, as shown in Table 2, the increase in Johnson County establishments accounted for one-third or more of the total net increase in the MSA in every major sector except the "Unclassified establishments" category.[1] In two sectors, mining and wholesale trade, without the gains recorded by Johnson County, there would actually have been net decreases in the metropolitan area.

[1]The growth in unclassified establishments represents an increase in the number of firms which did not provide sufficient information about their businesses to be classified according to the Standard Industrial Classification (SIC) definitions.

Table 2
Percent of Metropolitan and State Growth attributable to Johnson County Growth, by sector, 1980-86

Sector	Percent of Kansas City growth	Percent of State growth
Total	**44%**	**35%**
Agricultural services	59	22
Mining	136	7
Contract construction	38	210
Manufacturing	79	66
Transportation/public utilities	33	20
Wholesale Trade	128	100
Retail Trade	44	42
FIRE	76	79
Services	39	27
Unclassified	29	21

Source: calculated from U.S. Department of Commerce, Bureau of the Census, County Business Patterns, 1980 and 1986

As Table 3 indicates, by far the largest absolute growth occurred in the service sector. Increases in the number of service-oriented businesses accounted for more than one-third of the total net increase in establishments in the county (38 percent, 1344 establishments) and more than two-fifths of the increase (about 44 percent, 3432 new establishments) in the metropolitan region. This parallelled the national trend, where 42 percent of the net increase in establishments occurred in services. And, almost half of the state's gain in number of establishments can be attributed to growth in the service sector. The second largest gain both in the county and the MSA was in the number of retail trade establishments. The increases in retail trade businesses accounted for slightly more than 15 percent of each of the respective totals, or a gain of 535 establishments in the County and 1219 in the metropolitan area.

Table 3
Composition of Growth in Number of Establishments, 1980-86
Johnson County, Kansas City MSA, State of Kansas, & U.S.

CBP Code	CBP Description	Johnson County	Kansas City	Kansas	United States
07--	Agricultural Services, Forestry, Fish	1.54%	1.16%	2.47%	1.74%
10--	Mining	0.43	0.14	2.25	0.42
15--	Contract Construction	6.89	8.22	1.16	5.87
19--	Manufacturing	5.01	2.83	2.68	2.86
40--	Transportation & Other Public Utilities	2.53	3.43	4.57	3.34
50--	Wholesale Trade	9.11	3.20	3.22	4.36
52--	Retail Trade	15.23	43.75	49.62	42.18
60--	Finance, Insurance, & Real Estate	11.28	6.61	5.06	6.57
70--	Services	38.27	43.75	49.62	42.18
99--	Unclassified Establishments	9.71	15.12	16.26	15.39

Source: U.S. Department of Commerce, Bureau of the Census, County Business Patterns, 1980 and 1986

Net business formation in manufacturing was modest in both Johnson County and in Kansas City, particularly when compared to the dominant growth in services. However, even though the gains in manufacturing establishments accounted for only 5 percent of the County's total net increase, this was significantly higher than the 2.8 percent recorded both for the MSA and for the nation. By far the largest manufacturing gains in the county occurred in the printing and publishing industry, which accounted for 65 new establishments. Furthermore, the rate of growth in manufacturing establishments was slightly more than that for the county total, and was almost five times the national or metro-wide growth rate for manufacturing.

The fastest growing major sectors for Johnson County, in order of decreasing percentage growth were unclassified establishments, services, agricultural services, transportation and other public utilities, and manufacturing, each of which experienced increases greater than fifty percent.

The rate of growth in finance, insurance and real estate establishments was close behind with 49.9 percent. Mining also exhibited extremely high growth (70 percent), but did not have much absolute significance in the County given the sector's small size. For the metropolitan area, the state, and the nation, only growth in unclassified establishments exceeded fifty percent.

Broadly defining industries at the two-digit SIC level of detail, the largest absolute gain in any sector was recorded in Business Services both in the metropolitan area and Johnson County. The industries with the largest net increases and those with the largest rates of growth are indicated in Table 4 below. The known strengths of the area in business services and health services are clearly evident.

Table 4
Largest Absolute Gains in Establishments, 1980-86

Johnson County	Net Increase	Kansas City MSA	Net Increase
1. Business Services	423	1. Business services	890
2. Wholesale Trade durables	244	2. Health services	591
3. Miscellaneous services	223	3. Special Trade contractors	501
4. Health services	219	4. Miscellaneous services	471

Fastest Growing Industries, 1980-86
(with at least 50 establishments in both years)

Johnson County	Growth Rate	Kansas City MSA	Growth Rate
1. Transportation services	165%	1. Transportation services	96%
2. Miscellaneous services	140	2. Miscellaneous services	83
3. Business services	121	3. Business services	66
4. Printing and publishing	105	4. Membership organizations	46

Source: calculated from data in U.S. Department of Commerce, Bureau of the Census, County Business Patterns, 1980 and 1986

Table 5 provides data for the numbers of establishments for 1980 and 1986 for Johnson County and the Kansas City MSA, as well as growth rates for the state and the U.S. for each of the major industry groups of significance in the region. In all but a very few industries, the growth in establishments was greater in Johnson County than in either the metro area or the nation.

Additional data provided to the Institute by the Johnson County Economic Research Institute (CERI) reinforces the solid business start-up climate of the metropolitan area, and the prominent position of Johnson County as already reported. These data, recording the number of businesses formed in the area since 1985, suggest that at least one-third of all Kansas City start-ups since 1985 have been located in Johnson County. Even though it cannot be compared directly to the County Business Patterns data examined above since the start-ups are not weighed against any business failures that may occur, about 70 percent of these new establishments in the area and the county can be classified either as services or retail trade. Wholesale trade and FIRE establishments each accounted for about 10 percent of the total recorded increase in the county, and about 7 percent each for the metro area.

For the last three years, INC. magazine has published annual rankings of metropolitan area economies which reflect the relative climates for business growth. These rankings are based on three quantifiable factors: the number of jobs generated, the rate of significant new business start-ups[2], and the percentage of young companies classified as "high growth"

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[2]The rate of significant business births was figured as the aggregate of business enterprises in a given city divided by the number founded since January 1984 that had at least 10 employees by July 1988.

Table 5: Growth in Number of Establishments, by Two-Digit SIC Code, 1980-1986

Johnson County, Kansas City MSA, State of Kansas, United States

SIC Code	SIC Description	Johnson County establishments 1980	Johnson County establishments 1986	Kansas City Region establishments 1980	Kansas City Region establishments 1986	RATES OF GROWTH, 1980-86: Johnson County	Kansas City	State of Kansas	United States
----	TOTAL	6,539	10,051	30,511	38,355	53.71%	25.71%	18.09%	27.82%
07--	AGRICULTURAL SERVICES,FORESTRY,FISH	77	131	284	375	70.13%	32.04%	44.97%	47.64%
10--	MINING	13	28	69	80	115.38%	15.94%	19.70%	17.85%
15--	CONTRACT CONSTRUCTION	626	868	2,620	3,265	38.66%	24.62%	2.23%	17.75%
1500	GENERAL BUILDING CONTRACTORS	218	285	755	885	30.73%	17.22%	-12.57%	9.08%
1600	HEAVY CONSTRUCTION CONTRACTORS	57	62	206	221	8.77%	7.28%	-6.76%	1.59%
1700	SPECIAL TRADE CONTRACTORS	350	520	1,656	2,157	48.57%	30.25%	12.21%	24.23%
	ADMINISTRATIVE AND AUXILIARY	1	1	3	2	0.00%	-33.33%	-50.00%	21.15%
19--	MANUFACTURING	314	490	1,953	2,175	56.05%	11.37%	9.15%	11.30%
2000	FOOD AND KINDRED PRODUCTS	8	17	116	122	112.50%	5.17%	-11.40%	0.77%
2200	TEXTILE MILL PRODUCTS	1	2	6	12	100.00%	100.00%	83.33%	-2.38%
2300	APPAREL AND OTHER TEXTILE PRODUCTS	8	14	72	67	75.00%	-6.94%	-1.47%	2.08%
2400	LUMBER AND WOOD PRODUCTS	12	16	82	92	33.33%	12.20%	14.29%	5.20%
2500	FURNITURE AND FIXTURES	4	5	44	40	25.00%	-9.09%	6.78%	22.54%
2600	PAPER AND ALLIED PRODUCTS	7	9	59	61	28.57%	3.39%	2.17%	2.92%
2700	PRINTING AND PUBLISHING	62	127	399	513	104.84%	28.57%	28.71%	27.91%
2800	CHEMICALS AND ALLIED PRODUCTS	18	21	106	118	16.67%	11.32%	14.71%	7.18%
2900	PETROLEUM AND COAL PRODUCTS	2	5	21	22	150.00%	4.76%	-2.86%	8.64%
3000	RUBBER AND MISC. PLASTICS PRODUCTS	28	24	94	90	-14.29%	-4.26%	0.00%	18.68%
3100	LEATHER AND LEATHER PRODUCTS	1	1	5	6	0.00%	20.00%	-22.22%	-14.58%
3200	STONE, CLAY, AND GLASS PRODUCTS	12	20	96	99	66.67%	3.13%	-6.03%	2.23%
3300	PRIMARY METAL INDUSTRIES	3	4	40	42	33.33%	5.00%	-1.89%	-3.79%
3400	FABRICATED METAL PRODUCTS	16	26	188	210	62.50%	11.70%	5.12%	12.09%
3500	MACHINERY, EXCEPT ELECTRICAL	37	60	253	283	62.16%	11.86%	2.82%	8.49%
3600	ELECTRIC AND ELECTRONIC EQUIPMENT	38	53	99	122	39.47%	23.23%	47.06%	26.30%
3700	TRANSPORTATION EQUIPMENT	4	8	38	47	100.00%	23.68%	10.24%	13.00%
3800	INSTRUMENTS AND RELATED PRODUCTS	6	10	39	37	66.67%	-5.13%	15.00%	18.65%
3900	MISCELLANEOUS MANUFACTURING INDUSTR	19	24	83	78	26.32%	-6.02%	8.05%	17.62%
	ADMINISTRATIVE AND AUXILIARY	28	44	113	113	57.14%	0.00%	29.21%	4.43%
40--	TRANSPORTATION AND OTHER PUBLIC UTI	153	242	1,106	1,375	58.17%	24.32%	15.79%	25.16%
4100	LOCAL AND INTERURBAN PASSENGER TRAN	7	10	68	73	42.86%	7.35%	11.70%	10.47%
4200	TRUCKING AND WAREHOUSING	65	81	605	653	24.62%	7.93%	9.28%	19.16%
4400	WATER TRANSPORTATION	3	0	10	8	-100.00%	-20.00%	45.45%	9.52%
4500	TRANSPORTATION BY AIR	6	9	44	67	50.00%	52.27%	30.77%	37.57%
4600	PIPE LINES, EXCEPT NATURAL GAS	0	0	1	4		300.00%	12.50%	15.83%
4700	TRANSPORTATION SERVICES	29	77	134	262	165.52%	95.52%	92.00%	60.35%
4800	COMMUNICATION	33	49	146	208	48.48%	42.47%	20.68%	26.49%
4900	ELECTRIC, GAS, AND SANITARY SERVICE	5	8	65	58	60.00%	-10.77%	10.37%	14.99%
	ADMINISTRATIVE AND AUXILIARY	5	8	33	42	60.00%	27.27%	26.92%	38.06%
50--	WHOLESALE TRADE	852	1,172	3,220	3,471	37.56%	7.80%	6.08%	14.32%
5000	WHOLESALE TRADE-DURABLE GOODS	598	842	2,095	2,305	40.80%	10.02%	11.17%	16.83%
5100	WHOLESALE TRADE-NONDURABLE GOODS	237	314	1,044	1,090	32.49%	4.41%	0.56%	10.74%
	ADMINISTRATIVE AND AUXILIARY	17	16	81	76	-5.88%	-6.17%	-11.00%	4.57%

Table 5: Growth in Number of Establishments, by Two-Digit SIC Code, 1980-1986, continued

Johnson County, Kansas City MSA, State of Kansas, United States

SIC Code	SIC Description	Johnson County establishments 1980	Johnson County establishments 1986	Kansas City Region establishments 1980	Kansas City Region establishments 1986	RATES OF GROWTH, 1980-86 Johnson County	Kansas City	State of Kansas	United States
52--	RETAIL TRADE	1,555	2,090	7,703	8,922	34.41%	15.83%	8.32%	17.85%
5200	BUILDING MATERIALS GARDEN SUPPLIE	78	98	370	429	25.64%	15.95%	1.32%	11.62%
5300	GENERAL MERCHANDISE STORES	35	36	210	187	2.86%	-10.95%	-8.94%	-2.23%
5400	FOOD STORES	141	208	822	998	47.52%	21.41%	18.16%	18.89%
5500	AUTOMOTIVE DEALERS SERVICE STATIO	216	230	1,278	1,220	6.48%	-4.54%	-8.07%	-0.34%
5600	APPAREL AND ACCESSORY STORES	182	239	778	839	31.32%	7.84%	-2.26%	13.88%
5700	FURNITURE AND HOME FURNISHINGS STOR	138	215	554	704	55.80%	27.08%	11.75%	20.15%
5800	EATING AND DRINKING PLACES	299	421	1,731	2,162	40.80%	24.90%	22.12%	28.48%
5900	MISCELLANEOUS RETAIL	425	597	1,794	2,233	40.47%	24.47%	12.38%	25.67%
	ADMINISTRATIVE AND AUXILIARY	41	46	166	150	12.20%	-9.64%	-1.82%	10.32%
60--	FINANCE, INSURANCE, AND REAL ESTATE	793	1,189	3,100	3,618	49.94%	16.71%	10.30%	19.73%
6000	BANKING	30	40	205	230	33.33%	12.20%	3.08%	18.57%
6100	CREDIT AGENCIES OTHER THAN BANKS	125	163	486	485	30.40%	-0.21%	-15.84%	3.33%
6200	SECURITY, COMMODITY BROKERS SERVI	23	42	99	143	82.61%	44.44%	48.15%	77.04%
6300	INSURANCE CARRIERS	104	159	343	398	52.88%	16.03%	10.46%	6.44%
6400	INSURANCE AGENTS, BROKERS SERVICE	196	324	665	838	65.31%	26.02%	28.15%	25.63%
6500	REAL ESTATE	268	404	1,120	1,316	50.75%	17.50%	11.44%	20.97%
6600	COMBINED REAL ESTATE, INSURANCE, ET	8	6	42	33	-25.00%	-21.43%	-24.58%	-26.94%
6700	HOLDING AND OTHER INVESTMENT OFFICE	30	45	123	161	50.00%	30.89%	39.62%	54.14%
	ADMINISTRATVIE AND AUXILIARY	9	6	17	14	-33.33%	-17.65%	-21.05%	26.25%
70--	SERVICES	1,823	3,167	9,035	12,467	73.72%	37.99%	34.61%	41.71%
7000	HOTELS AND OTHER LODGING PLACES	21	49	150	217	133.33%	44.67%	7.61%	18.32%
7200	PERSONAL SERVICES	249	342	1,127	1,282	37.35%	13.75%	12.54%	17.53%
7300	BUSINESS SERVICES	350	773	1,353	2,243	120.86%	65.78%	69.21%	71.30%
7500	AUTO REPAIR, SERVICES, AND GARAGES	94	160	729	951	70.21%	30.45%	46.55%	34.22%
7600	MISCELLANEOUS REPAIR SERVICES	52	88	303	394	69.23%	30.03%	16.33%	21.61%
7800	MOTION PICTURES	33	27	102	85	-18.18%	-16.67%	-21.02%	24.11%
7900	AMUSEMENT RECREATION SERVICES	79	95	313	385	20.25%	23.00%	21.17%	35.26%
8000	HEALTH SERVICES	449	668	2,089	2,680	48.78%	28.29%	19.15%	29.14%
8100	LEGAL SERVICES	101	163	597	789	61.39%	32.16%	21.86%	32.24%
8200	EDUCATIONAL SERVICES	35	58	197	237	65.71%	20.30%	36.84%	33.21%
8300	SOCIAL SERVICES	60	108	452	626	80.00%	38.50%	46.53%	53.25%
8400	MUSEUMS, BOTANICAL, ZOOLOGICAL GARD	0	1	5	8		60.00%	41.67%	34.89%
8600	MEMBERSHIP ORGANIZATIONS	131	236	998	1,462	80.15%	46.49%	56.05%	59.11%
8900	MISCELLANEOUS SERVICES	159	382	567	1,038	140.25%	83.07%	71.84%	92.86%
	ADMINISTRATIVE AND AUXILIARY	10	17	53	70	70.00%	32.08%	14.00%	9.45%
99--	UNCLASSIFIED ESTABLISHMENTS	333	674	1,421	2,607	102.40%	83.46%	58.75%	76.14%

Source: U.S. Department of Commerce, Bureau of the Census, County Business Patterns, 1980 and 1986

firms.[3] According to these variables, the position of the Kansas City metropolitan area, relative to other cities, has steadily deteriorated during the past three years. In 1987, the Kansas City region was ranked 44th out of 154 cities.[4] By 1988, the ranking had dropped to 54th out of 156 cities. And, the most recent ranking places Kansas City 86th out of 191 cities, based on data current to July, 1988. Even though 35 new metropolitan areas were added for the 1989 edition, only eleven of these were ranked ahead of Kansas City. David Birch has used these same data series to forecast rankings for future growth, by anticipating what could be expected to happen as a consequence of "normal" corporate activity. For the period 1987-1997, Birch projected employment growth of 12.8 percent or an increase of 79,700 workers in the Kansas City metropolitan area.[5] The ranking of the metropolitan region based on the growth index places Kansas City 59th out of 239 regions.[6] This suggests that despite the high degree of growth occurring in Johnson County, as documented above, the metropolitan

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[3]Using David Birch's methodology, the number of "high growth" companies was established by calculating a growth index for each company formed between January 1980 and January 1984. This index was the product of the company's absolute growth in employment between January 1984 and July 1988 and the company's percentage growth during the same period. Companies with an index of 20 or more were classified as "high growth". The percent of high growth companies was calculated as the aggregate of these divided by the sum of all companies founded between January 1980 and 1984.

[4]The Kansas City metropolitan area (denoted Kansas City, MO in the article) was defined to include Johnson, Wyandotte, Leavenworth, and Miami counties in Kansas; Cass, Clay, Jackson, Lafayette, Platte, Ray, and Buchanan counties in Missouri. This is the official designation plus Buchanan county, which includes St. Joseph.

[5]Birch, Job Creation in America. His specification of the metropolitan area does not include Buchanan County.

[6]This ranking is the highest projected for any area in either Kansas or Missouri: St.Louis ranked 71st; northern rural Missouri, 162nd; Springfield, MO, 165th; Wichita, KS, 174th; Topeka, KS, 180th; eastern Kansas, 182nd; southern rural Missouri, 188th; and western Kansas, 219th.

region as a whole could do more to encourage the level of entrepreneurial activity and to enhance the climate for high growth business start-ups.[7]

B. Net Business Formation: Advanced Technology, Technology-Driven Industries

Advanced technology industries have generally been pegged as high growth industries, and have therefore been the object of many economic development planning efforts. Yet, despite the widespread use of the term and the general consensus as to the desirability of such industries, there is no consensus operational definition of what industries should be classified as advanced technology industry.

Depending on the context, the interest might be in advanced technology products or processes or both. For example, most definitions would include as advanced technology the producer of a robot even if its production process involves a traditional labor-intensive, assembly-line, but many

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[7]David Birch (Job Creation in America, 1987, pp.70-75) also reports that those industries with a very high rating after application of this Growth Index, are also the industries that are experiencing high rates of innovation. He classifies these highly innovative industries into seven categories which are not confined to the "high tech" sectors of the economy:

1. **High Technology makers** (Computers, communication equipment,electronic components, drugs, radio and television-receiving equipment, aircraft, measuring and controlling devices, and medical instruments).
2. **Information-Age Group** (nonresidential buildings, office furniture, electric distribution equipment, electric lighting and wiring equipment, airlines for business travel, noncertified air carriers, service to buildings, computer and data processing services, investment offices, and noncommercial research organizations).
3. **"Trend Buckers"** (steel and steel products, motorcycles and bicycles, weaving and knitting mills, textiles, paper mills, leather tanning, nonferrous rolling and drawing mills).
4. **Leisure-Time Group** (airlines, ship and boat building, toys and sporting goods, intercity highway transport, charter services, commercial sporting teams, local water transportation).
5. **Energy Group** (coal mining, petroleum discovery and refining, railroads, natural gas production and distribution, combination utility services, oil- and gas-field services).
6. **Baby Boom/Yuppie/Women-in-the-Labor-force** (producers of preserved meats, fruits, and vegetables, restaurant and fast-food chains, home entertainment, toys and games, real estate, resort and travel, household appliances, carpets, colleges and universities, women's business clothing, motor vehicles, prefabricated buildings and mobile homes, footwear, handbags, pottery, glassware, department stores and video shopping, individual and family services, residential care, medical and health insurance).
7. **Aging Group** (life and health insurance, nursing and personal care facilities, education, hospitals, recreation, travel, health and allied services).

would not necessarily include the industry that implements robotics in its production process, if the resulting product were not itself considered "high-tech". In many cases, this has evolved because data on firms' products are much more readily available than data on firms' production activities, and so, for reasons of practicality, most operational definitions ultimately rely on SIC codes.

Various attempts to distinguish advanced technology firms have relied on quantifiable properties such as: the percent of gross sales devoted to research and development, the rate of growth of employment within the sector or industry, the technological intensity of the process (i.e. how much R&D is embodied in the inputs to the production process), the degree of technical sophistication of the product, or the occupational sophistication of the labor force (i.e. what portion of the labor force can be classified as engineers, scientists, computer scientists, etc). As will be true with any industry-wide definition, the qualifying characteristics are based on aggregate or average data. Consequently, there is no guarantee that if an industry is indeed classified by a given set of characteristics as advanced technology, that every firm in that industry, or even most firms, should qualify.

Many definitions have focused exclusively on the manufacturing sector, and in fact, several of the above characteristics preclude firms in the services sector, particularly in the area of business services, a rapidly growing area of the economy which involves the high skill, high value-added products of the information age. For the purposes of this study, interest was focused largely on the magnitude of activity occurring in a broadly defined category of technology-oriented and technology-driven enterprises,

rather than in a narrowly defined R&D based definition. Consequently, after consulting several lists of advanced technology industries defined at the three- and four-digit level of SIC codes from several sources, a list of about 125 industries was chosen, including most of the industries identified as advanced technology by the Midwest Research Institute for its 1984 report Framework for the Future: Economic Development in Kansas City. Given the nature of the Johnson County economy and the purpose intended here, it seemed appropriate to include the relevant components of business and professional services; however, since this broad specification of "advanced technology" to include technology-oriented as well as technology-driven industries will certainly affect the assessment of the nature of the activity occurring in the region, other, more restrictive definitions have also been presented for consideration and comparison.

Applying the basic IPPBR definition to Bureau of the Census County Business Patterns data, the number of technology-driven establishments increased by 75 percent in Johnson County, during the period 1980-86, for a total net gain of 289 establishments. About three-quarters of this increase was in establishments with fewer than 20 employees. This suggests that a higher portion of advanced technology firms starting-up in Johnson County employ 20 or more employees than is the case for start-ups of any type. Johnson County's share of the metro-wide increase in technology-driven firms was about 44 percent, or roughly equivalent to its share in the total gain in establishments of any type. The rate of growth of advanced technology industries in the Kansas City metropolitan area was about 26 percent, which is very close to the national average of 28 percent. These increases account for about 8.2 percent of the total gain in establishments in Johnson

County, compared to the corresponding estimate of 6.9 percent for the MSA, and 6.3 percent for the nation.

As indicated in Tables 6 and 7, the rapid growth in those business and professional services included in the definition of technology-oriented industries dominated the gains from other sectors, accounting for more that eighty percent of the total increase in the County, the metropolitan area, and the nation. Given Johnson County's success in the professional service sector, it is not too surprising that the rate of growth experienced in service technology in the County was almost twice that of either Kansas City or the nation. Even though high growth occurred in management services and in engineering and architectural services, of particular interest, is the level of activity occurring in data processing and computer-related services.

Table 6
Rates of Growth, by Sector, 1980-86
Number of Technology-Driven Establishments
Johnson County, Kansas City MSA, State of Kansas & the United States

Sector	Johnson County	Kansas City	Kansas	United States
Mining	114.29%	11.11%	13.97%	23.09%
Manufacturing	33.33	6.42	9.19	10.51
Transportation & Communications	24.14	30.41	13.36	16.03
Services	100.43	56.48	50.38	55.77
Total, Technology-driven industries	75.06	35.72	24.10	34.29
Total, All Industries	53.71	25.71	18.09	27.80

Source: Calculated from U.S. Department of Commerce, Bureau of the Census, County Business Patterns, 1980 and 1986 using definition of advanced technology explained in text.

Table 7
Composition, by Sector, of Advanced Technology
Establishment Growth, 1980-86

Sector	Johnson County	Kansas City	Kansas	United States
Mining	2.77%	0.54%	10.71%	2.63%
Manufacturing	13.15	6.25	11.57	10.67
Transportation & Communications	2.42	8.28	10.57	5.22
Services	81.66	84.93	67.15	81.48
Total	100.00%	100.00%	100.00%	100.00%
Technology-Driven establishments as a percent of total establishments, 1986	6.71%	5.39%	5.55%	5.39%
Growth in Technology-Driven establishments as a percent of total establishment growth	8.23%	6.94%	7.03%	6.33%

Source: Calculated from U.S. Department of Commerce, Bureau of the Census, County Business Patterns, 1980 and 1986 using definition of advanced technology explained in text.

Notable, also, is the fact that technology-driven manufacturing industries grew three times faster in Johnson County than the nation and five times faster than in the metro area. Clusters of activity occurred in, among others, the production of miscellaneous plastics, radio and television equipment, electronic components, drugs and medicines. The metro area did demonstrate greater strength than Johnson County in the transportation/communications sector, primarily in the field of telecommunications. The details underlying these remarks are presented in Table 8.

Among alternative definitions of advanced technology enterprises which were considered, the picture is qualitatively altered only if computer and data processing services are excluded. According to the fairly restrictive "consensus" definition, growth in the number of advanced technology establishments in Johnson County was slightly more than the national rate,

Table 8: Number of Advanced Technology Establishments, 1986, and Change in Number, 1980-86, by SIC Code

Johnson County, Kansas City MSA, State of Kansas, and United States

SIC Code	SIC Description	Number of establishments, 1986				Change in number of establishments, 1980-86			
		Johnson County	Kansas City	Kansas	United States	Johnson County	Kansas City	Kansas	United States
	TOTAL, ALL INDUSTRIES	10,051	38,355	64,974	5,806,973	3,512	7,844	9,953	1,263,806
----	TOTAL, TECHNOLOGY-DRIVEN INDUSTRIES	674	2,067	3,605	313,224	289	544	700	79,960
1310	CRUDE PETROLEUM AND NATURAL GAS	11	25	524	9,087	6	3	59	2,063
1382	OIL AND GAS EXPLORATION SERVICES	4	5	88	2,102	2	0	16	36
2812	ALKALIES AND CHLORINE	0	0	0	51	0	(1)	(1)	(4)
2813	INDUSTRIAL GASES	0	2	11	566	0	(1)	1	36
2816	INORGANIC PIGMENTS	0	0	1	103	0	0	0	2
2819	INDUSTRIAL INORGANIC CHEMICALS, NEC	1	3	8	627	0	0	0	35
2821	PLASTICS MATERIALS AND RESINS	0	1	1	477	0	0	(1)	9
2822	SYNTHETIC RUBBER	0	1	1	87	0	0	0	(1)
2823	CELLULOSIC MAN-MADE FIBERS	0	0	0	18	(1)	(1)	(1)	(6)
2824	ORGANIC FIBERS, NONCELLULOSIC	0	0	0	76	0	0	0	14
2831	BIOLOGICAL PRODUCTS	4	7	7	348	0	0	1	61
2833	MEDICINALS AND BOTANICALS	0	0	1	223	0	0	1	49
2834	PHARMACEUTICAL PREPARATIONS	5	10	6	678	1	2	1	47
2841	SOAP AND OTHER DETERGENTS	1	12	10	725	0	2	2	51
2842	POLISHES AND SANITATION GOODS	0	10	8	702	0	(5)	(6)	(112)
2843	SURFACE ACTIVE AGENTS	1	2	2	199	1	0	2	1
2844	TOILET PREPARATIONS	1	3	1	654	0	0	0	83
2850	PAINTS AND ALLIED PRODUCTS	0	14	8	1,421	0	1	3	(12)
2861	GUM AND WOOD CHEMICALS	0	1	1	94	0	1	0	(5)
2865	CYCLIC CRUDES AND INTERMEDIATES	0	0	2	183	(1)	(1)	0	(7)
2869	INDUSTRIAL ORGANIC CHEMICALS, NEC	1	2	9	619	0	1	3	51
2873	NITROGENOUS FERTILIZERS	0	0	4	128	0	0	1	(17)
2874	PHOSPHATIC FERTILIZERS	0	0	1	97	0	0	1	(28)
2875	FERTILIZERS, MIXING ONLY	0	0	2	496	0	(1)	0	(43)
2879	AGRICULTURAL CHEMICALS, NEC	0	4	3	273	0	(1)	(2)	(55)
2891	ADHESIVES AND SEALANTS	0	11	4	664	0	5	1	59
2892	EXPLOSIVES	1	1	2	116	0	(1)	0	20
2893	PRINTING INK	1	8	4	501	0	(1)	1	37
2895	CARBON BLACK	0	0	1	24	0	0	0	(5)
2899	CHEMICAL PREPARATIONS, NEC	4	16	17	1,267	2	5	8	93
2910	PETROLEUM REFINING	2	4	11	441	2	1	(4)	23
2992	LUBRICATING OILS AND GREASES	1	8	9	391	0	1	2	(21)
3070	MISCELLANEOUS PLASTICS PRODUCTS	21	82	115	12,168	(6)	(8)	(1)	2,036
3482	SMALL ARMS AMMUNITION	0	1	0	65	0	0	0	13
3483	AMMUNITION, EXC. FOR SMALL ARMS, NE	0	0	1	71	0	0	0	10
3484	SMALL ARMS	0	0	1	116	0	0	1	6
3489	ORDNANCE AND ACCESSORIES, NEC	1	2	1	62	1	1	1	3
3511	TURBINES AND TURBINE GENERATOR SETS	0	0	0	74	0	0	0	(12)
3519	INTERNAL COMBUSTION ENGINES, NEC	2	2	5	274	1	1	2	78
3523	FARM MACHINERY AND EQUIPMENT	5	16	93	1,593	3	4	(13)	(184)

Table 8: Number of Advanced Technology Establishments, 1986, and Change in Number, 1980-86, by SIC Code, continued

Johnson County, Kansas City MSA, State of Kansas, and United States

SIC Code	SIC Description	Number of establishments, 1986				Change in number of establishments, 1980-86			
		Johnson County	Kansas City	Kansas	United States	Johnson County	Kansas City	Kansas	United States
3531	CONSTRUCTION MACHINERY	5	7	18	826	1	(2)	2	43
3532	MINING MACHINERY	0	0	0	284	(1)	(1)	(3)	(51)
3533	OIL FIELD MACHINERY	0	2	13	702	0	2	(6)	36
3534	ELEVATORS AND MOVING STAIRWAYS	0	1	4	156	0	1	0	22
3535	CONVEYORS AND CONVEYING EQUIPMENT	2	11	14	644	2	3	6	60
3536	HOISTS, CRANES, AND MONORAILS	0	1	2	239	0	(1)	(1)	(6)
3537	INDUSTRIAL TRUCKS AND TRACTORS	2	7	5	445	0	2	(2)	19
3541	MACHINE TOOLS, METAL CUTTING TYPES	3	6	8	867	2	4	2	(138)
3542	MACHINE TOOLS, METAL FORMING TYPES	1	3	3	412	0	0	(2)	(32)
3544	SPECIAL DIES, TOOLS, JIGS FIXTURE	2	40	32	7,070	1	3	3	71
3545	MACHINE TOOL ACCESSORIES	1	4	5	1,496	1	4	3	161
3546	POWER DRIVEN HAND TOOLS	0	1	1	165	0	0	0	2
3547	ROLLING MILL MACHINERY	0	0	0	60	0	0	0	(10)
3549	METALWORKING MACHINERY, NEC	0	0	2	397	0	(1)	(2)	(79)
3561	PUMPS AND PUMPING EQUIPMENT	0	1	7	544	0	0	(3)	(10)
3562	BALL AND ROLLER BEARINGS	0	0	2	169	0	0	0	7
3563	AIR AND GAS COMPRESSORS	0	0	1	262	0	0	0	59
3564	BLOWERS AND FANS	1	2	4	445	0	(2)	0	10
3565	INDUSTRIAL PATTERNS	0	4	11	812	0	0	0	(18)
3566	SPEED CHANGERS, DRIVES, AND GEARS	0	1	2	276	0	0	0	(3)
3567	INDUSTRIAL FURNACES AND OVENS	1	2	4	327	1	0	0	19
3568	POWER TRANSMISSION EQUIPMENT, NEC	1	1	1	268	1	1	0	29
3569	GENERAL INDUSTRIAL MACHINERY, NEC	2	9	17	1,333	0	3	3	(143)
3572	TYPEWRITERS	0	0	0	0	0	0	0	(19)
3573	ELECTRONIC COMPUTING EQUIPMENT	2	5	11	1,980	(2)	1	4	888
3574	CALCULATING AND ACCOUNTING MACHINES	0	0	0	73	0	0	0	19
3576	SCALES AND BALANCES, EXC. LABORATOR	1	1	1	118	1	1	1	4
3579	OFFICE MACHINES, NEC	0	0	0	191	(1)	(1)	(1)	18
3599	MACHINERY, EXCEPT ELECTRICAL, NEC	17	95	212	20,525	8	0	13	2,173
3612	TRANSFORMERS	0	0	0	272	0	(1)	0	(1)
3613	SWITCHGEAR AND SWITCHBOARD APPARATU	1	3	4	574	0	0	1	(1)
3621	MOTORS AND GENERATORS	1	2	5	432	1	1	3	(12)
3622	INDUSTRIAL CONTROLS	5	8	12	891	2	2	5	135
3623	WELDING APPARATUS, ELECTRIC	1	3	3	155	0	0	1	(12)
3624	CARBON AND GRAPHITE PRODUCTS	0	0	0	89	0	0	0	6
3629	ELECTRICAL INDUSTRIAL APPARATUS, NE	2	2	2	315	1	1	1	106
3651	RADIO AND TV RECEIVING SETS	1	4	7	354	0	(1)	0	(86)
3652	PHONOGRAPH RECORDS	2	3	3	479	2	3	2	(11)
3661	TELEPHONE AND TELEGRAPH APPARATUS	1	1	2	359	(1)	(1)	0	100
3662	RADIO AND TV COMMUNICATION EQUIPMEN	12	18	29	2,262	4	4	7	349
3671	ELECTRON TUBES, RECEIVING TYPE	1	1	1	83	0	0	0	(17)
3674	SEMICONDUCTORS AND RELATED DEVICES	2	3	3	804	2	0	0	164
3675	ELECTRONIC CAPACITORS	0	0	0	119	0	0	0	8
3676	ELECTRONIC RESISTORS	0	0	1	107	0	0	1	16
3677	ELECTRONIC COILS AND TRANSFORMERS	1	3	1	375	0	0	0	68
3678	ELECTRONIC CONNECTORS	1	2	2	209	0	0	0	66
3679	ELECTRONIC COMPONENTS, NEC	12	23	32	3,483	2	5	13	777
3691	STORAGE BATTERIES	1	5	4	178	0	(2)	(1)	(19)
3692	PRIMARY BATTERIES, DRY AND WET	0	0	0	61	0	0	0	11

Table 8: Number of Advanced Technology Establishments, 1986, and Change in Number, 1980-86, by SIC Code, continued

Johnson County, Kansas City MSA, State of Kansas, and United States

SIC Code	SIC Description	Number of establishments, 1986				Change in number of establishments, 1980-86			
		Johnson County	Kansas City	Kansas	United States	Johnson County	Kansas City	Kansas	United States
3693	X-RAY APPARATUS AND TUBES	0	0	1	240	0	(1)	1	59
3694	ENGINE ELECTRICAL EQUIPMENT	1	9	5	437	0	(1)	2	56
3699	ELECTRICAL EQUIPMENT SUPPLIES, NE	3	6	5	656	2	3	2	180
3721	AIRCRAFT	0	1	8	151	0	1	2	0
3724	AIRCRAFT ENGINES AND ENGINE PARTS	0	1	6	348	0	1	4	72
3728	AIRCRAFT EQUIPMENT, NEC	2	4	50	910	2	1	10	158
3760	GUIDED MISSILES, SPACE VEHICLES, PA	0	0	0	118	0	0	0	11
3810	ENGINEERING SCIENTIFIC INSTRUMENT	1	3	11	764	0	0	4	(51)
3822	ENVIRONMENTAL CONTROLS	0	1	0	229	0	(1)	0	6
3823	PROCESS CONTROL INSTRUMENTS	2	2	2	630	2	1	2	159
3824	FLUID METERS AND COUNTING DEVICES	0	0	0	125	(1)	(1)	(1)	12
3825	INSTRUMENTS TO MEASURE ELECTRICITY	0	2	2	754	0	0	0	99
3829	MEASURING CONTROLLING DEVICES, NE	0	1	3	651	0	0	(1)	95
3830	OPTICAL INSTRUMENTS AND LENSES	0	2	1	620	0	(2)	(1)	124
3841	SURGICAL AND MEDICAL INSTRUMENTS	2	5	5	950	0	1	0	259
3842	SURGICAL APPLIANCES AND SUPPLIES	2	11	11	1,333	2	5	4	228
3843	DENTAL EQUIPMENT AND SUPPLIES	0	1	3	453	(1)	(1)	0	(1)
3850	OPHTHALMIC GOODS	1	2	3	401	1	(1)	0	(38)
3860	PHOTOGRAPHIC EQUIPMENT AND SUPPLIES	1	5	4	756	1	(3)	0	34
4811	TELEPHONE COMMUNICATION	27	137	324	15,103	4	38	24	1,720
4821	TELEGRAPH COMMUNICATION	1	6	8	848	0	0	3	85
4899	COMMUNICATION SERVICES, NEC	4	21	96	5,120	0	4	20	1,596
4911	ELECTRIC SERVICES	0	16	85	4,794	0	0	(1)	298
4920	GAS PRODUCTION AND DISTRIBUTION	4	12	101	3,349	3	3	30	433
4930	COMBINATION UTILITY SERVICES	0	1	14	1,002	0	0	(2)	43
7372	COMPUTER PROGRAMMING AND SOFTWARE	32	74	78	11,119	18	44	39	6,719
7374	DATA PROCESSING SERVICES	30	71	77	7,354	20	19	15	1,203
7379	COMPUTER RELATED SERVICES, NEC	13	34	27	6,309	9	16	15	4,100
7391	RESEARCH DEVELOPMENT LABORATORIES	8	16	23	3,582	1	1	2	1,282
7392	MANAGEMENT AND PUBLIC RELATIONS	143	381	343	45,408	74	171	141	18,183
7397	COMMERCIAL TESTING LABORATORIES	6	16	33	2,784	4	6	13	613
7399	BUSINESS SERVICES, NEC	81	254	269	33,155	38	89	105	11,142
8071	MEDICAL LABORATORIES	12	50	53	6,214	6	22	19	1,704
8072	DENTAL LABORATORIES	12	47	61	7,682	(3)	1	12	1,347
8910	ENGINEERING ARCHITECTURAL SERVICE	133	331	429	55,986	70	98	115	18,530
8920	NONCOMMERCIAL RESEARCH ORGANIZATION	1	6	10	2,341	(1)	(5)	(6)	318

SOURCE:U.S. Department of Commerce, Bureau of the Census, County Business Patterns, 1980 and 1986
Numbers in ( ) indicate net decreases.

and slightly less than the state rate. Growth in the state compares favorably under this specification largely due to the increases in establishment formation occurring in the aircraft industry. An even more restrictive definition, designed to register only those industries heavily involved in new product development, included only those (manufacturing) industries that have a ratio of R&D expenditures to net sales at least twice the national average for all industries. Under this specification, growth in Johnson County again lagged behind the state and the nation, as well as the Kansas City metropolitan area. The rates of growth for each of the areas under several alternative specifications of advanced technology industries are summarized in Table 9.

The more current business formation data provided by CERI for the county and the metropolitan area confirmed the pattern of dominance of technology-driven services. Of the 251 new businesses formed since 1985 which could be classified as operating in advanced technology industries, 85 percent in the MSA and more than 90 percent in Johnson County were service-oriented. During this time period, only 4 of 25 new technology-driven manufacturing firms were established in Johnson County, even though 44 percent of all new such businesses located there.

Certainly, the available evidence suggests that while it may not be appropriate to describe either Johnson County or the Kansas City metropolitan area as a center for advanced technology business development, there is a significant, and growing, foundation in the community on which to build.

Table 9
Rates of Establishment Growth Under Alternative Specifications of Advanced Technology, by area, 1980-86[1]

Definition	Johnson County	Kansas City Region	Kansas	United States
A. "Consensus"[2]	33.93% (19)	22.73% (30)	35.96% (73)	30.40% (6589)
B. Variant of BLS I[3]	83.25 (174)	29.63 (259)	19.85 (374)	33.06 (46911)
C. BLS II[4]	26.32 (10)	36.77 (25)	42.62 (52)	40.01 (4135)
D. BLS III[5]	78.30 (83)	31.06 (123)	34.86 (167)	41.89 (21795)
E. IPPBR[6]	75.06 (289)	35.72 (544)	24.10 (700)	34.29 (79960)

[1]The absolute increase in number of establishments during the 1980-86 period is shown in parentheses for each alternative.

[2]Compiled by Thompson (1988) by choosing those SIC codes which appeared in a majority of 23 SIC-based definitions in a survey of federal and state advanced technology programs listed by the Office of Technology Assessment. This definition includes SIC codes 283, 2869, 351, 357, 3622, 365, 366, 367, 3693, 372, 376, 381, 382, 383, 384, 386, and 7391.

[3]See Riche, Hecker, and Burgan (1983). This group of industries consisted of those whose technology-oriented work force accounted for a proportion of total employment that was at least one and one-half times the average for all industries. The cutoff was set at 5.1 percent of total employment, and industries with national employment less than 25,000 were excluded. Of the three BLS classifications, this is the broadest. As applied here (to be compatible with other broad specifications), this includes SIC codes 131, 281, 282, 283, 284, 285, 286, 287, 289, 291, 348, 351, 352, 353, 354, 355, 356, 357, 358, 361, 362, 363, 364, 365, 366, 367, 369, 371, 372, 376, 381, 382, 383, 384, 386, 483, 389, 491, 493, 737, 7391, 891, and 892. Qualifying industries not included are SIC codes 162, 301, 324, 506, and 508.

[4]See Riche, Hecker, and Burgan (1983). This group, designed to focus only on industries emphasizing new product development, included an industry only if the ratio of R&D expenditures to net sales was at least twice the national average for all industries, with a cutoff of 6.2 percent. Only six industries, all in the manufacturing sector, qualified: SIC codes 283, 357, 366, 367, 372, and 376.

[5]See Riche, Hecker, and Burgan (1983). This group of industries was chosen based on criteria pertaining both to the levels of R&D expenditures and the nature of the work force. Specifically, this group included manufacturing industries whose proportion of technology-oriented workers relative to total employment exceeded the average for all manufacturing industries and the ratio of R&D expenditures to sales was at least close to the average for industries. This definition was designed to exclude most nonmanufacturing industries included in BLS I, that had very little R&D or new product development (e.g. engineering and architectural services, radio and television broadcasting), but did included two industries that provide technical support to manufacturing industries, **computer and data processing services** and R&D laboratories. The complete list of industries included are SIC codes 281, 282, 283, 284, 285, 286, 287, 289, 291, 348, 351, 355, 357, 361, 362, 365, 366, 367, 369, 372, 376, 381, 382, 383, 384, 386, 737, and 7391.

[6]As specified in Table 8.

SOURCE: Calculated from U.S. Department of Commerce, Bureau of the Census, County Business Patterns, 1980 and 1986 using the definitions as explained above.

C. **Employment**

For the same period 1980-86, total private nonfarm employment as reported in County Business Patterns in Johnson County increased by 41 percent, almost four times more than the national rate (11.4%) or that for Kansas City MSA (9.5%). These statistics count workers according to their place of employment, and so record the change in employment actually in, for example, Johnson County. Employment in the state of Kansas measured in this manner increased only 5.6 percent overall.

A highly favorable comparison of unemployment trends can also be made, as illustrated in Figure 1. Unemployment rates are based on the total civilian labor force as measured by the Bureau of Labor Statistics which counts workers by their place of residence. The average annual unemployment rates, contained in Table 10, show that Johnson County has experienced a substantially lower unemployment rate than the metro-wide rate, which, in turn, is lower than that for the United States.

Table 10
Average Annual Unemployment Rates

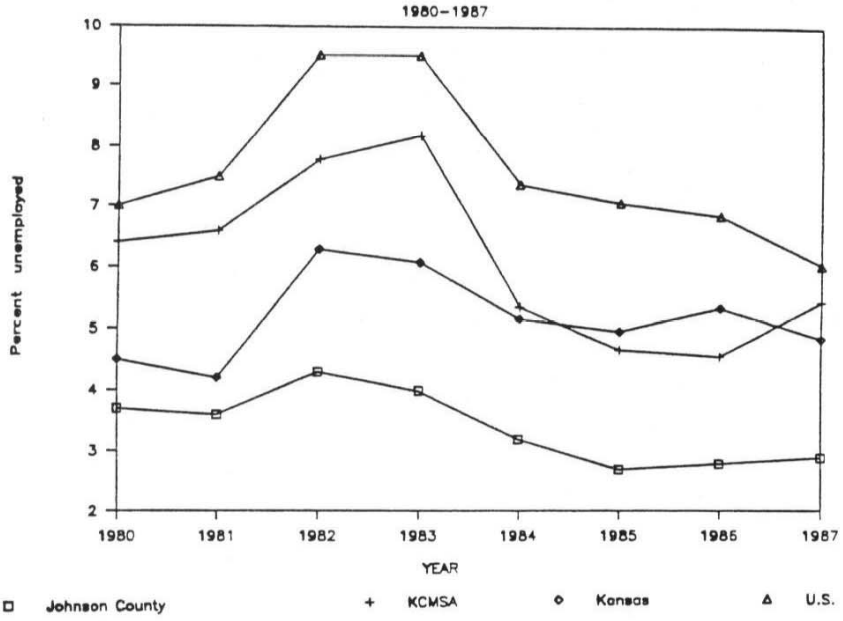
Year	Johnson County	Kansas City*	Kansas	United States
1980	3.7%	6.4%	4.5%	7.0%
1981	3.6	6.6	4.2	7.5
1982	4.3	7.8	6.3	9.5
1983	4.0	8.2	6.1	9.5
1984	3.2	5.4	5.2	7.4
1985	2.7	4.7	5.0	7.1
1986	2.8	4.6	5.4	6.9
1987	2.9	5.5	4.9	6.1

*The metropolitan unemployment rate was calculated using both the old and new definitions for the years 1980-83, but they were virtually the same, after rounding. Only in 1983, the year that the change took place, was there a slight (0.2) discrepancy. The number reported refers to the extended 10 county definition.

Sources: Kansas Department of Human Resources; Missouri, Statistical Abstract, Research Center, College of Business & Public Administration, University of Missouri; U.S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings.

Figure 1

Unemployment Rates



Source: same as Table 10

Furthermore, as summarized in Table 11, employment increased in every major sector of the county economy, with the growth rates in every sector also exceeding those for the metropolitan area, the state, or the nation. Even though the increase in manufacturing employment was very small -- less than one percent -- the MSA, the state, and the nation all experienced declines ranging from 8.6 percent to 10.8 percent. Aside from high employment growth in small sectors such as agricultural services and mining, the fastest growing sectors in the county were, in order of decreasing percentage growth: unclassified sectors, services, finance, insurance, and real estate (FIRE), and transportation and other public utilities.

Table 11
Summary of Employment Growth

CBP Code	CBP Description	Johnson County	Kansas City MSA	State of Kansas	United States
----	Total	40.99%	9.46%	5.64%	11.41%
07--	Agricultural Services, Forestry, Fish	107.05	50.09	55.20	41.90
10--	Mining	328.30	- 0.55	- 9.59	-14.81
19--	Manufacturing	0.89	-10.77	- 8.55	- 9.56
40--	Transportation and Public Utilities	47.71	2.05	4.49	5.64
50--	Wholesale Trade	37.51	- 4.48	0.95	9.85
52--	Retail Trade	35.48	13.92	9.21	16.63
60--	Finance, Insurance, Real Estate	53.85	20.49	15.72	20.32
70--	Services	92.94	31.22	25.02	33.12
99--	Unclassified Establishments	129.55	71.93	31.76	63.40

Source: U.S. Department of Commerce, Bureau of the Census, County Business Patterns.

For the county, the services sector provided almost 18,000 net new jobs during this period. Business services alone accounted for more than 7000 additional jobs. Other significant gains in employment occurred in retail trade (8673), finance, insurance, and real estate (6094), wholesale trade (3775), and transportation and other public utilities (2717).

At the two-digit SIC code level, in addition to the 7009 job expansion in business services, the largest absolute gains occurred in eating and drinking establishments (3629), health services (3390), real estate (2450), and wholesale trade durables (2373). In the transportation and public utilities sector, 1588 net new jobs were created in communications, and in the manufacturing sector, printing and publishing was the leader with 1281 new jobs. The details for Johnson County, as well as the rates of growth for the MSA, the state, and the U.S. are presented in Table 12. Since, at this level, much of the data for at least some counties in the metropolitan area and for a few industries in the state are suppressed to protect the privacy

Table 12: Growth in Employment, by two-digit SIC code, 1980-1986

Johnson County, Kansas City MSA, State of Kansas, and United States

SIC Code	SIC Description	JOHNSON COUNTY Employment 1980	1986	RATES OF GROWTH Johnson County	Kansas City MSA	State of Kansas	United States
----	TOTAL	101,769	143,487	40.99%	9.46%	5.64%	11.41%
07--	AGRICULTURAL SERVICES,FORESTRY,FISH	468	969	107.05%	50.09%	55.20%	41.90%
10--	MINING	53	227	328.30%	-0.55%	-9.59%	-14.81%
15--	CONTRACT CONSTRUCTION	7,918	8,730	10.26%	8.85%	-12.01%	4.15%
1500	GENERAL BUILDING CONTRACTORS	1,750 *	2,384	36.23%*	6.90%*	-18.80%	-2.64%
1600	HEAVY CONSTRUCTION CONTRACTORS	1,926	1,750 *	-9.14%*	-22.61%*	-35.27%*	-18.99%
1700	SPECIAL TRADE CONTRACTORS	4,547	5,238	15.20%	21.64%	-0.06%	16.09%
	ADMINISTRATIVE AND AUXILIARY	60 *	60 *	0.00%*	-41.67%*	5.36%*	26.39%
19--	MANUFACTURING	21,845	22,039	0.89%	-10.77%	-8.55%	-9.56%
2000	FOOD AND KINDRED PRODUCTS	1,536	1,250	-18.62%	-19.60%*	15.39%	-7.25%
2200	TEXTILE MILL PRODUCTS	10 *	60 *	500.00%*	668.29%*	629.17%*	-21.48%
2300	APPAREL AND OTHER TEXTILE PRODUCTS	1,750 *	1,750 *	0.00%*	-37.25%*	-13.93%	-15.76%
2400	LUMBER AND WOOD PRODUCTS	198	266	34.34%	6.15%*	-20.17%	-7.22%
2500	FURNITURE AND FIXTURES	175 *	95	-45.71%*	-4.60%*	-21.35%	0.58%
2600	PAPER AND ALLIED PRODUCTS	282	666	136.17%	-11.39%*	5.96%	-5.48%
2700	PRINTING AND PUBLISHING	2,843	4,124	45.06%	9.84%*	14.49%	15.17%
2800	CHEMICALS AND ALLIED PRODUCTS	1,779	2,192	23.22%	9.87%*	0.98%	-10.03%
2900	PETROLEUM AND COAL PRODUCTS	175 *	181	3.43%*	-70.07%*	-40.40%	-17.75%
3000	RUBBER AND MISC. PLASTICS PRODUCTS	1,229	887	-27.83%	-15.84%*	-0.05%	0.01%
3100	LEATHER AND LEATHER PRODUCTS	60 *	60 *	0.00%*	3.89%*	-12.50%*	-38.51%
3200	STONE, CLAY, AND GLASS PRODUCTS	272	395	45.22%	-24.49%*	-17.05%	-13.77%
3300	PRIMARY METAL INDUSTRIES	175 *	175 *	0.00%*	-57.29%*	-40.15%	-37.13%
3400	FABRICATED METAL PRODUCTS	726	727	0.14%	8.55%*	-20.84%	-11.88%
3500	MACHINERY, EXCEPT ELECTRICAL	999	1,665	66.67%	-23.64%*	-32.12%	-20.93%
3600	ELECTRIC AND ELECTRONIC EQUIPMENT	5,328	4,326	-18.81%	-24.64%*	-5.21%	-0.49%
3700	TRANSPORTATION EQUIPMENT	104	60 *	-42.31%*	-17.28%*	-4.81%	-2.75%
3800	INSTRUMENTS AND RELATED PRODUCTS	750 *	893	19.07%*	13.71%*	-23.40%	-4.29%
3900	MISCELLANEOUS MANUFACTURING INDUSTR	324	200	-38.27%	-10.09%*	-43.35%	-14.45%
	ADMINISTRATIVE AND AUXILIARY	3,750 *	2,663	-28.99%*	-24.38%*	4.12%	-1.64%
40--	TRANSPORTATION AND OTHER PUBLIC UTI	5,695	8,412	47.71%	2.05%	4.49%	5.64%
4100	LOCAL AND INTERURBAN PASSENGER TRAN	375 *	375 *	0.00%*	-14.16%*	-7.96%	1.29%
4200	TRUCKING AND WAREHOUSING	1,610	2,340	45.34%	-5.53%*	-8.79%	1.91%
4400	WATER TRANSPORTATION	2	0	-100.00%	-37.12%*	55.70%	-18.57%
4500	TRANSPORTATION BY AIR	226	201	-11.06%	-2.37%*	52.45%	17.12%
4600	PIPE LINES, EXCEPT NATURAL GAS	0	0		200.00%*	1.08%	7.33%
4700	TRANSPORTATION SERVICES	250	613	145.20%	32.67%*	39.49%	42.21%
4800	COMMUNICATION	2,101	3,689	75.58%	10.90%*	1.69%	-3.82%
4900	ELECTRIC, GAS, AND SANITARY SERVICE	175 *	60 *	-65.71%*	3.01%*	14.04%	12.75%
	ADMINISTRATIVE AND AUXILIARY	904	1,112	23.01%	6.46%*	58.37%	45.23%
50--	WHOLESALE TRADE	10,065	13,840	37.51%	-4.48%	0.95%	9.85%
5000	WHOLESALE TRADE-DURABLE GOODS	6,528	8,901	36.35%	4.07%*	1.59%	8.62%
5100	WHOLESALE TRADE-NONDURABLE GOODS	2,717	3,750 *	38.02%*	-43.24%*	3.49%	11.58%
	ADMINISTRATIVE AND AUXILIARY	820	750 *	-8.54%*	-35.73%*	-25.13%	10.62%

Table 12: Growth in Employment, by two-digit SIC code, 1980-1986, continued

Johnson County, Kansas City MSA, State of Kansas, and United States

SIC Code	SIC Description	JOHNSON COUNTY Employment 1980	1986	RATES OF GROWTH Johnson County	Kansas City MSA	State of Kansas	United States
52--	RETAIL TRADE	24,446	33,119	35.48%	13.92%	9.21%	16.63%
5200	BUILDING MATERIALS GARDEN SUPPLIE	757	1,750 *	131.18%*	59.51%*	2.17%	17.13%
5300	GENERAL MERCHANDISE STORES	4,044	3,947	-2.40%	-8.23%*	-0.59%	-0.55%
5400	FOOD STORES	2,138	3,772	76.43%	34.09%	19.62%	22.36%
5500	AUTOMOTIVE DEALERS SERVICE STATIO	2,481	3,179	28.13%	10.92%	-4.66%	10.65%
5600	APPAREL AND ACCESSORY STORES	2,080	2,372	14.04%	4.45%*	-3.07%	14.57%
5700	FURNITURE AND HOME FURNISHINGS STOR	1,104	2,076	88.04%	20.43%*	17.11%	15.75%
5800	EATING AND DRINKING PLACES	5,897	9,526	61.54%	25.51%	17.44%	24.15%
5900	MISCELLANEOUS RETAIL	4,606	5,501	19.43%	-0.01%	8.10%	15.18%
	ADMINISTRATIVE AND AUXILIARY	1,339	1,750 *	30.69%*	54.46%*	10.11%	20.68%
60--	FINANCE, INSURANCE, AND REAL ESTATE	11,317	17,411	53.85%	20.49%	15.72%	20.32%
6000	BANKING	1,521	1,784	17.29%	15.66%	7.35%	8.76%
6100	CREDIT AGENCIES OTHER THAN BANKS	1,292	2,012	55.73%	24.09%*	25.31%	38.41%
6200	SECURITY, COMMODITY BROKERS SERVI	175 *	309	76.57%*	103.10%*	71.04%	75.49%
6300	INSURANCE CARRIERS	5,185	6,227	20.10%	12.68%*	-8.15%	6.11%
6400	INSURANCE AGENTS, BROKERS SERVICE	1,185	2,333	96.88%	18.99%*	35.81%	29.09%
6500	REAL ESTATE	1,380	3,830	177.54%	14.31%*	39.91%	23.36%
6600	COMBINED REAL ESTATE, INSURANCE, ET	21	11	-47.62%	18.63%*	-21.62%	-18.36%
6700	HOLDING AND OTHER INVESTMENT OFFICE	449	702	56.35%	79.28%*	62.30%	50.80%
	ADMINISTRATIVE AND AUXILIARY	175 *	203	16.00%*	-26.80%*	4.30%	39.54%
70--	SERVICES	19,346	37,326	92.94%	31.22%	25.02%	33.12%
7000	HOTELS AND OTHER LODGING PLACES	820	2,225	171.34%	60.99%*	23.76%	22.62%
7200	PERSONAL SERVICES	1,510	2,580	70.86%	19.97%	20.71%	17.19%
7300	BUSINESS SERVICES	4,047	11,056	173.19%	65.65%*	69.43%	54.22%
7500	AUTO REPAIR, SERVICES, AND GARAGES	531	1,172	120.72%	35.01%	36.08%	29.82%
7600	MISCELLANEOUS REPAIR SERVICES	269	500	85.87%	12.21%*	-3.05%	6.19%
7800	MOTION PICTURES	750 *	375 *	-50.00%*	-40.68%*	-28.61%	21.08%
7900	AMUSEMENT RECREATION SERVICES	1,394	1,326	-4.88%	-7.77%*	4.77%	12.86%
8000	HEALTH SERVICES	5,454	8,844	62.16%	20.58%	7.55%	25.79%
8100	LEGAL SERVICES	494	726	46.96%	49.52%	27.15%	48.08%
8200	EDUCATIONAL SERVICES	911	1,352	48.41%	29.21%*	26.82%	25.81%
8300	SOCIAL SERVICES	608	1,310	115.46%	9.88%*	52.44%	33.72%
8400	MUSEUMS, BOTANICAL, ZOOLOGICAL GARD	0	10 *		113.51%*	264.86%	31.27%
8600	MEMBERSHIP ORGANIZATIONS	1,211	2,548	110.40%	31.88%	40.84%	39.62%
8900	MISCELLANEOUS SERVICES	1,338	2,775	107.40%	25.39%	37.27%	52.35%
	ADMINISTRATIVE AND AUXILIARY	175 *	638	264.57%*	87.08%*	131.91%	60.02%
99--	UNCLASSIFIED ESTABLISHMENTS	616	1,414	129.55%	71.93%*	31.76%	63.40%

Source: U.S. Department of Commerce, Bureau of the Census, County Business Patterns, 1980 and 1986

*: Data suppressed. Estimates only, based on the midpoint of the listed ranges.

of establishments, the growth rates have been calculated using estimates based on the midpoints of the ranges reported by the Bureau of the Census.

Although data suppression becomes an even greater problem at more detailed levels of industry classification, enough information does exist to identify certain subsectors of the economy which showed dramatic growth during this period. The levels of employment at least doubled in a minimum of 29 Johnson County industries as defined at the three-digit SIC code level of detail, including 2 in contract construction, 2 in manufacturing, 2 in transportation and other public utilities, 4 in wholesale trade, 2 in retail trade, 5 in finance, insurance, and real estate, and 12 in services. For 14 of those industries, this meant an increase in employment in excess of 500. Three subsectors of business services enjoyed increases of more than 1000 employees. The fastest growing industry was personnel supply services, which also experienced the largest absolute gain in employment. A selected list of these "high growth" sectors of the economy can be found in Table 13.

A recent study by the Institute The Nature and Significance of the Overland Park/Johnson County Economy reported that a comparison of the regional and national employment patterns using shift-share analysis reveals that the majority of employment growth in Johnson County is due to the dynamics of the Johnson County economy rather than to the influences of either the state or national employment growth. This was determined to be true not only for total employment, but also for virtually every major industry in Johnson County during the 1980-86 period. Only employment in nonclassifiable establishments would have been larger based on the national rate than on the local level.

Table 13
Selected Johnson County High Growth Industries, 1980-86
(Industries in which employment doubled and the actual increase in employment exceeded 500)

SIC Code	Industry Title	Rate of Growth	Employment Change
736	Personnel Supply Services	5.96	+2074
653	Real Estate Agents & Managers	2.6	+1547
573	Radio, Television & Music Stores	2.3	+ 706
737	Computers & Data Processing Services	2.0	+1317
701	Hotels, Motels & Tourist Courts	1.7	+1341
179	Miscellaneous Special Trade Contractors	1.7	+ 826
171	Plumbing, Heating, Air Conditioning Contractors	1.4	+ 602
739	Miscellaneous Business Services	1.3	+1951
275	Commercial Printing	1.3	+1225
651	Real Estate Operators & Lessors	1.1	+ 602
514	Wholesale Trade-groceries	1.0	+ 784
805	Nursing & Personal Care Facilities	1.0	+ 764
Other:			
808	Outpatient Care Facilities	4.8	+ 441
489	Communication Services N.E.C.	2.7	+ 183
891	Engineering & Architectural Services	0.9	+ 753
541	Grocery Stores	0.9	+1489

Source: U.S. Department of Commerce, Bureau of the Census, County Business Patterns, 1980 and 1986

The Institute's study of the Johnson County/Overland Park economy also reported the results of a location quotient analysis of employment patterns. This technique indicated that Johnson County's economic base is made up of manufacturing sectors, communications firms, wholesale trade sectors, some retail trade industries, several industries in the finance, insurance, and real estate classification, and some major service industries, as well as some of the administrative and auxiliary categories. Among those two-digit level SIC code sectors which were particularly significant were printing and publishing, wholesale trade in durable goods, and business services,

industries which have been mentioned previously in this study as notable for their exceptional growth or strength.

Much of the growth described in this section can be expected to continue, but at a bit slower pace, at least in the immediate future. The Institute's Kansas Econometric Model has been used to estimate 1988 and forecast 1989 employment for Kansas and the Johnson County/ Wyandotte County region by major sector. The results are shown in Table 14.

Table 14
Forecasts of Employment Growth Rates

Sector	1987		1988*		1989**	
	Kansas Portion of Kansas City	Kansas	Kansas Portion of Kansas City	Kansas	Kansas Portion of Kansas City	Kansas
Total Non-Farm Wage & Salary Employment	3.0	1.5	5.0	1.8	3.5	1.1
Manufacturing	- 7.4	0.1	5.1	2.8	2.6	2.0
Mining & Construction	5.6	0.4	2.5	- 4.3	2.4	0.3
Transportation & Pub Utilities	4.2	- 1.9	5.6	- 0.8	- 0.5	- 0.0
Wholesale & Retail Trade	5.8	1.5	5.1	2.1	3.9	0.5
Finance, Insurance & Real Estate	7.2	3.1	6.5	1.2	6.5	0.8
Services	5.7	3.6	6.4	3.5	5.7	2.2

Notes: The Kansas portion of the Kansas City metropolitan area includes Johnson, Wyandotte, Leavenworth and Miami counties.
*1988 estimate
**1989 forecast

Source: Glass, Robert "Regional Outlook for 1989: Northeast Kansas" Kansas Business Review, volume 12, number 2, and Kansas Economic Modeling Program, Institute for Public Policy and Business Research, University of Kansas.

Nonfarm wage and salary employment in the Kansas portion of the metropolitan area is predicted to grow at least three times more quickly than state employment. Growth in the finance, insurance, and real estate sector which depends, in the model, on real growth in GNP is expected to be the fastest, but growth in services employment should also be strong. The

increases in wholesale and retail trade employment should result solely from growth within the region, and the predicted slump in transportation, communications, and public utilities employment is due to the slowdown in growth of GNP and corporate profits. The decline in overall growth from 5 in 1988 to 3.5 percent in 1989 is also a reflection, in part, of the anticipated slackening of growth in the national economy. Causality tests performed on the data confirmed the conjecture that state employment growth patterns do not explain the growth experienced in the Kansas portion of the Kansas City area, led by Johnson County.

D. Per Capita Income

As shown in Table 15 and Figure 2, during the 1980-86 period, the level of per capita income for Johnson County was substantially higher than the national, state or metropolitan levels. The rates of growth of per capita income during this period were very similar: Johnson County, 44.4 percent; State of Kansas, 45.7 percent; United States, 47.6 percent; and for the Kansas City MSA, 45.7 percent.

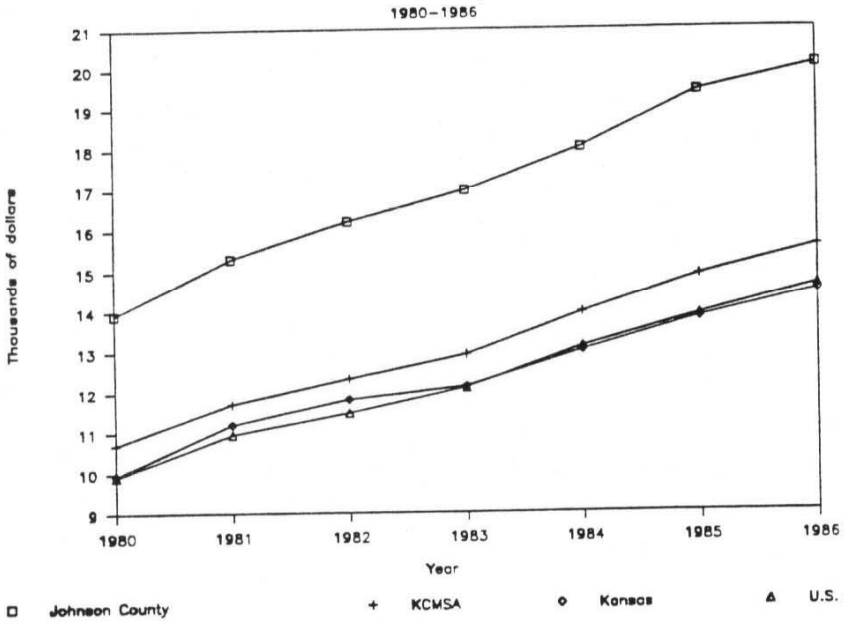
Table 15
Per Capita Income (in dollars), 1980-86

Year	Johnson County	Kansas City*	Kansas	United States
1980	$13,912	$10,702	$ 9,941	$ 9,919
1981	15,295	11,694	11,188	10,949
1982	16,217	12,329	11,809	11,482
1983	16,976	12,930	12,133	12,100
1984	18,029	13,962	13,017	13,116
1985	19,433	14,885	13,823	13,910
1986	20,091	15,595	14,486	14,639

*As reported, includes the entire 10 county metropolitan area for all years.
Source: U.S. Department of Commerce, Bureau of Economic Analysis, Local Area Personal Income, Summary volume and Plains Edition volume, 1979-84; 1981-86

Figure 2

Growth in Per Capita Income



Source: calculated from data in Table 15

E. Population Projections

The Institute's population projections to the year 2010 are presented for Johnson County and the State of Kansas in Table 16, with comparable projections for the Kansas City area and the nation. As Figure 3 illustrates, the growth rates for Johnson County are expected to continue to surpass those for all of the other areas designated for comparison here.

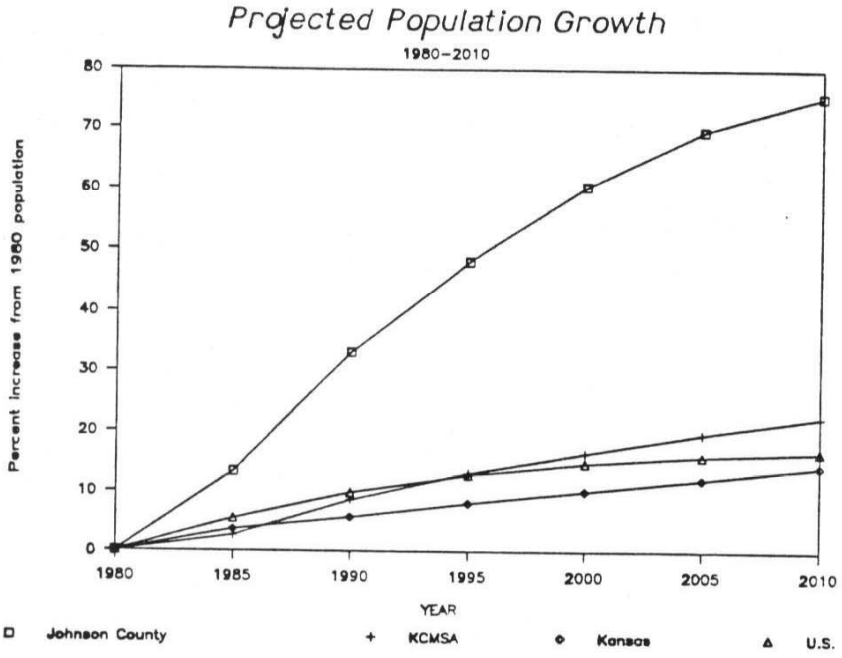
Table 16
Population Projections

Year	Johnson County	% Change*	Kansas City**	% Change*	Kansas	% Change*	United States	% Change*
1980	270,269	0.0	1,381,915	0.0	2,364,236	0.0	226,545,805	0.0
1985	318,300	17.7	1,418,426	4.2	2,461,000	4.1	241,489,000	6.6
1990	359,826	33.1	1,498,881	8.5	2,496,862	5.6	248,656,000	9.8
1995	400,407	48.2	1,561,751	12.4	2,553,265	8.0	255,239,000	12.7
2000	433,580	60.4	1,607,386	16.3	2,600,636	10.0	259,576,000	14.6
2005	458,439	69.6	1,650,777	19.3	2,648,646	12.0	262,363,000	15.8
2010	474,166	75.4	1,690,193	22.3	2,698,976	14.2	264,193,000	16.6

*cumulative percentage change - since 1980.
**as defined by Mid-America Regional Council, does not include Miami or Lafayette Counties.

Sources: Kansas Statistical Abstract; Mid-America Regional Council; Bureau of the Census Population Reports, series P-25.

Figure 3



Source: same as Table 16

F. Market for Office Space

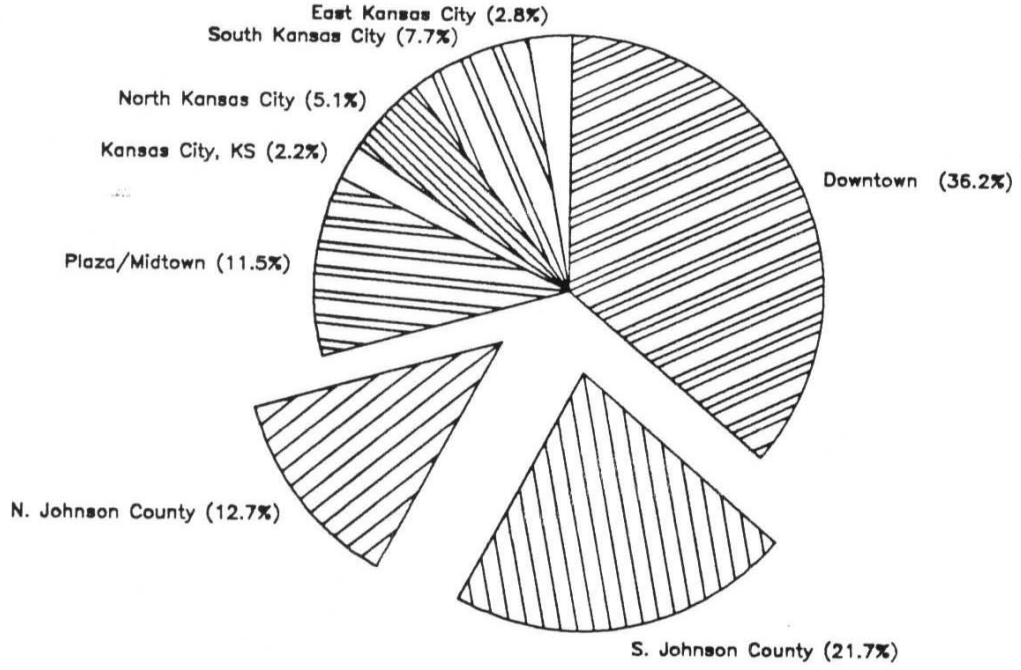
Since the "space" offered by an incubator, including the support services and linkages, is characteristically very different from office space offered in the traditional real estate market, they should not be considered as direct competitors. However, the rental rates in the area are relevant for consideration since they do affect the expectations of potential tenants, as are vacancy rates, despite their "point-in-time" nature, which can affect rents. For example, relatively low vacancy rates tend to support higher rents, while relatively high vacancy rates tend to depress rents.

There are several sources which reported estimates of the aggregate amounts of office space available during the latter part of 1988 for the Johnson County and Kansas City markets, including data from the Mid-America Regional Council (MARC) Research Data Center, the Office Leasing Guide of

the Kansas City Business Journal, and statistics provided by Coldwell Banker Commercial Real Estate Services. The listings from these sources differ in scope, ranging from an attempt to classify all major space in the area, both leasable and non-leasable, (MARC, about 15.5 million square feet in Johnson County), to classification of the space that is potentially leasable (Office Leasing Guide, approximately 10.8 million square feet), and finally to space available in commercial office buildings with more than 20,000 square feet (Coldwell Banker, about 9.4 million square feet). Since the interest here is in the rental market, the latter two sources offer a reasonable range of leasable office space between 9.5 and 11 million square feet. As indicated in Figure 4, Coldwell Banker's estimate of 9.4 million square feet accounts for about 34 percent of Kansas City's total leasable space.

Figure 4

Kansas City Office Space Distribution



Source: Kansas City Star, November 13, 1988

The Coldwell Banker survey also found Johnson County to have an average vacancy rate of 16.6 percent or (1.6 million square feet). As Table 17 indicates, north and south Johnson County have among the lowest vacancy rates in the entire metropolitan region, even though the available space is among the highest in the area. During the time period covered in the study, the third quarter of 1988, the Kansas City area suburban market posted the 14th lowest vacancy rate (17.9 percent) of the 51 markets examined. However, for the entire metropolitan region, the vacancy rate was 20.7 percent, ranking Kansas City 28th out of 51 cities surveyed. For comparison, it is interesting to note that Downtown locations which account for almost half (45 percent) of all vacant office space in the metropolitan area, experience an average vacancy rate 9 points higher than that for Johnson County even though the total office space available in each location is approximately the same.

Table 17
Coldwell Banker's Survey of Total Office Space and Office Vacancy Rates

Location	Number of Buildings	Total Sq. Ft. in Millions	Vacant Sq. Ft. in Millions	Vacancy Rate %
Downtown	71	9.855	2.529	25.7
South Johnson County	91	5.914	1.100	18.6
North Johnson County	73	3.466	0.456	13.2
Plaza/Midtown	35	3.142	0.558	17.8
South Kansas City	37	2.083	0.283	13.6
North Kansas City	29	1.379	0.320	23.2
East Kansas City	28	0.754	0.221	29.3
Kansas City, Kansas	9	0.611	0.166	27.2
North and South Johnson County Combined	164	9.380	0.1556	16.6

Source: Kansas City Star, November 13, 1988

The information provided by the Office Leasing Guide concerning the rental rates associated with the available office space is summarized in Table 18. Over half (52.5 percent) of the reported office space in Johnson County rents for $11.01 - $15.00 per square foot.

Table 18
Major Office Space for Lease (Sq.Ft. (000s))

Johnson County	Up to $8.00	$8.01-$11.00	$11.01-$15.00	$15.01-$18.00	Over $18.00	Total
North	64.75	778.3	2680.3	456.5	0.0	3980.35
South	460.1	647.5	3089.9	1263.5	1539.4	7000.4
Total	524.75	1425.8	5770.7	1720.0	1539.4	10980.75

Source: "Office Leasing Guide," Kansas City Business Journal, November 1988.

According to analysts at MARC, the inventory of office space in Kansas City is estimated to have grown 17.5 million square feet between 1984-87. Johnson County construction and renovation comprised 3.8 million square feet of the total, ranking second behind the downtown area. Therefore, despite substantial growth in the amount of space available, the vacancy rates have remained relatively low. This suggests that the absorption rate of this new space in Johnson County is strong, even though demand is lagging behind supply in much of the metropolitan area.

G. Summary

This section of the study presented an extensive analysis of the nature of current economic activity in Johnson County. To assess the general economic and business climate of the region, published data documenting the composition and magnitude of recent economic growth in Johnson County, were

examined and compared to commensurable data for the entire Kansas City metropolitan area, the state of Kansas, and the nation. The evidence suggests that the Johnson County economy has experienced exceptional growth since 1980, both in absolute and in relative terms, which is a continuation of an even longer trend. The County has generally out-performed the state and the nation, and is also the clear leader in the metropolitan area.

The number of establishments in Johnson County grew by 54 percent between 1980 and 1986, almost double the national rate. The growth in Johnson County accounted for 45 percent of the total net business formation in the metropolitan region, and more than one-third of the state total. Most of the increase (85 percent) occurred in businesses with fewer than 20 employees. Johnson County also experienced strong increases (75 percent) in net business formation in a broadly defined group of technology-oriented industries, although the growth was heavily concentrated in the services sector. The evidence suggests that there exists a significant collection of firms in innovative and high growth service industries such as computer and data processing which could provide the basis for continued expansion, particularly if a healthy environment prevails.

For the same time period, total private employment in Johnson County increased by 41 percent, almost four times the national growth rate (11 percent) or the metropolitan rate (10 percent). Employment in the state grew by only 5.6 percent. This growth represents over 41,000 additional employees.

The growth in per capita income in Johnson County during the 1980-86 time period was comparable to the rates of growth experienced by the nation, state, and metropolitan area, although the level in Johnson County was

several thousand dollars higher. This growth was maintained despite large increases in the County population.

Clearly, the record of recent economic activity is very positive. Yet, there exists room to build and to further diversify the economic base. Maintaining this dynamic environment in the future depends on listening and responding to the needs of the business community to assure that Johnson County and the entire Kansas City metropolitan region can remain competitive in an information and technology-based economy. The next section provides the responses of young technology-oriented firms operating in Johnson County to a survey conducted by the Institute in order to understand the types of problems encountered and to evaluate the area as a place to start innovative businesses.

III. RESULTS OF SURVEY OF ADVANCED TECHNOLOGY FIRMS

A survey of advanced technology firms currently operating in Johnson County was conducted to determine: (1) the nature and types of activities occurring in the county; (2) the problems encountered during start-up and early development, including difficulties locating risk capital or other resources; (3) the strengths and advantages of the area for starting a business; (4) some general entrepreneurial characteristics; and (5) the attitudes of these entrepreneurs about the usefulness of an incubator and the services that might be provided there (see Appendix A). A total of 424 questionnaires were mailed to Johnson County establishments potentially in technology-driven industries. Due to the lack of a universally operational definition of "advanced technology," respondents were asked to classify their firm's activites, and a determination was made not to include in the valid sample the responses for any firms that did not consider themselves to be in the "advanced technology" or "technology-driven" category. The response rate for completed surveys fitting our criteria was 21 percent.

Even though there was an element of self-selection on the part of the respondents, the expenditures for research and development of the firms in the sample averaged about 14 percent of gross income, a level which would be more than sufficient to classify them as technology-driven establishments under an R&D-type definition. And, characterizing the sample firms according to the major product or service provided yields an SIC list that is very much consistent with the IPPBR definition of advanced technology industries used in Section II. In addition, as one would expect, about 40 percent of these respondents evaluated the level of technology employed by their firms as "cutting edge." Another 54 percent rated the level of technology used as

"current," while only 6 percent considered their technology to be "traditional."

Since many of the questions were designed to evaluate the climate for young and developing businesses in Johnson County and the Kansas City metropolitan area, the sample was restricted to firms that were 15 years old or less. It was assumed that establishments in this age category were young enough to provide data relevant to the assessment of business start-up conditions, but would also include establishments that had survived the development phase. The sample responses were also grouped in two different ways to determine whether the experiences were markedly different from one group to another. The groupings were by industrial classification so that firms engaged in business or engineering services could be compared with manufacturing firms, and by size so that firms with fewer than twenty employees could be compared to those with twenty or more. Although the sample is really not large enough to anaylze simultaneously by industrial classification and by size, there are about twice as many small firms as large in each of the two industrial categories. The composition of these groups is summarized in Table 19:

Table 19
Composition of Sample Firms by Years in Operation

	Percent of Sample*	**Years in operation** mean	(median)
General sample		**7.13**	**(7.5)**
Business and Engineering Services	66%	7.30	(7.0)
Manufacturing	31	7.20	(8.5)
Fewer than 20 employees	66%	5.70	(4.0)
20 or more employees	34	9.90	(10.0)

*3% of the sample did not fall into either of these two industrial classifications, but the number of establishments in this "other" category is so small that the results are not reported separately.

The results from these divisions are reported whenever they seemed relevant to the issues being addressed or if they varied greatly from the general sample. Responses to questions addressed to business start-up conditions and assistance by firms that had been in operation no more than five years were also analyzed separately to see if differences in circumstances could be identified. For the most part, their answers were fairly similar to those of the norm and so are reported qualitatively, but not quantitatively.

About 70 percent of the valid surveys were completed by (one of) the actual founder(s) of the firm. Whenever the founder was no longer with the firm, it was requested that the survey be completed by someone active in the management of the firm. Thus, we believe that the results presented here legitimately reflect the climate for advanced tech industries in Johnson County from the perspective of the entrepreneur.

A. Characteristics of Firms in the Survey

1. Employment characteristics

The respondents were asked to designate the number of full-time and the number of part-time employees. Part-time employees were then converted to full-time equivalents with the assumption that two part-time employees equals one full-time employee. As indicated above, the majority (66%) of the firms are small, employing fewer than 20; 15 percent employed 20-49; 12 percent employed 50-99; and only 7 percent employed 100 or more. The averages for the sample, and for the sub-groups are reported in Table 20. The average composition of that employment by category is summarized in Tables 21 and 22 (the medians are reported in parentheses).

Table 20
Composition of Sample Firms by Employment Size*

	Number of employees	
	mean	(median)
General sample	31.3	(10.5)
Business and engineering services	28.0	(12.0)
Manufacturing	40.3	(8.8)
Fewer than 20 employees	7.1	(5.0)
20 or more employees	78.7	(55.0)

*Based on full-time equivalent employees.

Table 21
Composition of Sample by Employment Type

	Employment by Type		
	Percent of Employment		Percent of Firms Having
Clerical	14.5%	(10.0)	78%
Data processors	9.1	(0.0)	41
Technicians	17.9	(10.0)	62
Scientists/engineers	21.3	(8.1)	56
Business/management	18.5	(10.0)	79
General labor	9.5	(0.0)	29
Other	9.2	(0.0)	29

Table 22
Composition of Sample by Industrial Group and Employment Type

	By industrial group		By employment group	
	Business & Engineering Services	Manufacturers	<20 employees	≥20 employees
Clerical	17.0% (10.0)	9.8% (10.0)	15.4% (10.0)	12.6% (10.0)
Data processors	11.8 (0.0)	3.3 (0.0)	4.1 (0.0)	18.8 (10.0)
Technicians	17.1 (5.0)	17.1 (10.0)	16.6 (10.0)	20.6 (10.0)
Scientists/engineers	21.0 (0.0)	24.2 (20.0)	24.5 (10.0)	15.0 (5.3)
Business/management	18.2 (10.0)	16.0 (10.0)	20.5 (10.0)	14.6 (10.5)
General labor	4.5 (0.0)	22.2 (17.5)	5.7 (0.0)	16.9 (0.0)
Other	10.3 (0.0)	7.5 (0.0)	13.1 (0.0)	1.5 (0.0)

From this breakdown, it is evident that a relatively large portion of employment in these firms falls into the professional and skilled categories, and further, that about one-fifth of the work force can be classified as scientists or engineers. And, even though the advanced technology manufacturing firms in the sample employ, on average, a larger portion of general labor than do those firms in business services, this percentage is much smaller than is generally the case in manufacturing firms in Kansas. A recent survey by the Institute of Kansas manufacturers revealed that, in contrast to the reponses of technology-oriented manufacturers presented here, more than half of their employees were classified as general labor, and only about 2 percent were in the science/engineering category.

Since advanced technology businesses require a greater percentage of highly skilled employees, it is necessary that a significant pool of such personnel be available in the area. However, about half of the respondents answered that their firms had had difficulty locating and hiring individuals with such critical skills or training. The expertise most often cited as difficult to find included engineers of various specialities, computer programmers and computer scientists, and individuals with combinations of skills, like management/programming or engineering/management. This concurs with a study by Midwest Research Institute City, completed in 1984, Framework for the Future, Economic Development in Kansas City, which concluded that the lack of a strong resource base for highly skilled labor was a potential constraint on the development of advanced technology industries in Kansas City.

The entrepreneurs themselves also tended to be highly skilled. For the sample as a whole, 86 percent of the founders held at least a college

degree, and 47 percent of the total held a graduate degree. Breaking the sample into industrial and employment groups yields similarly high percentages of advanced degrees. In addition, 70 percent had moved from an established firm to their own new firm, and they had on average 10.3 years of experience in similar industries prior to starting their own businesses. Less than five percent of the founders had started their own firm directly out of college. For the entire group of entrepreneurs, current as well as founding, about one-third listed engineering as an area of expertise, while about 40 percent listed business/accounting/management, and 15 percent listed computer science/computer programming.

2. Origination Characteristics of Firms

Of the firms represented in the survey, 87 percent had been started in the metropolitan area. About 70 percent indicated that among the primary reasons for starting the firm in Kansas City was that "this was home". About 40 percent of the respondents cited that the Kansas City area was a promising place to own and operate a business, including several who felt that it was the best place in Kansas to conduct technology-oriented business. This creates the expectation that the majority of new technology-driven start-up businesses in Johnson County will be founded by individuals already living and working in the area.

Once the decision had been made by these entrepreneurs to devote significant amounts of personal time and resources to the establishment of the firm, it took an average of 1.8 years to complete the typical early development milestones of (i) hiring an outside person, (ii) receiving the first sales income/revenue, and (iii) obtaining the first significant

financial support. However, since not all firms had sought outside financial support, this presents an optimistic view of the time path for development. If only firms that sought and obtained outside financial support are considered, the average increased to 2.24 years. A few of the very young firms were still struggling to obtain such support.

3. Sales and Asset Characteristics

The average sales and asset values for the firms responding to the survey are summarized by industrial and size classifications in Table 23. These firms generated an average of $5.2 million in revenues in 1987.

Table 23
Mean Sales and Asset Characteristics of Sample Firms

	Sales/revenues 1987		Net asset value 1987	
	mean	(median)	mean	(median)
General sample	**$ 5,206,124**	**$ 950,000**	**$1,749,062**	**$ 200,000**
Business & Engineering Services	3,017,726	950,000	1,403,616	125,000
Manufacturing	9,253,529	560,000	2,671,667	600,000
<20 employees	489,522	300,000	296,046	85,000
≥20 employees	13,138,591	3,000,000	4,390,909	2,000,000

A comparison of the means and medians in Table 23 indicates that a few very large firms can skew the picture of the typical firm, so the summary in Table 24 provides some additional characteristic information. The sample included a nice mixture of firms in each industrial classification in terms of the volume of sales, and as would be expected, the firms with larger employments had greater revenues than did the smaller ones. If the sample had not been restricted to firms 15 years or younger, the averages in each of the categories above would have been even larger.

Table 24
Classification of Sample by Sales Categories

Range	General sample	Business & engineering services	Manufac-turing	<20 em-ployees	≥20 em-ployees
less than $100,000	15.3%	12.8%	23.5%	24.3%	0.0%
$100,000-$249,999	11.9	17.9	0.0	18.9	0.0
$250,000-$499,999	16.9	15.4	17.6	24.3	4.5
$500,000-$999,999	6.8	5.1	11.8	10.8	0.0
$1,000,000-$4,999,999	33.9	38.5	23.5	21.6	54.5
$5,000,000-$9,999,999	5.1	7.7	0.0	0.0	13.6
$10,000,000 or more	10.2	2.6	23.5	0.0	27.2

Firms were also asked to provide information about the destinations of their sales. For the sample as a whole, about one-third of sales occurred in Kansas, although the portions were smaller for manufacturing firms and for those firms with 20 or more employees. Table 25 contains a summary of these results:

Table 25
Classification of Sample by Destination of Sales

	% sales to Kansas		% sales to Adjacent States*		% sales to rest of U.S.		% sales outside U.S.	
General sample	**34.3%**	**(30.0)**	**21.4%**	**(30.0)**	**41.3**	**(40.0)**	**3.0**	**(0.0)**
Business & engineering services	38.3	(37.5)	26.4	(20.0)	33.6	(15.0)	1.8	(0.0)
Manufacturing	20.6	(5.0)	9.8	(5.0)	63.0	(75.5)	6.6	(0.5)
<20 employees	42.2	(45.0)	24.7	(17.5)	31.7	(5.0)	1.4	(0.0)
≥20 employees	19.4	(7.5)	15.2	(6.5)	59.4	(70.0)	6.1	(0.0)

*Adjacent states inlude Colorado, Nebraska, Missouri, and Oklahoma.

In addition, firms reported the portion of sales actually made in Kansas City. Again, as illustrated in Table 26, the larger firms and the manufacturing firms tended to sell less locally than did other firms:

Table 26
Portion of All Sales which occur in the Kansas City Region

	% of sales in Kansas City
General sample	26.7%
Business & engineering services	29.6
Manufacturing	11.3
<20 employees	31.5
≥20 employees	17.7

B. Evaluation of Johnson County/Kansas City Business Climate

The respondents were asked to evaluate their city as a place for conducting business with respect to several important factors, many of which are particularly pertinent to advanced technology businesses. The extremes are reported below so that the strenghts and weaknesses of the area become apparent. For the most part, the responses were fairly positive for both of the industrial groups, although there were some notable exceptions.

In general, there appear to be particular strengths in the availability of affordable building space, the infrastructure, the availability of professional business personnel and business support services, and the accessibility of the area by air and by car. The respondents also expresssed a moderate satisfaction with the available pool of professional science and technical employees, as well as the educational opportunities that such groups require. On the negative side, every group expressed significant dissatisfaction with the obtainability of financing of some sort, and also, with taxes on business income and property. The smaller firms had typically experienced more difficulty accessing venture capital than had the larger firms. Some manufacturing firms also reported having encountered problems

with accessibility to their suppliers, although about one-third of manufacturers expressed their satisfaction with this aspect of their location. There do seem, however, to be problems with access to research and development facilities, particularly, but not exclusively for manufacturers.

Overall, respondents expressed a moderate satisfaction with the support of local government for their businesses, although only about one-quarter of them said that they were very satisfied. The results are summarized in the following tables.

Table 27
Evaluation of Location, Entire Sample

Factor	Percent of firms very satisfied	Percent of firms not satisfied
Availability of:		
1. Professional science/technology staff	24.4%	8.9%
2. Professional business staff	45.7	6.5
3. Technical staff	31.4	15.7
Education and training opportunities:		
4. For professional staff	25.0	12.5
5. For technical staff	27.9	16.3
Access to:		
6. Research and development facilities	19.4	36.1
7. Consumers/clients	51.2	9.8
8. Suppliers of production equipment	35.3	14.7
9. Suppliers of raw materials/component parts	33.3	29.6
10. Business support services	54.3	6.5
Access to:		
11. Seed capital for initial development	21.2	36.4
12. Venture capital for commercialization	9.1	45.5
13. Operating capital	12.2	29.3
14. Local government support for business	26.8	24.4
15. Taxes on business income and property	13.0	28.3
16. Building space availability	63.5	5.8
17. Building space expenses (rent,etc)	50.0	6.0
18. Infrastructure	55.6	8.9
19. Access to airports	37.8	17.8
20. Access to interstate highway network	74.0	0.0

Table 28
Evaluation of Location by industrial classification

	Business & Engineering		Manufacturing	
	Degree of satisfaction			
	very	not	very	not
Availability of:				
1. Professional science/technology staff	27.6%	6.9%	21.4%	14.3%
2. Professional business staff	50.0	6.7	42.9	7.1
3. Technical staff	32.4	17.6	33.3	6.7
Education and training opportunities:				
4. For professional staff	22.2	11.1	36.4	9.1
5. For technical staff	32.1	10.7	23.1	15.4
Access to:				
6. Research and development facilities	27.3	22.7	8.3	50.0
7. Consumers/clients	53.8	9.8	41.7	25.0
8. Suppliers of production equipment	42.1	0.0	30.8	38.5
9. Suppliers of raw materials/component parts	33.3	16.7	38.5	38.5
10. Business support services	69.0	3.4	26.7	13.3
Access to:				
11. Seed capital for initial development	22.7	36.4	22.2	22.2
12. Venture capital for commercialization	4.8	42.9	20.0	40.0
13. Operating capital	10.7	25.0	18.2	27.3
14. Local government support for business	30.8	19.2	23.1	38.5
15. Taxes on business income and property	16.7	26.7	7.1	35.7
16. Building space availability	64.7	5.9	60.0	6.7
17. Building space expenses (rent,etc)	54.5	6.1	46.7	6.7
18. Infrastructure	50.0	10.7	66.7	6.7
19. Access to airports	25.8	25.8	66.7	0.0
20. Access to interstate highway network	75.0	0.0	80.0	0.0

Table 29
Evaluation of Location by size

	<20 employees		≥20 employees	
	Degree of satisfaction			
	very	not	very	not
Availability of:				
1. Professional science/technology staff	26.9%	15.4%	21.1%	0.0%
2. Professional business staff	51.9	7.4	36.8	5.3
3. Technical staff	29.0	16.1	35.0	15.0
Education and training opportunities:				
4. For professional staff	25.0	8.3	25.0	18.8
5. For technical staff	29.2	12.5	26.3	21.1
Access to:				
6. Research and development facilities	19.0	33.0	20.0	40.0
7. Consumers/clients	57.7	7.7	40.0	13.3
8. Suppliers of production equipment	40.0	15.0	28.6	14.3
9. Suppliers of raw materials/component parts	37.5	25.0	27.3	36.4
10. Business support services	53.3	6.7	56.3	6.3
Access to:				
11. Seed capital for initial development	15.0	40.0	30.8	30.8
12. Venture capital for commercialization	4.8	52.4	16.7	33.3
13. Operating capital	0.0	38.5	33.3	13.3
14. Local government support for business	33.3	25.9	14.3	21.4
15. Taxes on business income and property	14.8	22.2	10.5	36.8
16. Building space availability	68.8	55.0	6.3	5.0
17. Building space expenses (rent,etc)	56.7	10.0	40.0	0.0
18. Infrastructure	65.4	7.7	42.1	10.5
19. Access to airports	41.7	20.8	33.3	14.3
20. Access to interstate highway network	81.3	0.0	61.1	0.0

C. Start-up Problems

The responding entrepreneurs were asked to indicate the severity from their own experience of several kinds of problems that are commonly encountered by businesses in the early stages of development. These

problems were grouped into four categories: (1) products, processes, and markets; (2) financial; (3) management/organizational; and (4) selecting/developing a location. Each of the problems in the first three types were encountered by at least half of the responding firms, although the degree of severity varied. Very, very few firms experienced any difficulty with locational problems. In Table 30, the problems are ranked for the general sample both in terms of the overall percentage of firms reporting that the problem had been encountered, and by the percentage of firms who reported that the problem was more than a minor one. The differences that emerged from the industrial and size subgroups are reflected in Table 31, which reports the percentages of firms in each classification that indicated the problems were either major or moderate.

Most firms had struggled with finding qualified skilled personnel, developing and commercializing products, and obtaining financing. More than one-third (37%) of all firms indicated that obtaining risk capital was a major problem, but this was especially true for the smaller businesses in the sample. Analyzing markets and planning a marketing strategy posed greater problems for service-oriented firms than for manufacturers, as well as for larger versus smaller firms. The service-oriented firms also indicated that setting and implementing goals presented special difficulties during the start-up phase, while manufacturers struggled with process development and control. The young firms, those 5 years old or less, reported much more difficulty getting insurance than did the sample as a whole, suggesting that this aspect of starting a business may be getting more difficult.

Table 30 - Types of Start-up Problems Encountered, Percent of Entire Sample

Problem	Rank	Firms which experienced problem with moderate or major severity	Firms which experienced problem to any degree	Rank
Developing new products/services	(1)	59.3%	83.1%	(1)
Finding qualified professionals	(2)	57.4	80.3	(4)
Obtaining financing	(3)	55.5	79.6	(5)
Finding other qualified staff	(4)	55.0	78.3	(6)
Commercialization of product	(5)	52.9	80.4	(3)
Analyzing markets	(6)	50.8	77.0	(7)
Finding qualified managers/executives	(7)	50.0	71.2	(11)
Planning marketing strategy	(8)	46.7	81.7	(2)
Process development/control	(9)	45.5	70.5	(12)
Preparation/use of business plan	(10)	39.6	73.0	(10)
Coping with government regulations	(11)	36.6	73.3	(9)
Establishing banking relationship	(12)	36.6	66.7	(15)
Develop accounting/control system	(13)	34.5	67.2	(13)
Setting/implementing goals	(14)	34.4	75.0	(8)
Managing personnel	(15)	31.2	67.2	(14)
Obtaining insurance	(16)	26.7	56.7	(17)
Identifying suitable site	(17)	16.7	48.3	(19)
Systems maintenance	(18)	15.7	56.9	(16)
Locating suitable rental space	(19)	13.7	50.0	(18)
Access to suppliers	(20)	10.3	32.8	(21)
Access to customers/clients	(21)	9.8	37.7	(20)

Table 31 - Types of Start-up Problems Encountered by Industrial Type and Employment Size of Firm

	% of Firms Reporting Problem Was More Than Minor			
Problem	Business & Engineering Services	Manufacturing	<20 employees	≥20 employees
Developing new products/services	58.9%	52.9%	56.4%	65.0%
Finding qualified professional staff	53.6	61.1	48.7	72.8
Obtaining financing	50.0	61.1	62.9	42.1
Finding other qualified staff	53.9	52.7	55.2	54.5
Commercialization of product	52.9	50.1	55.8	47.0
Analyzing markets	53.7	38.9	46.1	59.1
Finding qualified manager/executives	51.5	41.1	51.6	47.6
Planning marketing strategy	52.5	33.4	43.6	52.4
Process development/control	37.9	60.0	44.8	46.7
Preparation/use of business plan	38.1	33.4	43.9	31.8
Coping with government regulations	36.9	26.4	38.4	33.3
Establishing banking relationship	30.8	44.4	40.0	30.0
Develop accounting/control system	30.0	33.3	37.5	28.5
Setting/implementing goals	42.8	15.8	35.7	31.8
Managing personnel	32.5	27.8	28.2	23.8
Obtaining insurance	26.3	26.3	28.2	23.8
Identifying suitable site	14.6	23.5	15.4	19.1
Systems maintenance	15.2	13.3	9.4	26.3
Locating suitable rental space	7.5	31.3	16.2	9.6
Access to supplies	10.3	5.9	10.3	10.5
Access to customers/clients	9.8	11.8	12.2	5.0

D. Types of Start-up Assistance Most Needed

The types of assistance that firms would have used, and which would have been the most beneficial, are consistent with the problems that they had encountered. A majority of firms would have used essentially each of the potential types of assistance suggested, although the perceived benefits of these varied greatly. Generally, the responses suggested that the greatest benefits would have been derived from business support type services, including, advertising and promotion, market research and planning, financial planning, business planning, and legal services. The manufacturing firms in the group indicated that potential benefits from assistance with product and process development, as well as with technology transfer would also have been significant, more so than those in business or engineering services. However, the service-oriented firms would have aided from assistance with product commercialization. Access to scientific equipment and computers would benefit only a small portion of firms, and even though more than 80 percent would have liked to be able to access library searches, the benefit from such access did not seem large. Not surprisingly, the results suggest that, with the exception of technology transfer, each of the types of assistance would have been of greater benefit to the smaller firms than to the larger firms. The tables which follow summarize these results. The results also indicated that firms operating for five years or less, a subset of the general sample, would have benefitted more than the norm from certain types of assistance, including: assistance with advertising and promotion, market research and planning, obtaining insurance and legal services, and accessibility to library or computer services.

Table 32 - Types of Assistance That Would Have Been Most Beneficial During Start-up, Entire Sample

Type of assistance:	% of firms indicating that assistance during start-up would have been very beneficial	would be used at all
1. Advertising and promotion assistance	50.7%	87.3%
2. Market research & planning assistance	50.0	84.4
3. Access to library or computer searches	29.7	82.8
4. Assistance w/preparation/use of business plan	41.2	82.5
5. Financial planning/management assistance	43.6	82.3
6. Assistance with "starting a business"	34.9	79.4
7. Legal services	33.3	77.8
8. Insurance services	25.9	77.4
9. Technology transfer	27.4	72.6
10. Assistance with product analysis	23.0	72.1
11. Access to general office services	21.1	71.9
12. Personnel management assistance	22.2	68.3
13. New product development assistance	24.2	66.1
14. Product commercialization assistance	21.4	65.6
15. Assistance with grant proposal preparation	31.1	65.5
16. Access to large computers	20.0	51.7
17. Inventory control assistance	14.6	51.6
18. Assistance w/products or manufacturing processes	13.1	50.8
19. Access to scientific equipment	15.0	46.7

Table 33 - Types of Assistance Yielding Greatest Benefits, by Industrial and Size Classification

Type of Assistance:	% of Firms Indicating that Assistance Would have Benefited Them Greatly During Start-up: By Industrial Classification: Business/ Engineering Services	Manufacturing	By Size Classification: <20 Employees	≥20 Employees
1. Advertising & promotion assistance	50.0%	44.5%	61.0%	31.8%
2. Market research & planning assistance	52.3	42.1	58.5	34.8
3. Access to library or computer searches	31.0	31.6	41.5	8.6
4. Assistance w/preparation/use of business plan	40.4	38.9	46.4	31.8
5. Financial planning/management assistance	41.5	44.5	48.8	33.3
6. Assistance with "starting a business"	35.7	27.8	38.0	28.5
7. Legal services	26.2	44.5	38.1	23.8
8. Insurance services	19.5	33.3	30.9	15.0
9. Technology transfer	20.0	42.2	25.6	30.4
10. Assistance with product analysis	17.9	31.6	25.6	18.2
11. Access to general office services	18.4	25.0	24.3	15.0
12. Personnel management assistance	19.5	26.3	24.4	18.2
13. New product development assistance	20.5	35.0	25.0	22.7
14. Product commercialization assistance	25.7	15.8	28.2	9.0
15. Assistance with grant proposal preparation	29.0	38.9	39.5	15.0
16. Access to large computers	23.1	16.7	21.0	18.2
17. Inventory control assistance	10.0	21.0	15.0	13.6
18. Assistance with manufacturing processes	5.1	31.6	18.0	4.5
19. Access to scientific equipment	10.5	21.0	15.4	14.3

Less than four percent of the firms responding to the survey had been tenants or clients of a business incubator facility. In fact, only about 20 percent of the firms represented here indicated that a small business incubator was available in Kansas City during the start-up phase of their development. For those who had started businesses before such a facility was in existence (or prior to their awareness of such), slightly more than one-third indicated that they would hypothetically have considered pursuing such an option had one been available. Almost 40 percent were uncertain whether they would been interested, and slightly more than one-fourth felt that they would not have been interested.

Table 34
Hypothetical Interest in Using an Incubator if One Had Been Available During Start-up*

	Would have considered	Would not have considered	Don't know
General sample	35%	26%	39%
Business & engineering services	31	28	41
Manufacturing	50	31	19
<20 employees	46	12	42
≥20 employees	19	48	33

*only those who indicated that an incubator had not been available (or that they were not aware one) answered this question.

Those engaged in manufacturing enterprises were especially positive about such an opportunity. Half of those who had not had the option at the time of start-up felt that they would have considered it, and almost three-quarters of the manufacturers indicated strong interest in such a facility now if they were to start a new business. For the sample as a whole, about

half, including about 50 percent of the small and 50 percent of the large firms, responded positively to the possibility of starting a new business in an incubator compared to only 27 percent who were probably not interested. The service-oriented firms were, as a group, somewhat less enthusiastic, although more than one-third of entrepreneurs in this category described themselves as interested.

Table 35
Interest in Using an Incubator if Were Involved in Starting a New Business

	very or probably interested	neutral	probably not interested
General sample	51.5%	21.9%	26.6%
Business & engineering services	38.1	26.2	35.7
Manufacturing	73.7	15.8	10.5
< 20 employees	52.3	26.2	21.4
≥ 20 employees	50.0	13.6	36.4

E. Future Plans

Approximately 22 percent of the firms in this study had already spun off at least one new firm, two-thirds of which were from service-oriented firms. For the future, the strong indication from these firms was that they intend to develop new products, and most intend to expand. None of the firms expected to decrease their level of employment significantly in the next two or three years. As can be seen from Table 36, the responses were fairly consistent across industrial and size classifications. Furthermore, 84 percent of these firms responded that it was very likely that their firms would make technological changes in the next five years. Less than five percent believed that such changes were unlikely. Unfortunately, even though about 35 percent of all firms did not perceive there to be any

barriers to the adoption of new or different technology into their firms, 65 percent of firms indicated that potentially viable technological changes had been identified for their firms, but not adopted. Several reasons were given for this, but the most overwhelming reason was the lack of financial resources more than 85 percent of this group responded that this was a significant constraint. Among the other restrictions cited frequently: 42 percent, lack of technical expertise; 29 percent, lack of skilled labor; lack of technical information, 16 percent, and high risk, 18 percent.

Table 36
Plans for the Future

	General sample	Business & engineering	Manufacturing	<20 employees	≥20 employees
1. No major changes	8.8%	11.1%	5.0%	8.9%	8.7%
2. New product development	72.1	71.1	70.0	71.1	73.9
3. Change mix of products	54.4	57.8	40.0	60.0	43.5
4. Significant increase in employees	67.6	68.9	65.0	64.4	73.9
5. Significant decrease in employees	0.0	0.0	0.0	0.0	0.0
6. Spin off new firms	26.5	28.9	20.0	28.9	21.7
7. Sell firm	4.4	2.0	10.0	6.7	0.0

F. The Interest in and Need for Academic Linkages

The interest in academic linkages pertains to the issue of a potential incubator's affiliation, whether formal or informal, with a university. One of the identified criteria for success of small business incubators is the association of the facility with a strong university. Since there is no major research institution in the Kansas City area, the potential for a cooperative relationship with The University of Kansas, as well as a continuation of th existing supporting role of JCCC, is an issue to address.

To assess the types of assistance and degree of utilization that already exists between technology-driven businesses and academic institutions, the respondents were asked to describe any such interaction. About 28 percent of the sample firms reported having used the services of The University of Kansas and about the same percentage had used services at Johnson County Community College. Described interactions with other Kansas schools was very, very limited. In fact, only 47 percent of the total sample had used the services of any Kansas university, community college, or vocational/ technical school. The most compelling reason for the choice of location for those who had used any services was the proximity of the institution - about 74 percent of the respondents indicated that this was one of the primary reasons. Other important factors in the choice of schools to contact included: knew or had information about whom to contact, 55 percent; was familiar with the institution, 52 percent, and awareness that department or institution had reputation for expertise in area of interest, cited by 26 percent.

Of those who had utilized academic resources, both technical and business assistance had been accessed, but the emphasis appeared to be heavily on technical problems. Table 37 illustrates the type and degree of academic linkages occurring between Johnson County firms and The University of Kansas and Johnson County Community College. The service-oriented firms report utilizing academic resources much more than manufacturing firms, after accounting for the fact that there were proportionately more service-type firms in the sample than manufacturers. Table 38 summarizes the types of resources that these firms were most interested in accessing through academic institutions. Many of the employee and management training

resources are available in Johnson County through the Small Business Development Center located on the Johnson County Community College. Many of the more techncical-type resources could be leveraged effectively through a cooperative effort with The University of Kansas. However, for manufacturers, there is an expressed deficiency in the availability of research and development facilities which may make it difficult to nuture such enterprises.

Table 37
Types of University/Community College Resources Utilized

Technical services	**Percentage of firms using**
Library utilization	22%
Technical consultation with faculty	21
Technical training of workers	19
Computer utilization	12
Explanation of existing technology	10
Explanation of new technology	9
Technical research for future products	7
Use of scientific instruments and equipment	6

Business-type services	**Percentage of firms using**
Market research and planning	10%
Library utilization	9
Advertising and promotion of products/services	8
Personnel and organization assistance	6
Preparation and use of business plan	6

Table 38
Percent of Firms Expressing Moderate to Great Interest in Various Services Potentially Available at Kansas Academic Institutions

Type of Service:	**All sample**	**Service-oriented**	**Manufac-turing**	**<20 emp**	**≥20 emp**
Technology transfer	77.0%	68.4%	95.0%	75.0%	80.9%
Access to employee training programs	74.1	73.7	70.5	72.9	76.2
Computerized information retrieval	73.0	78.5	55.5	80.0	60.8
Technical problem identification/solution	70.0	60.5	84.2	75.0	60.0
Access to management development training	67.2	70.0	55.5	65.0	71.4
R&D to develop new technology	66.6	52.5	95.0	65.8	68.2
Business problem identification/solution	63.4	70.0	45.0	70.7	50.0
Access to labs/equipment	45.0	36.9	57.9	51.3	33.4

G. Summary

This section of the study reported the results of a recent survey of young, technology-oriented Johnson County firms. The purpose of the survey was to gather data from the entrepreneurial perspective with which to evaluate the local environment as a place to start a business.

Most of the firms in the sample had been started in the metropolitan area because the entrepreneur(s) already lived there. On average, these entrepreneurs had about ten years of experience in similar industries prior to starting their own business. The median level of employment for the firms in the sample was 10.5 employees, while the median level of sales was almost $1 million. On average, these firms spent 14 percent of gross income on Research and Development activities, which is indicative of their technological orientation. Most of the firms expressed an intention to expand and develop new products in the immediate future.

In general, the respondents' evaluation of the Johnson County/Kansas City area as a place to conduct business was fairly positive. Based on their assessment, there appear to be particular strengths in the availability of affordable building space, the infrastructure, the availability of personnel and business support services, and the accessibility of the region by major transportation networks. They expressed only moderate satisfaction with the available pool of professional science and technical employees, and with the educational opportunities that such groups require. On the negative side, significant dissatisfaction was expressed with the obtainability of risk capital, and manufacturers were especially concerned with the lack of research and development facilities.

Most of the problems encountered by these firms during the start-up phase of development were very typical. The types of problems frequently encountered can be categorized into three broad groups: (1) products, processes, and markets; (2) financial; and (3) management/organizational. Many firms reported having struggled to find qualified skilled personnel and with developing/commercializing their products. More than one-third of all firms indicated that obtaining financing was a major problem. Service-oriented firms had more difficulty analyzing markets, planning a marketing strategy, and setting/implementing goals, while manufacturers particularly encountered trouble with process development and control.

A majority of the firms would have been interested in each of the suggested types of assistance during their own start-up phase, but the perceived benefits varied greatly. The responses suggested that the greatest benefits would have been derived from business and professional support services, including advertising and promotion, market research and planning, business and financial planning, and legal services. Service-oriented firms would also have especially benefited from assistance with product commercialization, while manufacturers would have utilized technology transfer services and assistance with product/process development. Access to scientific equipment and computers would have significantly benefited only a small portion of firms, although most firms would have liked convenient access to university library services.

About half of the respondents expressed at least a moderate interest in using an incubator if they were ever again involved in starting a new business, with the most enthusiastic responses coming from the manufacturers. Furthermore, since the types of start-up problems most

frequently encountered by these Johnson County firms are the ones that community-sponsored incubators are most proficient at solving, such a facility should greatly enhance the entrepreneurial climate in the area. And, even though some linkages to a research institution would be desirable, this evidence suggests that location on such a campus would not be necessary.

In the next section, through a discussion of published survey results, the characteristics and experiences of a variety of existing incubators are examined. This descriptive information provides valuable insight into the incubator development process, despite the absence of a definitive design.

IV. KEY RESEARCH FINDINGS ABOUT INCUBATORS IN THE SURVEY LITERATURE

Several major surveys of existing incubator facilities have been conducted in the last five years. While much general information has been learned from the "aggregate" experiences of other facilities, these surveys have also highlighted the uniqueness of each incubator. It is unlikely that any given enterprise can be duplicated since each has developed from its own particular economic base and environment. For example, some communities with innovation strengths, such as universities with research capabilities, medical centers, or federal or industrial R&D divisions have designed their incubators in order to nurture technology-driven firms. In other communities, where the potential for a critical mass of such firms may be lacking, the focus may be placed on diversification of the economic base and the support of moderate rather than high growth sectors. This section of the report is devoted to an examination of the characteristics, both similarities and differences, that researchers have distinguished in five independent surveys conducted since 1984.

Since the published data from surveys conducted by other researchers is fairly comprehensive, in both content and time intervals, the Institute did not conduct its own nationwide survey, but concentrated instead on in-depth interviews with the managers of a few selected facilities.

A. Temali and Campbell (1984)

The first major study of incubator facilities Business Incubator Profiles, A National Survey was conducted by Mihailo Temali and Candace Campbell through the Hubert H. Humphrey Institute of Public Affairs, and published in 1984. As the title suggests, this research concentrated on

individual portraits of the responding facilities, with some brief summary tables.

Their survey of fifty incubators, including 13 publicly-sponsored, 4 non-profit community-based, 4 industrial development agency based, 7 university affiliated, and 22 incubators licensed or developed by private corporations (3), revealed that almost all incubators at that time began in existing structures, acquired by the sponsoring organization with public assistance playing a big role in purchase and rehabilitation, particularly among the non-private. Among the funding sources were a variety of government loans and grants, including monies from the Economic Development Association, Community Development Block Grants, Urban Development Action Grants, state or locally issued industrial revenue bonds, and others. The authors stressed that most incubators arose from a partnership/collaboration between local government and private corporations, and often universities.

Publicly-sponsored incubators indicated that top-priority was placed on job creation, and also seemed to place less emphasis on development of advanced technology industries. Many non-profit incubators listed development of a particular industrial area or neighborhood as the primary objective, while university-affiliated incubators generally sought to transfer research and development technology and to commercialize research efforts.

The study also revealed many common offerings among the facilities, such as flexibility in leasing and management of space, centralized services designed to help reduce the overhead costs of the tenants, and various types of business support services. Most of the incubators also acted as brokers between their tenants and potential investors. However, despite all of these apparent similarities of approach, the most common theme that emerged from

the Temali-Campbell study was that the people are more important than the building.

B. Allen (1985)

In September, 1985, David Allen published a report Small Business Incubators and Enterprise Development for the U.S. Department of Commerce, Economic Development Administration which included the survey results of 46 responding incubators (out of 70 known facilities) and 217 of their tenants. This study concentrated on many of the details of operations and objectives of the facilities, both from the perspective of the manager and of the tenants.

The responding incubator facilities were categorized according to three types of organizational affiliation: 22 were public/nonprofit; 15, private; and 9, university-sponsored. Just as the Temali-Campbell study, Allen found that the objectives of the facility, and the criteria by which success is measured differ largely according to the type of sponsorship. Table 39 summarizes the types of criteria considered when selecting tenants as indicated by the various sponsors. Typically, local economic conditions affected the goals of incubators maintained by public organizations, either government or nonprofit corporations. Job creation and economic diversification, as well as tax base expansion, and the creation of a positive development image were common themes for incubators of this type. Furthermore, the study revealed that given the need for community support and the investment of public money, public incubators were more likely to involve a wide circle of community representatives in the management and governance of the facility.

Table 39
Selection Criteria for Admissions, by Type of Incubator

Criteria	Public (N=21)	University (N=9)	Private (N=15)
Net jobs potential	86%	78%	20%
Diversifies local economy	48	44	27
Start-up firm	62	44	27
Age of firm	57	44	20
Locally-owned firm	48	22	20
Firm's space requirements	81	100	53
Complements existing firms	52	67	47
Environmental considerations	43	89	47
Net profit potential	19	56	47
Business plan completed	19	22	27
Affiliated with university	9.5	44	20
Advanced technology firm	--	33	--

Source: Allen (1985)

Those sponsored by private sector organizations were primarily concerned with perceived profit opportunities: (1) stimulation of commercial and industrial real estate, or (2) if run by venture capital groups, on value-added or a high rate of return for investment in the tenant firms. University-affiliated incubators shared many of the same purposes of the other two types, but differed in the emphasis placed on the commercialization of faculty research.

If the incubators were characterized according to the type of tenant activity, Allen found that services and manufacturing facilities were the most common, accounting for 10 each of the 46 total. At least 80 percent of the tenant firms in those facilities were engaged in, respectively, services or manufacturing businesses. There were also 9 advanced technology facilities in the sample with at least 80 percent of firms engaged in technology-oriented products or processes. The remaining 17 facilities were characterized as mixed use, since they contained tenants of all three generic types. Table 40 contains a summary of the actual composition of the

tenants of the incubators responding to Allen's survey, categorized by sponsorship type, while Table 41 summarizes the admissions criteria by type of business activity. Light manufacturing firms with a large new technology component and professional business services firms were the only two categories of tenants that were fairly evenly represented in the three facility sponsorship-types. More than one-third of all tenants in university facilities were R&D firms, and every such facility had at least some of this type, suggesting a strong emphasis on advanced technology products and processes. Nearly one-fourth of all tenants in privately sponsored incubators were engaged in wholesale or retail activities, with about two-thirds of these facilities having at least one such tenant. Also, more than one-half (57%) of the private incubators reported having anchor tenants, compared to only 23 percent for publicly sponsored facilities and 38 percent for university centers.

Table 40
Composition of Tenants in the 46 Responding Incubator Facilities

	Percentage of Tenants by facility type			Facilities with Such Tenants		
	Total Sample	Public	Private	University	Public	Private	University
Light Manufacturing with Large New Technology Component	10.4%	9.5%	9.2%	14.4%	45.5%	53.3%	88.9%
Light Manufacturing with Small New Technology Component	14.2	30.8	11.3	3.7	72.7	73.3	55.6
Heavy Manufacturing	1.5	1.5	1.0	2.6	13.6	20.0	33.3
Retail and Wholesale	18.4	19.4	24.0	2.7	40.9	66.4	22.2
Professional Personnel Services	5.6	3.0	8.2	1.6	22.7	33.4	22.2
Professional Business Services	24.5	20.4	24.2	29.4	50.0	86.7	87.8
Research & Development	16.2	9.5	11.5	35.8	45.5	60.0	100.0
Governmental Agencies	5.9	3.5	5.5	9.6	31.8	46.7	33.3
Other	3.3	2.5	4.9	---	9.0	20.0	---
	(N=875)	(N=201)	(N=487)	(N=187)	(N=22)	(N=15)	(N=9)

Source: Allen (1985)

Table 41
Admission Criteria, by Type of Business

Criteria	Public (N=19)	University (N=9)	Private (N=11)
Retail	21%	22%	27%
Wholesale	53	33	82
Heavy Manufacturing	37	33	18
Light Manufacturing	89.5	90	100
Warehousing	47	11	64
Professional or personal services	42	33	54.5
Government/Nonprofit agencies	32	44	73

Source: Allen (1985)

Furthermore, about two-thirds of all public and university facilities indicated having an exit policy, compared to only 20 percent of private facilities. Of those having an exit policy, most reported that it was flexible. However, at the time of the survey, as even now, many facilities are simply too young to have been constrained by space limitations, and as such, may not have had to enforce a policy.

About two-thirds of the sponsors, regardless of type, owned the buildings in which the incubator facility was housed. As Table 42 indicates, public facilities typically relied heavily on both private and public funds in order to finance the physical structure of the incubator. Private financial assistance usually consisted of loans and mortgages, while federal assistance largely was derived from the Economic Development Administration. University facilities were financed primarily by state and local governments and by private sources. Sources and amounts (in 1985) of operating revenues are specified in Table 43. Even though rent was the greatest source of operating revenue for publicly sponsored incubators, meeting these expenses was also their greatest financial concern.

Table 42
Financing Sources for Land & Structures*

Source	Public			Private			University		
	%**	Mean	N	%**	Mean	N	%**	Mean	N
Federal Government	20.6	$949,857	7	---	--	-	9.1	$1,000,000	1
State Government	8.8	662,333	3	---	--	-	36.4	1,400,000	4
Local Government	29.4	234,148	10	33.3	$ 796,666	3	27.3	1,300,000	3
Private	32.4	514,227	11	66.7	1,813,333	6	18.2	675,000	2
Nonprofit/University	5.9	22,500	2	---	--	-	9.1	1,600,000	1
Other	2.9	84,000	1	---	--	-	---	--	-

*Fourteen facilities did not provide financing information and four had acquired free space.
**Percentage of total financing amount for that column.

Source: Allen (1985)

Table 43
Source & Amount of Annual Funds for Operating Revenue

Source	Public			Private			University		
	Mean	Median	N	Mean	Median	N	Mean	Median	N
Rents	$158,941	$100,000	17	$439,875	$400,000	8	$200,000	$260,000	5
State Funds	42,500	42,500	2	25,000	25,000	1	459,500	466,500	4
Local Funds	28,000	28,000	1	---	---	-	400,000	400,000	2
Federal Funds	55,000	---	1	---	---	-	---	---	-
Private	---	---	-	666,666	686,000	6	200,000	200,000	1
University/Education	50,000	50,000	1	---	---	-	125,000	125,000	1
Non-Profit	16,500	12,500	4	---	---	-	100,000	100,000	1
Other Unspecified	171,200	100,000	5	42,000	42,000	1	---	---	-

Source: Allen (1985)

The facility operating characteristics are summarized in Table 44. The privately-sponsored incubators were more likely to be larger, have more tenants, and have higher valued equipment in their facilities, but were also more likely to charge rents that were at least as high as the market rate. University and publicly affiliated incubators, on average, charged rents that were below the market rate, and in the case of public incubators also included more services in the basic rent than did their private counterparts. In conjunction with the larger number of tenants, private

facilities tended to have larger administrative staffs than university or publicly sponsored incubators, although the median ratio of business consulting staff to tenant firms was almost identical among the three types.

The types of services provided to tenants in an incubator can be divided into three broad categories: logistical or physical, shared office support, and management consulting. Allen asked the managers of the responding facilities to indicate what services were provided and whether these services were provided by personnel on staff at the facility (on-site) or by individuals brought in from outside organizations. Table 45

Table 44
Facility Operating Characteristics

	Public (N=22)	University (N=9)	Private (N=15)
Median size (square feet)	36,000	57,500	154,000
Median number of tenants	7.8	14	21
Average annual rental fee (square feet)	$2.50	$6.13	$9.10
Median value of equipment	$40,100	$50,000	$70,000
Median number of administrative staff	1.6	1.9	3.5
Median number of business consulting staff	1.4	2.1	2.1
Ratio of business consulting staff to firms (median)	.13	.12	.12
Rent Structure			
No rent paid	13.6%	11.1%	6.7%
Below-market	63.6	55.6	20.0
Market rate	22.7	33.3	60.0
Above-market	---	---	13.4
Fixed Scale	64.7	75.0	66.7
Sliding Scale	23.5	12.5	33.3
Fixed & Sliding	11.8	12.5	---
Rent renegotiation			
Allowed	61.1%	66.7%	76.9%
Not allowed	38.9	33.3	23.1
Payment for renovations to tenant space			
No renovations	---%	---%	7.1%
Tenant pays	31.8	11.1	7.1
Facility pays	4.5	44.4	35.7
Costs Shared	63.7	44.4	50.0

Source: Allen (1985)

summarizes the results for the 15 most frequently provided services in each facility type, including how the service is provided. Private facilities seemed more apt to place great emphasis on the physical/logistical and shared office services, while public facilities offered more business consulting services.

Table 45
Most Frequently Provided Services, by Type of Facility
(With Percent of Facilities Providing Service and Percent Providing Service On-Site)

	Public		University		Private	
	Provide Service	Provide On-Site	Provide Service	Provide On-Site	Provide Service	Provide On-Site
Physical/Logistical Services						
Conference room	77%	73%	78%	78%	100%	100%
Custodial service	77	68	100	78	100	67
Building security	68	59	78	78	73	47
Furniture/equipment rental	--	--	--	--	87	67
Cafeteria/Lunch room	--	--	--	--	87	67
AV equipment	--	--	89	44	67	53
Shared Office Services						
Photocopier	82	73	100	100	87	87
Clerical	77	73	78	78	87	87
Mail Service	64	54.5	89	78	93	93
Word Processing	64	54.5	78	78	87	87
Shipping & Receiving	--	--	--	--	87	87
Receptionist	--	--	78	78	87	87
Business Consulting Services						
Government grants & loans	86	68	78	56	--	--
Business plan preparation	77	55	89	78	87	60
Advertising & Marketing	77	45	--	--	73	40
Relocation plans	77	50	--	--	--	--
Research & Development	68	18	100	67	--	--
Equity & Debt services	68	32	78	44	--	--
Business taxes	68	27	--	--	--	--
Government procurement	64	32	--	--	--	--
Employee relations	64	27	--	--	--	--
Government regulations	64	45	--	--	--	--
Computing	--	--	--	--	73	67
Patent assistance	--	--	78	22	--	--

Source: National Council for Urban Economic Development (1985)

Table 46 reveals that most public, as well as private, incubators are involved to some extent in arrangement of financing for the tenants, although in the case of the publicly sponsored facilities, this typically does not mean direct investment. Recognizing that access to early stage risk capital is one of the most prevalent problems for start-up businesses -- two-thirds of initial capital for the incubator tenants represented here came from personal sources -- many incubators had, by the time of this survey, already begun to raise seed capital funds themselves, or link up with seed capital pools arranged by other community organizations.

Table 46
Arrangements for Tenant Firms' Financing

	Public Percentage Involved	Private Percentage Involved	University Percentage Involved
Arranges Seed or Venture Fund Financing	50.0	66.7	33.3
Arranges Revolving Loan Fund Financing	59.1	46.7	11.1
Involved in Tenant Firm Investment	9.1	40.0	44.4

Source: Allen (1985)

The survey of tenants revealed that photocopying was the most important service in all three types of facilities. In general, shared office services and physical/logistical services were of greater interest to the tenants than business consulting services, except in publicly sponsored facilities. Even though, there was a fairly good match between the types of services tenants desired and the types offered, a noticeable mismatch occurred with accounting services. Allen was surprised at the relatively low marks received by the management assistance services, since lack of managerial

experience is an underlying factor in many business failures, and hence, raising the issue of how best such services might be provided. Since entrepreneurs may be unwilling to admit that they need managerial help, or may be unaware that such help is needed until the problem is near-crisis, incubator managers must be prepared to be pro-active rather than reactive.

Furthermore, the informal interaction among entrepreneurs in an incubator environment may in fact be one of the key forms of assistance. This hypothesis was borne out by the evaluation by tenants of the influence of the incubator on their businesses. Table 47 presents the factors that provided the greatest positive influence, even though more than 90 percent of all tenants indicated that they would have started their businesses even if the incubator had not been available.

Table 47
Influence of Incubator on Firms' Business Operation
(Percentage of Firms Citing Factor a Positive Influence)

Factor	Entire Sample	Public	University	Private
Availability of business services	77%	67%	80%	81%
Interaction with other firms	69	69	67	69.5
Management skills/ knowledge	48.5	54	46	47
Business strategy	43	54	49	35
Market development	39.5	42	40	38
Interaction with university	39	23	92	19.5
Attraction of qualified employees	39	30	75	26
Capital availability	32	48	29	25
	(N=201-208)	(N=50-52)	(N=50-52)	(N=97-105)

Source: Allen (1985)

The economic development potential showed very little variation across facility type. The median number of employees in incubator firms in any type of facility was 2.3 in 1984, about the same as for 1983. Even though firms had grown little in that year, they expected to about double in size during the next year. About 97 percent of firms also anticipated an increase in sales during the next year, with none reporting expected declines. More than 80 percent of the tenants expecting to move out of the facility intended to relocate in the same area. Those who did not expect to move out of the facility were almost exclusively housed in privately operated incubators.

C. Smilor and Gill (1986).

Another major survey was conducted in mid-1985 by Raymond Smilor and Michael Gill. The results of this survey of 50 incubators (from an original sample of 117) were reported in their book The New Business Incubator, Linking Talent, Technology, Capital, and Know-How.

Although not much time had elapsed between this survey and the last, the some types of data requested were quite different. Slightly more than half (54.5%) of the sponsors of the responding incubators were from the private for-profit sector, about 30 percent were sponsored by some form of government (22% local government, 6.5% state, and 1.6% federal), 9.8 percent were from universities, and 5.7 from private nonprofit organizations. and 1.6 percent from the federal government. The majority (60 percent) of incubators were located in urban areas, although they were more common in smaller rather than larger urban areas, and for about 58 percent, the planning phase extended between six and eighteen months. Even though less than 10 percent of these incubators were university sponsored, 81 percent of

them indicated some degree of affiliation with a university: one-third maintained an informal affiliation, 25 percent had formal ties, and another 23 percent indicated other ties, including faculty consultants and entrepreneurs. Furthermore, of those who claimed ties to a university, most were located in close proximity to that university. Only about 18 percent of these facilities were further away than 10 minutes by car.

The reported involvements with and responsibilities to the facilities of the sponsors are summarized in Table 48. For most facilities, the manager and the board of directors or a special selection committee share the responsibility for selecting tenants. Final approval for selection involved the board of directors in 64 percent of the facilities, the manager in 59 percent, and a selection committee in 44 percent.

Table 48
Types of Involvement by Sponsors

Activity	Percent of Sponsors Involved
Financial support	88%
Service as board member	77
Advise tenants	75
Paid full-time staff	38
Equity position in tenants	37
Passive investors in capital pool	32
Paid part-time consultants	27
Service on board of tenant company	21

Source: Smilor and Gill (1986).

The operating and physical characteristics of incubators responding to this survey did not deviate significantly from those reported by Allen, although Smilor and Gill did not report results by incubator type. The majority of incubator facilities were housed in buildings that were not new,

and more than half (64 percent) had 40,000 square feet of space or less. About 40 percent of the facilities had 20,000 square feet or less of actual leasable space, but on average, only 61 percent of space in that size class was leased. Larger facilities had on average even higher vacancy rates. The responding sample was about equally distributed between operations that owned the building and those that leased.

Since most of the chosen sites were not designed to be incubators, renovations were typically required to meet the needs of this purpose. In this survey, approximately 41 percent of the facilities cost over $500,000 to renovate; 37 percent spent between $100,000 and $500,000 for renovation; and 22 percent spent less than $100,000.

About 30 percent of the facilities charged $2 or less per square foot, and more than two-thirds (68 percent) charged $5 or less per square foot. Almost 70 percent of the responding incubators offered flexible lease terms. Two-thirds of the incubators could accommodate twenty firms or less, with the capacity of 31 percent of facilities listed at ten firms or less. On average, almost half (45 percent) of all tenant companies occupied 1000 square feet of space or less; only 18 percent of the firms occupied more than 4000 square feet. More than 90 percent of responding facilities provided office and manufacturing space to tenant companies; more than half (55%) offered laboratory space and 41 percent had warehouse space.

Smilor and Gill reported very little specific data about the methods of financing except to reaffirm that financial support comes from a variety of sources. Since there is no single funding source, most facilities, as illustrated by Table 49, are compelled to put together a financing package from various sources.

Table 49
Sources of Financial Support for Incubators

	Percent of incubators receiving support from given source
Community-related	
Private sources	69 %
City government	63
Local sources	56
Private Industrial councils	38
County government	38
University	37
Chambers of Commerce	33
Industrial Revenue Bonds	7
State-related	
State agency	63 %
Other state authorities	44
State revolving funds	25
Federal aid	
Economic Development Administration (EDA)	60 %
Community Development Block Grant (CDBG)	55
Job Training Partnership Act (JTPA)	39
Urban Development Action Grant	18

Source: Smilor and Gill (1986)

For responding facilities, annual operating expenses in 1985 ranged from $35,000 to over $1 million, with about 40 percent of the incubators in the $50,000 to $100,000 range. Expenditures for overhead accounted for the largest mean and median dollar disbursements. The largest outlays are summarized in Table 50.

The qualitative interpretation of responses obtained concerning objectives, selection criteria, and types of services offered were very similar to those reported by Allen (1985), and so are only briefly summarized. The Smilor and Gill survey asked the managers to indicate the three most important goals of the incubator. The number one priority for 67 percent of respondents was to create jobs; economic development was the

primary objective of 13.3 percent, and 8.9 percent wanted to make a profit. When the top three choices were ranked collectively, 81 percent listed job creation as one of their top three priorities, while 69 percent reported general economic development objectives, and 47 percent ranked the promotion and development of entrepreneurship.

Table 50
Characterization of Operating Expenses of Responding Incubators

Expense	Average Annual	Median	Range
Overhead	$43,800	$25,000	$ 0 - 1 million+
Maintenance	27,900	10,300	1,000 - 173,000
Rent/lease of incubator building	24,900	11,500	0 - 100,000+
Building/grounds maintenance	18,400	7,500	0 - 100,000+
Equipment purchases	16,400	5,000	1,000 - 100,000+
Consultants	14,400	14,500	0 - 35,000
Other	12,500	4,000	1,000 - 100,000+
Marketing	8,100	2,100	1,000 - 100,000+
Travel expenses	4,500	2,500	0 - 26,000
Production	2,700	1,000	not reported
Publication	2,600	1,800	1,000 - 8,000
Annual operating budget	(not reported)	110,000*	35,000 - 1 million+
Employee compensation	(not reported)	45,000	12,000 - 922,000
Executive salaries#		29,000**	2,000 - 100,000+
Administrative salaries			0 - 99,000+
Support salaries			1,000 - 30,000

* 40 percent of respondents reported having annual operating budgets between $50,000 and $100,000.

** 48 percent of respondents allocated $25,000 - $50,000 in executive salaries; 38 percent provided less than $25,000; and 14 percent provided in excess of $50,000.

For just the incubator managers, 13.6 percent earn less than 20,000 per year; 40.9 percent make $20,000 to $29,000; 18.2 percent earn $30,000 to $39,000; 13.7 percent make $40,000 to $69,000; and 13.6 percent make $70,000 or more per year.

Source: Smilor and Gill (1986)

Incubator directors also reported having clear preferences for the types of firms that they wanted to attract to their facility. More than 40

percent of all respondents listed both light manufacturing and high-technology businesses as most desirable. Technology-oriented firms ranked in the top three choices by more than 85 percent, while light manufacturing enterprises were among the top choices of 80 percent of managers. Smilor and Gill interpreted this to mean that incubator sponsors had linked their objectives of job creation, and economic and entrepreneurship development with these types of businesses. The attempts to turn these goals into reality are also reflected in the criteria for tenant selection: 80 percent looked for businesses that would create jobs, 60 percent required companies that paid their own operating expenses, 50 percent required a written business plan, and 35 percent each required that firms fill a unique niche in the community and that the enterprise be a start-up.

Respondents also provided data about the tenants that currently occupied their facility, an overwhelming majority (96 percent) of which had been tenants for less than two years. The employment statistics are almost identical with those reported by Allen's (1985) survey. Of 211 firms represented in this survey, about 42 percent employed one or two individuals, 22.3 percent had 3 to 5 employees, and another 15.6 percent had 6 to 10 workers. Only slightly more than one percent employed more than 50 people. Data on annual sales was also provided for 42 firms. The majority of these firms had sales less than $200,000.

Table 51 provides a summary of the services provided in the responding incubator facilities, and an evaluation by the managers of the usefulness of the services. The highest marks were received by the business consulting services offered to the enterprises.

Table 51
Services Provided by Incubators

Service	Percent of Facilities Providing Service	% of Facility Managers Indicating Service Was Most Important to Tenants
General Office		
Word Processing	90.7%	38.4%
Typing	88.9	32.5
Photocopying	86.7	57.5
Receptionist	79.1	57.1
Clerical	72.1	25.0
Filing	45.0	7.4
Administrative		
Mailing	70.7	27.6
Accounting	61.5	25.9
Equipment rental	56.3	29.2
Billing	53.7	15.4
Contract Administration	50.0	18.2
Health Insurance	33.3	13.6
Consulting Services		
Business Planning	(not reported)	62.5
General Counseling	93.0	51.4
Marketing	86.0	61.6
Loan Packaging	79.5	50.0
Accounting	75.0	60.6
Managerial	(not reported)	60.6
Evaluating Financial Options	(not reported)	57.5
Access to Grants & Loans	(not reported)	55.6
Legal	66.7	40.7
Venture Capital Contacts	61.8	50.0
Financial Contacts	59.5	(not reported)
Tax Planning	(not reported)	32.3
Other		
Security	90.7	55.5
Conference Room	90.7	45.9
Other (parking, etc.)	85.7	62.5
Computers	75.0	53.2
Library	72.1	32.3
Loading Docks	60.5	47.1
Laboratory	41.7	32.3
Exhibition Space	33.3	12.5
Day Care	7.9	5.6

Source: Smilor and Gill (1986)

D. Allen and Dougherty (1987).

David Allen was involved with another, more recent survey of incubators which was conducted in order to examine the "state-of-the-industry" practices and trends. In 1987, he and Mary Ann Dougherty designed a questionnaire to be mailed to the 180 identified incubators. The usable sample of 127 respondents comprised the largest yet assembled for analysis.

Allen and Dougherty asked respondents to identify the type of organization that (1) owned the building in which the incubator was housed, and that (2) sponsored/managed the facility. About 42 percent of the facilities were owned and managed by nonprofit entities. Another 25 percent of all facilities were owned and managed by for-profit organizations, while those owned and operated by academic institutions constituted another 15 percent. The remaining 18 percent of the incubators were classified as hybrids 6 percent identified themselves as explicit public/private partnerships for both ownership and management, and 12 percent were implicit partnerships whose ownership and management characteristics did not overlap. The mean age for these facilities was about 2.5 years old (30 months), with half less than 21.5 months old. On average, only about 15 percent of leasable space was actually occupied on opening day -- one-quarter of the incubators had no tenants on opening day, compared to only four of the facilities that were pre-leased to capacity. About 50 percent of the facilities were half full after one year, and after four years, about half achieved 90 percent occupancy.

The median square footage of these facilities was 35,800, but a few very large facilities brought the mean size up to about 86,420 square feet. However, regardless of gross size, on average close to 75 percent was

leasable tenant space. The remaining area was comprised of common area (11%), shared office support services (8%), and management assistance offices (7%).

The average number of tenants in the responding incubators was 20, but the median was only 10. Even though the respondents indicated that many types of businesses were eligible for admission to tenancy, high value added firms, like advanced technology, research and development, and light manufacturing, were desirable to almost all facilities. As indicated in Table 52, compared to Allen's 1985 survey, there was indeed a decreased tendency to accept retail and heavy manufacturing establishments.

Table 52
Acceptable Business Types for Tenancy
(N=127)

Type of Business	Percent of Facilities Accepting
Commercialized Advanced Tech Products	92.1%
Research and Development	90.6
Light Manufacturing	83.5
Service-oriented	76.4
Mail Order	46.5
Wholesale	44.1
Non-Profit Organizations	44.1
Heavy Manufacturing	21.3
Retail	15.7

Note: The responses to each item are independent.

Source: Allen and Dougherty (1987)

About half (53%) of the facilities had an explicit exit policy, with most using length of tenancy as a criterion for graduation, although space constraints were also a factor in more than half of these policies. Fewer facilities made exit decisions based on job creation and business profits. Another 21 percent of the incubators used an implicit exit policy, primarily in the form of graduated rents, to encourage tenants to relocate. Just as

with Allen's previous survey, slightly more than one-fourth (26%) of the facilities did not indicate having any type of exit policy, many of which were presumably young facilities.

Allen and Dougherty concluded that there is "no single optimal package of services or assistance" that works for every facility, since such arrangements generally do and should depend on the needs of the tenants (e.g. service firms tend to be more paper intensive, and consequently use more shared services than do manufacturing firms) and the management's ability to leverage providers, in part, a function of the networks that existed in the community prior to the incubator. The types of shared support services that respondents indicated were available in their facilities, including the general payment structure, are reported in Table 53. The most frequently provided service of this type was photocopying (97%), although most facilities also offered a conference room (94%), security (88%), word processing (84%), and receptionist (84%). Photocopying and word processing were usually offered on a "per-use" basis, while the conference room, security, receptionist, and business library were typically included in the basic rent. Not surprisingly, the managers also reported that photocopying, reception, and conference areas were the most frequently utilized services.

Data on the availability of business development services were also requested (see Table 54). Accounting, marketing, and business planning services were offered (in that order) by more than 90 percent of the facilities and used more often (in reverse order) than any other service. Since access to this type of services is a feature that distinguishes

incubators from other multi-tenant space, the external networks that provide much of the assistance are clearly crucial to the success of the facility.

Table 53
Provision of Shared Support Services
(N=127)

	Provided through the Incubator		Not Provided
	Include in Rent	Some Add. Cost*	
Photocopies	11.8%	84.2%	3.9%
Office equipment/ furniture	33.1	41.7	25.2
Conference Room	74.8	18.8	6.3
Receptionist	69.3	14.1	16.5
Computer Facilities	26.0	52.0	22.0
Word Processing/ typing	15.7	68.5	15.7
Security	79.5	8.6	11.8
Business Library	65.4	7.1	27.6
Additional Storage	20.5	58.3	21.3

*Typically, "paid as used," or less frequently, cost shared by tenant and incubator.
Source: Allen and Dougherty (1987)

Table 54
Availability of Business Development Assistance
(N=127)

	Available Through the Incubator		
	In-House	External Network	Not Available
Accounting	22.0%	70.1%	7.9%
Marketing	34.6	57.5	7.9
Business Plans	57.5	37.8	4.7
Computer Training	31.5	47.2	21.3
Legal Service	4.7	73.2	22.0
Government Procurement	30.7	50.4	18.9
Government Grants & Loans	37.0	50.4	12.6
Business Taxes	12.6	60.6	26.8
Equity & Debt Financing	19.7	64.6	15.7
Patent Assistance	8.7	66.1	25.2
Research & Development	14.2	55.1	30.7
International Trade	11.0	57.5	31.5

Source: Allen and Dougherty (1987)

Not included as a service available through the incubator was managerial consulting, although Smilor and Gill reported that this was a very important

service to tenants. The information provided by respondents about the financial arrangements for procuring these professional services is summarized in Table 55. Many professional services were either provided at reduced rates or were donated.

Table 55
Provision for Business Development Assistance
(N=127)

Type of Arrangement	Percent of Facilities Using
Professional charges reduced fees	54.8%
Professional donates services	53.2
Tenant provides total reinvestment	43.7
Professional charges full services	24.6
Tenant and incubator divide cost	11.9
Incubator provides total	10.3

Note: The responses to each item are independent; more than one arrangement may apply in any given facility.

Source: Allen and Dougherty (1987)

This survey also followed up Allen's earlier examination of the abilities of these facilities to attract the appropriate potential tenants. The respondents rated several mechanisms through which their tenants might have discovered the incubator. The highest rating was earned by informal external networks, followed by referrals from affiliated agencies, referrals from current tenants, and public speaking. Conventional advertising sources did not seem effective. Similarly, individual contacts and networking, followed by public speaking, mass media coverage, and brochures/pamphlets were much more effective methods through which to generate support than were radio and television advertising. Without question, the time- and people-intensive methods were most productive.

The quantifiable implications for economic development - largely firm graduation and job creation - were heavily skewed by a few graduates who had generated hundreds of jobs. Half of the facilities reported having had no

graduates yet, but the average for the sample was 7. Allen and Dougherty reported that graduates had created an average of 142 jobs per facility, but the median was only 4.5. Similarly, the average number of jobs per facility for current occupants was 169 (or 8.5 per firm), but the median was only 52. Even though the "incubator industry" was two years older at the time of this survey than during Allen's first study, the industry is still too young and has recently grown too fast to generate any generalizable findings.

E. University of California, Riverside (1988).

The last survey discussed in this section was conducted in conjunction with an incubator feasibility study/strategic plan for the county of Riverside in California. Questionnaires were mailed to 215 incubators nationwide, and 100 were returned with usable responses. About 96 percent of the responding facilities had been opened since 1980, and 75 percent had been formed since 1985, again underscoring the youthfulness of the incubator industry. Slightly more than one-third (35 percent) of these facilities were private, 20 percent were university-affiliated, and 22 percent were publicly sponsored. The remaining 23 percent were sponsored by some combination of organizations. About 78 percent of the operations had either an executive or advisory board, which averaged approximately 6 or 7 members, and met 5 to 7 times a year. However, there was no apparent significance between the presence of a board and any other factor studied.

The average facility occupied 47,604 square feet, although the spaces ranged from 2000 to 235,000 square feet. Since the median size reported was 30,000 square feet, and three-quarters of the responding facilities reported less than 50,000 square feet, the results were clearly skewed by the

presence in the sample of several very large facilities. The vacancies ranged from 0 to 111,172 square feet, with an average of 12,816 and a median of 5000 square feet. This result is consistent with previous research indicating that it can take up to four years to fill the facility to 85-90 percent capacity. Despite these reported variations in size, age, and types of incubator represented, the researchers did not find any significance between these factors and any other variables in the analysis.

As indicated in Table 56 the types of firms most commonly found in the responding incubators were light manufacturing or assembly, professional, and research and development establishments. However, according to additional information provided by BRB, the apparent prevalence of professional service firms in the incubators is deceptive since this type of establishment was heavily concentrated in several facilities. For comparison, only 22 of the responding incubators did not have any light manufacturing tenants, while 37 did not have any professional firms.

Table 56
Types of Firms in Business Incubators

Type of Establishment	Percent of Tenants
Light manufacturing	27.5%
Professional	25.4
Research and Development	15.8
Retail trade	8.4
Wholesale trade	4.9
Government	3.5
Heavy manufacturing	1.6
Other	12.8

Source: Business Research Bureau, University of California, Riverside (1988)

Only one-quarter of the incubators operated in newly-constructed space, with the remainder occupying structures that had to be adapted for the intended purpose. About 40 percent of the facilities had required major renovations to be suitable. Approximately 25 percent of the buildings were leased, while 40 percent had been purchased by the sponsoring organization, and another one-quarter were attained by a combination of methods. The financing arrangements used to acquire the physical structures varied widely, and are summarized in Table 57. Private financing, the largest single category, accounted for slightly more than one-fifth of the buildings.

Table 57
Financing Sources for Acquisition of Incubator Facility

Source	Percent of facilities acquired
Private financing	20.5%
Local financing	14.6
Community Development Block Grants	12.3
Bank financing	12.3
Economic Development Association	9.9
Venture financing	1.8
SBA	1.8
Miscellaneous	26.9

Source: Business Research Bureau, University of California, Riverside (1988)

The majority of managers (72 percent) reported charging rents that were below the market rate; about 21 percent charged rates comparable to the market rate, and only 7 percent charged rental rates that were above the market value. The ability of most of these facilities to charge rates less than the market rate was, at least in part, a reflection of the early trend

for incubators to be established in older, less expensive buildings that did not require large mortgage payments.

The predominant lease was an annual agreement, which had been implemented by about half of the facilities. A small portion -- only 14 percent -- of the incubators used monthly leases, and the remainder used leases ranging in term from several months to several years. Almost two-thirds of these incubators had an explicit exit policy which was based on length of occupancy. The average of these was 3.1 years, with a median of 3 years.

The operating revenues for these facilities, as summarized in Table 58, also came from a variety of sources. By far the largest component, accounting for 68.3 percent of revenues, was tenant rent.

Table 58
Operating Funds for Incubators

Source	Percent of Operating Budget
Tenant rent	68.3%
State funds	11.5
Local funds	5.6
Private funds	4.8
Federal funds	4.2
University support	2.9
Other	2.7

Source: Business Research Bureau, University of California, Riverside (1988)

Table 59 indicates most of the facilities provided access to business consulting services in addition to the variety of administrative and office support services. More than half of the incubators reported providing the consulting services on-site on a full-time basis.

Table 59
Services Offered to Tenants by Incubators

	Percent of Facilities providing
Business Consulting Services	
Business planning	86%
Assistance acquiring financing	80
Marketing	76
Production assistance	44
Other	36
Administrative Services	
Photocopier	90
Conference Room	89
Receptionist	82
Custodial	81
Building security	80
Clerical	73
Answering service	68
Word processing	68
Computing	64
Shipping/receiving	57
Library	56
Telephone equipment	51
Telex	35
Government loan assistance	34
Accounting	33
Cafeteria	30
Advertising/marketing	28
Legal	16
Other	14

Source: Bureau of Business Research, University of California, Riverside, (1988)

Most incubators also reported making referrals for services outside the incubator. More than half of the facilities referred clients to the SBA, to local universities, or to government agencies for help, while only 7 percent did not report referring their tenants to other agencies for assistance.

E. Summary

This section of the report was intended to provide background information about the development process of an incubator through the

experiences of existing facilities. Even though each facility must be conceptualized individually - as a response to the needs of the environment in which it will operate and as a complement to existing resources - there are some basic features and some considerations which are general to all facilities. This is due, in part, to the fact that regardless of motivation, all incubators are in the business of nurturing fledgling young firms into healthy businesses.

The objectives embodied in an incubator are a reflection of the sponsoring organization; however, if the incubator is successful, the local economy should receive long-term benefits, through job creation, diversification, increased tax base, etc. Even though respondents indicated that many types of businesses were eligible for admission, high value added firms, like technology-oriented, research and development, and light manufacturing establishments, were desirable to almost all facilities. Over time, there appears to have been a decreased tendency to accept retail and heavy manufacturing companies, although for-profit facilities and those that operated in very distressed areas provided exceptions to that generalization.

The basic set of services provided through the incubator is fairly standard, even though for-profit facilities tended to be more equipment-oriented and less business support-oriented. However, the surveys can only measure availability of services, not the quality. If a value-added approach is taken as an operating principle, then the quality of business and professional support services is a crucial element in the process. Since most facilities do not have the resources to maintain large full-time consulting staffs, the incubator must be linked into external networks that

can help provide these services to its clients. Strong community support and involvement is also essential to the long-term development of the facility itself, since it is also a fledgling enterprise whose success depends on the success of its tenants.

Most facilities have received financial support from a variety of sources. Even though many non-profit facilities rely on rent as a major source of operating revenue, this adds another element of vulnerability to the facility. An important aspect of the incubator concept is to maintain a relatively low rent structure so that the overhead for the tenants is manageable. This means that increasing rents may not be an acceptable method to raise additional revenue. Furthermore, dependence on rent increases the pressure to keep the facility, with a minimum threshold of 30,000 or more square feet, at full-occupancy, even if this means deviation from the desired admission standards. Experience suggests that rent will not be sufficient to meet all obligations, at least for several years. Several facilities in this position take an equity option in tenant companies in exchange for the value-added services performed in the incubator. This approach should eventually provide additional capital for the facility, but the benefits will not be reaped immediately.

There appears to be an increased tendency among existing facilities to be linked with some specific risk capital pool, sponsored either internally or externally (or both). Since accessing such capital is a major problem for most start-up firms, this trend is a natural extension of the incubator philosophy.

Given the diversity of circumstances, resource environments, and motivations in which incubators have been developed, it is not surprising

that there is no blueprint or formula for success. However, based on observations from surveys such as those presented in this section, researchers have been able to discern some characteristics that can be associated with successful facilities. These criteria, and the propensity for a Johnson County incubator to fulfill them, are discussed in the next section.

V. CRITICAL FACTORS FOR SUCCESS

Smilor and Gill (1986) identified ten key ideas and practices from their research which they designated as critical to the development of small business incubators. They noted that even though not all successful incubators incorporate every one of these characteristics, there seem to be direct correlations between "successful incubator development and the extent to which each of these factors is consciously implemented by most incubator managements."[1] In this section of the study, each of the ten characteristics will be identified, and the potential for a Johnson County incubator to incorporate them will be discussed. It is important to note however, that to develop an effective incubator and to build successful companies, requires not only the appropriate resources, but also an understanding of the entrepreneurial process.

The entrepreneurial process has been described as consisting of the following four elements: (i) the talent (the entrepreneurs); (ii) the technology or innovative ideas; (iii) the capital resources to finance the venture; and (iv) the know-how, both business and technical, to make the enterprise viable.[2] Since the small business incubator, particularly one with economic development objectives, seeks to be the integrating link among these four components, the facility characteristics associated with success generally involve the provision of services and a support structure designed to complement the natural talents of the entrepreneurs in the community.

Quality management and technical services are expensive, so the incubator manager must be proficient at leveraging resources to assist

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[1]Smilor and Gill, p.23.

[2]Smilor and Gill, p.13.

their tenants and add value to their tenants' companies. Consequently, one of the most crucial aspects of the incubator development process, both for the facility and for its potential tenants, is the role played by the enterprise support network. This network is comprised of individuals and organizations in the community that provide assistance to entrepreneurs during the early stages of development of their businesses. In many cases, due to its visibility, the incubator becomes the centerpiece of such a network, and thus serves the entire business community, in addition to its own clients, by heightening the awareness of entrepreneurial activities in the area, by helping to direct the network's functions, and by making appropriate professional referrals. Serving as the focal point of entrepreneurial activity in the community also benefits the facility in that contacts made through the network may result in the location of highly desirable prospective clients.

The significance of this network has been recognized in the literature and was emphasized by virtually all of the incubator managers interviewed by the Institute. Consequently, it should not be surprising that in the discussion below, the degree to which the incubator is able to implement many of the factors for success often depends on the strength of this entrepreneurial network.

A. On-Site Business Expertise

There is a significant body of evidence which suggests that entrepreneurs often have the ideas, skill, and even the financial resources required to start a new business, but lack the business know-how to convert those resources into a viable enterprise. The results of the survey of

advanced technology firms in Johnson County conducted for this study also confirmed this hypothesis. These firms indicated that the types of assistance that would have been the most beneficial to them as they started-up were business consulting services, including advertising and promotion assistance, market research and planning assistance, financial planning and management assistance, assistance with the preparation and use of a business plan, and general assistance with "starting a business." These services are also the ones that incubator managers in another survey ranked as most important to their clients' businesses,[3] and fortunately, there is evidence which suggests that when provided, this assistance is effective.

Marketing is crucial to any new company as it struggles to establish credibility and to differentiate its product in the marketplace. Experts have pointed out, however, that the marketing function in an incubator targeted toward technology-oriented firms (as has been proposed by the Advisory Board for the Johnson County incubator) may be especially important since:

- there may be reluctance to buy early-generation technologies;
- there may be uncertainty about the selection of the best initial market where there is potential for several applications;
- there may be special difficulties forecasting market demand for innovative products for which buyers have little perspective
- it may be necessary to educate potential customers.[4]

Equally important to the future of any emerging firm is the manner in which it manages its resources - human, financial, and technological - and

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[3]Smilor and Gill, p.73. For a summary of their results, see Table 51, Section IV of this report.

[4]Smilor and Gill, p.25.

the foresight incorporated in its business plan. These factors will determine the firm's ability to respond to an ever-changing marketplace.

The literature on strategic planning has generally demonstrated that a positive relationship exists between planning and business performance. A recent article in the American Journal of Small Business studied the role of incubators in small business planning. Data was collected from the managers of 76 incubators, 93 percent of which offered planning oriented services to tenants, regarding the planning behavior of their tenants, and compared to information about 25 clients of a Small Business Development Center (SBDC). The results, summarized in Table 60, indicate that, with the exception of information gathering, incubator tenants were more actively involved than non-tenants. This suggests that incubators are, in fact, successful in encouraging a higher degree of strategic business planning.[5]

Table 60
Planning among Incubator Tenants and Non-Tenant Businesses

Characteristic or Activity	Mean Tenant percentage	Non-tenant percentage
Have a written mission statement	53%	42%
Have a written short-run operational plan	48	25
Have a written strategic or long run plan	39	29
Have financial plans for past or future financing	60	33
Have written budgets	61	46
Meet monthly or quarterly for planning purposes	49	21
Use spreadsheets for forecasting or budgeting	37	13
Read business information and government reports	60	75
Utilize incubator services (SBDC services) for planning	51	38

Source: Fred L. Fry, "The Role of Incubators in Small Business Planning", American Journal of Small Business, Summer 1987, p.56.

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[5]However, the author also suggested that these facilities should take an even greater role to ensure that the tenants themselves learn how to develop strategic plans.

The provision of business expertise is a vital element in the process of nurturing young businesses, regardless of the structure of the facility itself. Smilor and Gill suggested that such expertise could be leveraged into tenant firms through any or all of the following: (i) the director of the facility; (ii) the board of directors; (iii) an advisory council; (iv) a consultant network. The increasing use of consultant networks has been instrumental in the ability of incubators to offer more sophisticated business services to their tenants.

An incubator located in Johnson County should have great potential for leveraging essential, quality consulting services,and should regard itself as a focal point for resources available to business start-ups in the community. The manager of the incubator may devote a great deal of time developing additional such relationships, but some of the obvious existing strengths in Johnson County include:

> The membership of the already-formed advisory board encompasses key professionals in the community with a rich mix of expertise and business experience.
>
> Most major accounting and law firms actually have offices located in Johnson County. Evidence suggests that many of these firms recognize the potential of incubators, particularly those emphasizing advanced technology products and services, as an important source for prospective clients, and are therefore willing to provide their services at reduced rates or pro bono.[6]
>
> The Kansas City chapter of SCORE/ACE (Service Corps of Retired Executives/Active Corps of Executives) is active. Volunteers from this organization provide free counseling on most types of business problems and objectives.
>
> Johnson County Certified Development Corporation (CDC) is a local development organization which has been certified by the Small Business Administration to administer the 503/504 Loan Program.

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[6]Robinson, Anthony, 1988, p.10.

Johnson County Community College already has an operational SBDC office as well as the Business and Industry Institute. Additional support could come from the campuses of the University of Kansas, including the main campus, the Medical Center, and the Regents' Center.

Silicon Prairie Technology Association was organized in 1986 to encourage the growth of advanced technology industry in the Kansas City Region.

County Economic Research Institute (CERI) provides economic research and strategic planning support to Johnson County organizations.

The presence of the Center for Business Innovation (CBI) has already generated an awareness of the incubator concept, and has laid many of the necessary network foundations.

The literature, as well as the interviews with incubator managers conducted by the Institute, suggest that the importance of establishing strong, dynamic relationships with these and other organizations cannot be over-emphasized. And even though the development of these networks is certain to be a time-consuming and people-intensive process, all of the facilities contacted had been successful with their efforts. Given the nature of the Johnson County economy, it should be expected that providers would be particularly receptive to this opportunity.

B. Access to Financing and Capitalization

Capital provides the financial resources necessary for the entrepreneur's ideas to be realized. However, as documented in the survey of Johnson County firms, capital, "the lifeblood of emerging companies," can also be quite difficult to obtain, particularly for young establishments.[7] The complex financial market offers a wide variety of alternatives to be

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[7]Smilor and Gill, p.26. The term capital includes "working-capital financing and equity and debt capitalization."

identified and evaluated for each stage of development, sponsored by an equally wide variety of organizations, including commercial and investment banks, the Small Business Administration, research and development partnerships, and private investors. Most entrepreneurs are inexperienced with this market, and therefore need assistance in understanding their options, determining the best available financial package, and then assembling the necessary documentation to acquire the funds. Therefore, it seems essential that the management team of an incubator be connected, either directly or indirectly, to funding sources.

Start-up companies have often had to finance their early development through personal loans or government grants because seed capital has been very difficult to generate.[8] Recognizing that reliance on commercial banks, the federal Small Business Innovation Research (SBIR) Program, SBA loans, and "angels" in the community is not always enough, many incubators have moved toward the establishment of their own seed capital funds or have been instrumental in promoting the establishment of community-wide funds.[9] Additionally, Smilor and Gill reported that most incubator directors considered providing their tenants with introductions to the venture capital industry an important activity, even though most venture capital organizations do not make seed-capital investments and are not interested in enterprises until they have demonstrated market and management competence.

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[8]In fact, David Allen in 1985 found that more than two-thirds of initial capital for the tenant companies represented in his survey had come from personal sources.

[9]Only ten states have a seed capital fund according to State Technology Programs in the United States, 1988, Minnesota Department of Trade and Economic Development, Office of Science and Technology, p.4.

Since almost ninety percent of the community leaders interviewed expressed the importance of developing an advanced technology or R&D center in the community as an important goal for a Johnson County incubator, particular attention was addressed to the resources available to new businesses in that category.[10] The State of Kansas has recently committed many resources specifically designed to foster innovation and to stimulate the commercialization of new technology as part of a broad-based economic development strategy.[11] This commitment strengthens the position of emerging innovative or technology-oriented Kansas firms because it includes legislation which provides funding for every stage of development. Kansas Technology Enterprise Corporation (KTEC) is a quasi public, not-for-profit corporation that provides a series of programs designed to develop and promote technology in Kansas from concept to commercialization. The supported programs include:[12]

(1) **an applied research matching grant fund:** This fund was designed to encourage collaboration in applied research between universities and industry in Kansas.

(2) **a Small Business Innovation Research (SBIR) matching grant program:** The federal SBIR program was designed to strengthen the link between small, innovative firms and federal research and development. The program consists of 3 phases of funding, all of which are highly competitive and are oriented toward projects that exhibit commercial potential. Phase I federal awards are

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[10]There is also the Kansas Small Business Fund which is designed to provide financial incentives to new and expanding Kansas small businesses that may not be able to afford conventional financing rates.

[11]The Kansas economic development network includes KTEC, Kansas Inc., Kansas Venture Capital, Inc., Kansas Department of Commerce, Certified Development Companies, Kansas Small Business Development Centers, and Kansas Development Finance Authority.

[12]Kansas Technology Enterprise Corporation, Business Plan, February, 1988, pp 2-16. KTEC also has other major programs, including the Centers of Excellence and the Technology Transfer and Technical Referral Service.

typically for up to $50,000 and support up to six months of research to determine the feasibility of the project. Phase II federal awards are up to $500,000 to be used for product development. KTEC's matching grant program is designed to aid Kansas firms in obtaining Phase I awards, and to aid in preparation of Phase II awards. Phase III requires investment by the private sector.

(3) **a seed capital fund:** This financial assistance is designed to provide a flexible, alternative source of financing for start-up companies, involving licensing, royalty, or equity arrangements. This program includes those companies that need capital for product development, those that have developed the technology to the prototype stage, but still require additional development (field trials, test marketing, etc.) and those that have exhausted initial funds on product development but need support for manufacturing and sales. (Companies needing funding for later stages of development are referred to venture capital organizations.) The fund currently has $1.56 million, all from the lottery, and is designed to fund 5-6 projects per year. The current goal for the fund is to have $5-$15 million by the end of 1989. Each funded project can receive a maximum of 10 percent of the pool.[13]

(4) **a research equipment grant and special project fund:** This program is designed to fund proposals that have economic development potential, but are not addressed by any other specific KTEC program.

The latter three sources of funding would be of particular interest to potential clients of an incubator in Johnson County, although each program is competitive and is intended for technologically innovative firms throughout the state. The specific guidelines can be obtained from KTEC.

The state also sponsors funds for later stages of development of small businesses in Kansas. Kansas Venture Capital, Inc. is designed as a partnership between the State and private financial institutions to create a statewide risk capital system to invest in technically feasible projects. This organization is also a Small Business Investment Company (SBIC) licensed by the SBA.

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[13]Conversation with Vice President for Administration, KTEC.

A recent survey was conducted by the Greater Kansas City Chamber of Commerce to assess the state of venture capital funding for small businesses in the Kansas City area.[14] The Finance Committee of the Chamber identified 27 venture capital organizations which regularly review requests for funding by individuals and businesses in exchange for equity positions in the enterprise. Nineteen of these firms, including Kansas Venture Capital, Inc. and the State of Kansas seed capital fund, completed the survey, while the remaining six firms indicated only that they did not have funds available for seed or start-up capital needs. Of the locally based organizations identified, the following types were represented: 9 venture firms, 4 private investors, 4 SBICs, 2 divisions of corporations, 4 investment bankers, and 3 representatives of investors. There was a limited response rate regarding the amount of capital under management; however, from the information that was reported, the conclusion was drawn that there exists in excess of $500 million from locally based firms and that approximately $400 million of that has been invested currently. All respondents expressed willingness to invest in firms in the metropolitan area, and none excluded businesses in the Kansas portion of the area.

These organizations expressed a distinct preference for the types of firms in which they are interested. The industries or categories - all of which show commercial potential - indicated to be most attractive included: electronics, high technology enterprises, environmental enterprises, telecommunications, computer software, manufacturing, health care, and chemicals.

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[14]Chamber of Commerce of Greater Kansas City, Financing Committee of the Metropolitan Entrepreneurs' Council, Venture Capital Sources in the Kansas City Area, December 1988.

The survey confirmed that the availability of funds for early stages of development of new businesses is very limited. There were four seed capital firms and six start-up venture firms identified, all of which had been formed since 1984.[15] The total capital available was reported to be approximately $12 million. This survey did not include any data about the amount of risk capital invested by the so-called "informal investor networks." Some seed capital experts have estimated that funds from these sources equal or exceed those of the formal venture capital industry, so access to this type of network, to the extent that it exists in Kansas City, would also be essential.[16] Relevant to this issue is the fact that the Center for Business Innovation in Kansas City, Missouri has recently launched a campaign to assemble a local seed capital fund for the exclusive use of its tenants and clients. According to their proposal:

> The Center has sought financing for its tenant companies by working with private investors willing to invest between $5,000 and $50,000 in high risk, high potential start-up companies. This has been a difficult, time consuming, and often frustrating task which becomes more difficult as available resources are committed. The time needed to assemble as many as twenty investors for investment in a single business is extremely long, and the supply of investors willing to assume the required risk is limited. As a result, start-up businesses will often see their progress held up for six months to a year due to inadequate financing. Many promising businesses simply never start up because they do not have timely access to a source of seed capital. Kansas City cannot afford to lose these businesses.[17]

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[15]For the purposes of this survey, seed capital was defined to be intended for firms with no current operation or prototype and no feasibility study prepared. Start-up capital was taken to be funds for building prototype, testing, test marketing, or expanding to profitability.

[16]National Council for Urban Economic Development, Creating Jobs by Creating New Businesses, The Role of Business Incubators, November 1985, p.38.

[17]Funding Proposal, Mid-Continent Capital Trust, pp 2-3.

Even given that the State of Kansas offers more support for the early development of high-growth, technology-oriented enterprises than does Missouri, the available funds may still not be sufficient for firms in a Johnson County incubator.

The success of a potential incubator in Johnson County will inevitably be linked to the ability of the promising tenants it houses to attract financial resources. Consequently, the questions of whether to attempt to raise seed capital funds from local investors exclusively for incubator tenants or to try to link up with a community-organized seed capital pool will have to be addressed.

C. In-Kind Financial Support

Most business start-ups require some degree of office support services, including clerical, administrative, and facilities support. However, their needs and their resources are not sufficient to justify the costs of hiring their own staffs. This divisibility problem is solved in an incubator because a mechanism is provided by which the tenants "share" the cost of overhead items such as receptionists, utilities, photocopying, computer or database services, word processing, general typing, janitorial services, security, conference room, and equipment rental.[18] Smilor and Gill regard this in-kind service support of the incubator to be a form of seed-capital financing. The tenant companies may pay for the provision of these services on an as-used basis, by trading an equity share of their business, by paying a competitive or below-competitive rent which includes some or all of these

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[18]Several of the surveys discussed in section IV gathered data about the types of services typically offered, as well as those that clients felt were most useful.

additional services, or by providing services for other companies located in the incubator.

As indicated by the incubator surveys discussed in the previous section, a set of these services is available in virtually every facility. Although the management of the incubator would need to make decisions regarding the composition of services to be offered, as well as the purchasing arrangements, this should not be an obstacle for an incubator in Johnson County.

D. Community Support

The available evidence suggests fairly strongly that broad-based community support - both local government and private sector - is a key ingredient to the sustained development of an incubator. The support may take a variety of forms, including direct financial or consulting assistance, or assistance with promotion of the facility and public relations, and may come from a variety of sources, including private individuals, city and county governments, chambers of commerce, universities and community colleges, and industrial councils. There are incentives for communities to be positively and actively involved in incubator efforts since all facilities, regardless of sponsorship, have the objective of nurturing small businesses and promoting entrepreneurial activity, and many reflect related community economic development goals such as job creation and diversification. By understanding the dynamics of the entrepreneurial process, incubators are typically able to utilize the resources available in the community more effectively to help develop a tenant company than could that enterprise operating on its own, and by operating from a physical

facility, the incubator heightens the awareness of entrepreneurial activities in the community. Furthermore, by serving as the focal point for the enterprise support network, the incubator also serves entrepreneurs not located in the facility by coordinating the services and through referrals. There is a need for this in the County since several of the community leaders were aware of resources currently available in the community that were not being widely utilized, including the Johnson County Community College SBDC and the Business and Industry Institute, and the Certified Development Corporation and SCORE.

Interviews conducted for this project with several Johnson County community leaders representing many different perspectives suggested that there would indeed be strong support for an incubator in the county. This group overwhelmingly expressed the opinion that an incubator would fill an important need in the county, and would complement the economic development programs already implemented. Because of their active involvements in community affairs, those questioned were aware of the presence in the metropolitan area of the Center for Business Innovation, an incubator affiliated with the University of Missouri - Kansas City, and most felt that, although it is still in the maturing stage, it is a successful operation.

Most of these individuals were fairly satisfied with the progress that had occurred in Johnson County as a result of economic development efforts; however, they were much less satisfied with the progress achieved by the entire metropolitan area. Several areas for improvement were mentioned, among the most often suggested were the need to enhance the entrepreneurial climate, to diversify the economic base, and to encourage bi-state

cooperation. They also felt that an additional incubator in the metro area would fulfill an important need, and would fit in well with Kansas City area efforts for economic development. Even though there was concern that two incubators in the area might duplicate efforts, and that there might be potential resistance based on that, they still felt that such an effort would be supported by the metro community.[19]

E. The Entrepreneurial Network

This criterion for success underscores ideas that have already been presented - namely, the vital importance of mutually beneficial enterprise support networks available for access by any entrepreneur, whether located in an incubator or not. As summarized in Figure 5, the system envisioned by Smilor and Gill includes not only access to business support services, but also includes the establishment of links to potential customers and suppliers, and the opportunity to interact with other entrepreneurs whose companies are at various stages of development.

The interaction that occurs among tenants is significant since, according to Allen and Hendrickson-Smith (1986), some of the best advice is provided by fellow entrepreneurs who have themselves encountered the same problem or recently gone through the same experiences. This research also showed that only infrequently do incubator managers choose new tenants that would directly compete with existing tenants, and typically emphasis is placed on the selection of firms that complement existing tenants. A

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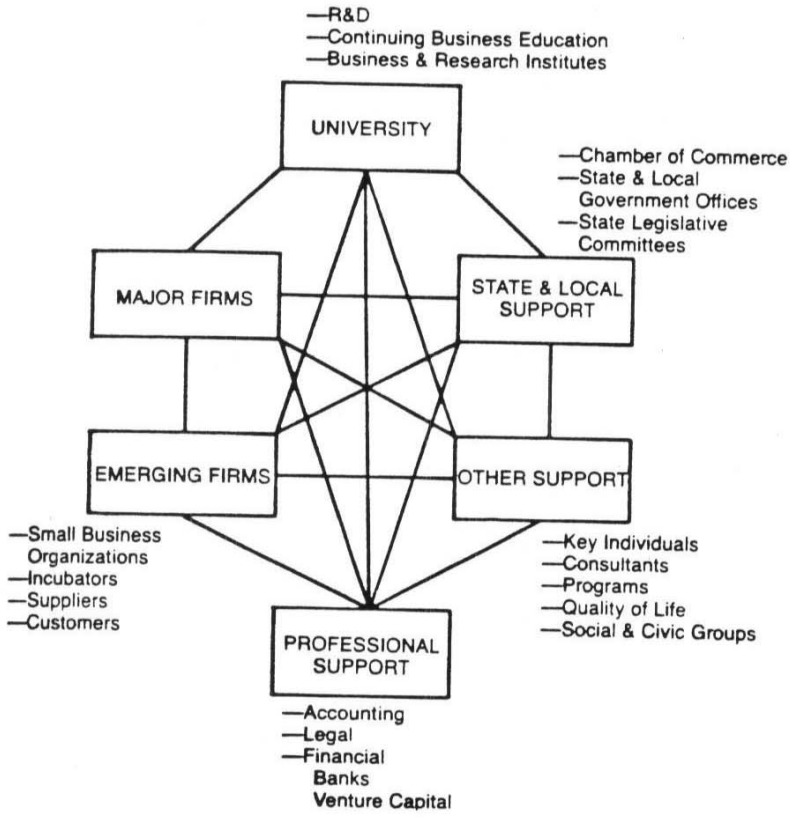
[19]The director of CBI also expressed concern that two incubators with a focus on advanced technology enterprises would not be successful. However, if a Johnson County incubator could distinguish its targeted industries from those targeted by CBI, the duplication could be avoided.

desirable outcome of this is that mutually advantageous business arrangements, such as shared equipment, employment, and expertise, produce a synergistic environment from which may emerge inter-firm trade relations and/or joint ventures.

Figure 5
The Entrepreneurial Network



Source: Smilor and Gill (1986), p.29

Since it is a difficult and time-consuming process for an emerging entrepreneur to attempt to establish these strategic relationships, an incubator can facilitate this process by providing the foundation for a wide range of networking opportunities. Assuming that the incubator has a

positive reputation in the community and has a demonstrated record of producing successful companies, the tenant company can distinguish itself from other enterprises because it is known to have access to a variety of resources and opportunities that will help sustain it and potentially give it an edge in the marketplace. And too, by acting as the focal point for the resources in a community available for small business development, the incubator also provides an invaluable role for the entire entrepreneurial community at every stage of growth.

F. Entrepreneurial Education

This aspect of business development prepares the entrepreneur to operate his company outside the nurturing environment of the incubator. The benefits of an incubator to a tenant company include access to the enterprise support network, assistance with the development of credibility, the ability to solve problems faster due to interaction with experienced business personnel, and the acceleration of the learning process.

As discussed above, the development of the necessary skills can occur through interaction and exchange with peers as well as with experienced practitioners. Some incubators also offer more structured programs, such as seminars or presentations, on topics such as management, marketing, and accounting. This training is intended to give the entrepreneur the confidence to graduate when the appropriate time comes and to run the company effectively outside the confines of the incubator.

An arrangement that has been quite successful for several incubators is an explicit connection to a Small Business Development Center. Since there is an active SBDC already associated with Johnson County Community College,

the Advisory Board could consider locating the incubator facility jointly with this SBDC, in order to benefit from the counseling, consulting and training services offered by appointment, as well as materials general information about starting and operating a business. And, since this office also acts as a referral source for other organizations within the community which provide services to small businesses, it is already a participant in the existing network. Even though much of the counseling done by the SBDC would be with clients outside the incubator, having no cost consultants located in the facility would be a positive feature for management.

G. The Perception of Success

If a facility is perceived to be successful, it will enhance the regard for its tenants, as well as improve the facility's ability to attract resources, including even stronger entrepreneurial candidates. Smilor and Gill suggested several ways in which this perception of success might be achieved, including: a new and attractive facility, affiliation with key institutions, both public and private, an experienced incubator manager, an influential board of directors, a group of promising start-up companies, and a distinguished advisory council. Since the proposed Johnson County incubator already has an advisory board composed of influential individuals, and the potential for affiliations with key institutions are numerous, this facility should be able to generate positive perceptions.

H. The Selection Process for Tenants

The criteria for selection and evaluation of tenants will most likely vary with the objectives of the facility, but such a policy is necessary to

ensure that the goals of the incubator are being met. These criteria should include how the incubator will judge progress and success as well as the policies for admission and exit.

Possible selection criteria based on economic development motivations include growth potential, job creation potential, and an emphasis on an industry consistent with the strengths of the supporting community and/or university.[20] Firms may also be required to have achieved certain milestones such as having a business plan and a market analysis.

Since the incubator industry is still itself in infancy, only recently have many firms reached the maturity stage, and thus space constraint problems are fairly new phenomenon. So, while it was not necessary to have an explicit exit policy at the beginning, it has become so. The most common exit policy among incubators having them was simply a maximum time limit. However, tenant progress should probably be evaluated diligently to ensure that the same economic development promise that was demonstrated for entrance continues to show promise of success. This is particularly true for incubators relying on community support - both financial and in-kind.

I. Tie to a University

As already noted, over 80 percent of the incubators responding to Smilor and Gill's survey reported having some affiliation, whether formal or informal, with a university. Of those, 82 percent indicated that the facility was located less than ten minutes away from the campus by car. Included in this group is the Center for Business Innovation, which is

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[20]The Center for Business Innovation (CBI) does look for tenant companies that emphasize one or more of the strengths of UMKC. These include telecommunications, computer sciences, basic life sciences and innovative technological products and services.

located on the edge of the University of Missouri - Kansas City campus, and within the area of a planned research park.

There are numerous advantages to an incubator of being located near a college or university. The proximity of a research institution enhances the entrepreneurial (or intrepreneurial) pool, both directly through faculty ventures, and indirectly, by acting as a catalyst which attracts outside organizations desiring to locate close to the sources of research in a particular field. Furthermore, access to library facilities, to state-of-the-art equipment, and to technically skilled labor also enhances the opportunities for business and technical assistance.

Even though there is no major college or university located in Johnson County, there are some interesting potential affiliations for an incubator, including ties to Johnson County Community College, The University of Kansas Regents Center, The University of Kansas Medical Center (Wyandotte County), and The University of Kansas (Lawrence). Interviews with various faculty and administrators from these institutions suggested that opportunities for cooperation and collaboration would indeed exist for the incubator.

Even though the incubator could not be physically "close" to either of the two major research institutions named above, it might be possible to place several University representatives on the board of directors, have a separate technical advisory board composed of local technical experts and faculty from various fields of specializations at the University, and/or to locate in the facility a research liaison office connected with either the Lawrence campus of The University of Kansas or its Medical School.[21] This

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[21]For example, the major strengths of the University of Kansas Medical Center include molecular biology and cardiology. Major research is currently being conducted in immunology, reproductive biology, neuro-science, and nephrology.

office would be better prepared to link appropriate faculty with tenant companies. For consulting purposes, the distance between Lawrence and Johnson County was not viewed to be an inhibiting factor, but interest in any given project was considered to be a major qualifier.

At least half of the community leaders interviewed for this study preferred a location for a Johnson County incubator close to either Johnson County Community College or The University of Kansas Regents Center. Furthermore, almost half of those interviewed thought that business start-ups affiliated with University research should be specifically targeted by the incubator. And, about ninety percent of those surveyed indicated that among the possible goals for an incubator, the development of an advanced technology or R&D center was very important - in fact, it was the third most important goal, behind only the goals of job creation and retention and the improvement of the start-up business environment.

J. Concise Program Milestones with Clear Policies and Procedures

Since the incubator is itself a business, much like the tenants it serves, it must be operated in a business-like manner. In the uncertain world of starting a new business, some organizational difficulties can be minimized or avoided if tenant companies are aware of guidelines pertaining to things like: what will be expected of them, what the operating procedures will be, what the incubator will provide, and how they will be evaluated, particularly when the incubator plans to take equity positions in its tenant companies. Explicit and precise policies for these procedures are necessary, and should be designed in conjunction with the development objectives and mission of the facility. However, as essential as these

guidelines are, the management must also have some flexibility to cope with unanticipated circumstances.

The relationship between the incubator management and the tenant companies has many dimensions. The management team serves as landlord, consultant, champion, evaluator, and sometimes, stockholder, so the entrepreneur must be aware of what benefits are obtained by the association and what trade-offs are involved. During the start-up phase of incubator development, the focus in the past has typically been centered on readying and occupying the facility. However, time should also be devoted by the management team, the stakeholders, and the board of directors to delineating these guidelines for operation. Experience has shown that the more straightforward are the policies and procedures from the beginning, the greater is the likelihood that expectations from both the incubator management and tenant perspectives will be fulfilled.

K. Summary

This section of the study has been devoted to a discussion of some criteria, derived from common characteristics and experiences of existing incubators, which are associated with success. While implementation of all of these elements is neither necessary nor sufficient for the successful genesis of an incubator, there are some clear correlations.

These ten factors fall into two very broad categories, both inherently related to the organizational purpose and economic objectives of the facility. The first type involves recommendations for making operational policies and procedures explicit and unambiguous, including rules for entry, exit, and evaluation. These factors have certainly evolved through the ex-

periences of other facilities and the "on-the-job-training" of their management team. Many mistakes of this nature could be avoided by the proposed Johnson County incubator simply through management awareness and education - including, for example, consultations with current managers, preparation through management training workshops and available manuals, and participation in the National Business Incubation Association conferences and networks.

The second category of factors is derived from the importance of the community's commitment and the involvement of its resources in order for an incubator to meet its economic development objectives. Making the incubator a part of the local economic development process and a complement to other projects is essential to its long-term effectiveness. Even though acting as a focal point to link together and coordinate the community's strengths and resources into enterprise support networks directly enables the incubator to provide the quality consulting services that add value to its tenant companies, it also signals the community's continuing intention to actively promote entrepreneurship and innovation.

As seen in this section, given Johnson County's rich endowment of resources and the community's enthusiasm, the environment for the development of a small business incubator seems very positive. In the last section of this study, these factors, combined with the assessment of the economic climate and the strategic development needs of the community, are incorporated into the Institute's recommendations for the planning and development of an incubator in Johnson County.

VI. ISSUES AND RECOMMENDATIONS

According to a recent study of new Minnesota firms, the more start-up problems reported by the firms as solved, the greater the contributions to the local economy (jobs, sales, exports) of these firms a few years later.[1] This is not surprising, but it does reinforce the agenda for nurturing fledgling young businesses when they are most vulnerable, particularly those which hold great promise for future contributions to economic development. The recent growth in the number of small business incubators in communities of every size reflects the increasing recognition of the importance of the small business sector in enterprise development, as well as an awareness of the need for cooperation and partnerships between the public and private sectors to improve the base of small businesses.

After careful analysis of the present literature on incubators and the data available for Johnson County and the Kansas City metropolitan area, it is our opinion that an incubator located in Johnson County would indeed be feasible if implemented along the lines of recommendation which follow in Section F of this chapter, and would also provide invaluable benefits to both the county and metropolitan communities. The economic data on business formation suggest that there is sufficient activity in the area to support an additional facility, while the survey of the needs of young firms indicate that an incubator would contribute positively to the successful development of new businesses. Furthermore, as indicated in Chapter V,

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[1]Reynolds, Paul and Brenda Miller, 1987 Minnesota New Firms Study: An Exploration of New Firms and Their Economic Contributions, Center for Urban and Regional Affairs, 1988. Interestingly also, the greater the number of start-up problems reported by these firms, the greater the contribution a few years later. Possibly this suggests that the greater the awareness of particular problems, the more likely they are to be solved. This is consistent with what many incubator managers report - namely, by the time many entrepreneurs realize that there is a problem, it may beyond solving.

Johnson County has the potential to effectively implement each of the ten critical factors for success. While these elements do not guarantee success, they do suggest that the climate is highly conducive to the development of a (second) incubator in the metro area.

Even though there are some common characteristics to successful incubator facilities, the type of facility must be designed to be compatible with the interests of the community. This chapter addresses the specific issues of interest and concern to the Advisory Board of the proposed Johnson County incubator.

A. Goals and objectives

The notion of feasibility implies that the facility has the capability for success, but to measure and evaluate this success, the facility must have specific objectives and purposes. The goals of an incubator are inherently related to the nature of the sponsorship of the facility. Much of the incubator literature recognizes four basic sponsorship types, but in reality many of the existing facilities have evolved by leveraging community strengths, and so involve combinations of two or more of these.[2] These partnerships should be encouraged since it has been suggested that the maintenance of a dynamic mix of stakeholders can enhance the opportunities for success of the incubator project.[3] Given this, the goals of the project can be expected to reflect the hybrid nature of the sponsorship, and even

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[2]For example, the Center for Business Innovation receives major funding from the state of Missouri, is affiliated with the University of Missouri, Kansas City, and, by value added, equity option approach to its tenants acts somewhat like a private sector effort. Consequently, the classification of facilities by this type of criteria may not always be meaningful.

[3]Allen, David, Jonathan Gorham, and Tripp Peake, "Small Business Incubators, Phases of Development and the Management Challenge", Commentary, Summer 1987, p.9.

though, they may be compatible, it will still take some effort to manage the stakeholders and coordinate the efforts.

Since a major university with research capacity is not located in Johnson County and since the state of Kansas is currently not in the incubator business, the options for primary type of sponsorship can be narrowed to a non-profit, community sponsored or a private, for-profit incubator.[4]

1. Survey of Community Leaders

The survey of community leaders conducted for the purposes of this study indicated overwhelming support for a non-profit community-sponsored facility.[5] The goals that were most important to these individuals reflected the economic development priorities typically embodied in a not-for-profit facility, including those sponsored by a public/private partnership. However, in contrast to many facilities of this nature, these goals are not the response to distressed economic conditions, but rather a proactive desire to enhance entrepreneurship in the community's growing economy. Table 61 which follows summarizes the ranking obtained from their responses.

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[4]The for-profit incubators include the following types: corporate/"intrapreneur" facility, real estate-driven facility, facility designed by venture capital organization to supervise its investments, and an informal facility where an individual or corporation decides to devote idle capacity or extra space to assist new start-up businesses.

[5]There was also some interest expressed in a university-affiliated incubator and in a collaborative effort between the community and the university. The incubator managers interviewed by the Institute recommended that the situation in Johnson County seemed appropriate either for a not-for-profit, community sponsored facility, or a private, for-profit facility sponsored by a developer. However,

Table 61
Goals for a Johnson County Incubator

Goal	Rank
Job creation and retention	1
Improve success rate of small business start-ups	2
Develop an advanced technology/R&D center	3
Develop local suppliers for major companies already in the community	4
Tax base expansion	5
Commercialize university research	6
Fill identified industrial gaps in local economy	7
Generate profits	8

Source: Institute for Public Policy and Business Research, Survey of Community Leaders, January 1989.

The goals identified as the single most important by these individuals were (1) to improve the success rate of small business start-ups, and (2) job creation and retention, but the drive to diversify the local economy is implicit in several of these objectives. Furthermore, the importance of research and innovation in several of these goals indicates an interest that some emphasis should be placed on businesses that are technology-oriented, that offer a unique product or service to the area, or that otherwise have high growth potential.[6]

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[6]Even though several of those surveyed indicated that there should not be any specific target, the research of Campbell and Allen (1987) indicates that there are two basic applications of an incubator in an economic development strategy: (i) general assistance for small businesses in declining economies; and (ii) assisting small businesses among specific industries, areas, or types of entrepreneurs within a local economy. Given the overall strength of Johnson County's economy, the assistance should be directed, at least somewhat. It is generally held that innovative enterprises, in either product or service oriented markets, hold a much greater potential for growth beyond the local marketplace than does a small business which develops simply to fulfill a local demand, with no expectations beyond that. Other considerations include: these types of businesses are much likely to attract risk capital; and this would help build a critical mass in particular fields to enhance the opportunity for synergy, the type of environment thought to have encouraged high growth spin-offs to occur in places like Silicon Valley.

2. Types of Tenants

The interest in pinpointing upscale, innovative enterprises discussed in the previous section is consistent with the general rationale of the incubator concept and with the available economic data for Johnson County. This target is general enough to encompass a wide variety of technology-related products and services, but narrow enough to generate the synergistic effect and to concentrate energies so that the effort does not become too dispersed. Innovative firms typically have a longer development cycle, and consequently, benefit from the nurturing environment offered by an incubator.

In fact, Smilor and Gill identified the following four critical elements for fostering the entrepreneurial process in order to make small businesses succeed:

(1) Talent - entrepreneurs
(2) Technology - innovation/ideas
(3) Resources - capital
(4) Business Know-How

The evidence examined in Chapter II suggested that Johnson County does have a wealth of potential talent - that is, there is a solid base of entrepreneurs and technology-oriented enterprises on which to build. Consequently, an incubator designed to foster technology-oriented businesses would provide the necessary environment for this talent to converge with the other crucial elements. Furthermore, there is no question that an incubator with these objectives would be a highly visible signal of the community's commitment to foster entrepreneurship, and as such would likely act as a catalyst for attracting future entrepreneurial activity in high growth, innovative enterprises.

3. Export Potential

While job creation, innovation, and broadening of the economic base are important criteria for tenant selection, several recent studies suggest another indicator for growth potential should be considered - namely export potential. Whereas it used to be standard to affiliate export potential with manufacturing industries, many recent studies have shown that the export of services can also offer high growth and even better quality jobs. A 1987 study of new Minnesota firms reported that even though retail and consumer services were a major source of new jobs (in terms of numbers), firms with substantial export-orientation tended to create high quality jobs because they were typically started in areas with a higher proportion of college-educated adults, as a response to expanding economies rather than high unemployment conditions.[7] The export-oriented firms were concentrated in services (distributive/wholesale and business) and manufacturing. Furthermore, due to the high-growth nature of these firms, the multiplier effects can be significant.[8] A similar study of the service economy in the Seattle metropolitan area also found that the growth of their regional economy was being fueled more by the export of services rather than goods, and that the number of jobs resulting from these exported services was larger than the number of export-tied manufacturing jobs.[9]

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[7]Reynolds and Miller, 1988. An earlier study by Reynolds also found that a relatively few firms created the bulk of new employment opportunities. Therefore, it is not surprising that the same phenomenon occurs in firms that are housed in incubators.

[8]In fact, based on the analysis of their data, Reynolds and Miller recommended that programs designed to assist "the small proportion of high-growth, export-oriented new firms may be the most efficient and effective." (p. xi)

[9]Beyers, Alvine and Johnson, The Service Economy: Export of Services in the Central Puget Sound Region (Seattle: Central Puget Sound Economic Development District, 1985) as reported in David Birch, Job Creation in America, p.84.

The recent study of the Johnson County/Overland Park economy conducted by the Institute revealed the significant contribution made to the economy by export-oriented service firms.[10] Since much has been written about the importance of a critical mass where technology-oriented industry is concerned, the evidence would suggest that innovative, export-oriented services provide such a niche in Johnson County.

4. Women and Minority Owned Businesses

Some incubators are specifically targeted to a particular type of entrepreneur, rather than, say, a type of enterprise, but this has typically occurred in areas where the economic circumstances were especially grim.[11] The responses of those surveyed did not indicate the need to target a particular population of entrepreneurs (for example, women or minorities). Presumably, this is an indication that any good business opportunity fitting the other tenant selection criteria should be encouraged. It is interesting to note, however, that Hirsch and Brush (1985) reported women comprise the fastest growing segment of entrepreneurs in the United States with a rate of growth that is about six times that for men. Furthermore, data released by the Control Data Corporation indicates that about one-third of all tenants that were currently in their facilities are either women or other minority-

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[10]Sanborn, Gina, et al., The Nature and Significance of the Overland Park/Johnson County Economy, Institute for Public Policy and Business Research, Report No. 155.

[11]For example, the New Enterprises for Women Building in Greenville, Mississippi, was a response to a situation where female unemployment rates were as high as 31 percent; one of the Philadelphia incubators, the Southwest Germantown Business Incubator Project was established in a predominantly black inner-city neighborhood with high levels of commercial abandonment and unemployment. The Omaha (Nebraska) Business and Technology Center incubator, also located in a predominantly black neighborhood, had a target of 50 percent minority owned businesses, but has achieved at least 75 percent minority ownership.

owned businesses.[12] Even though this is not conclusive evidence by far, it is encouraging.[13]

5. **Ability of Incubator to Achieve These Goals**

These objectives are common to many of the incubators that are already in operation. There is some preliminary evidence concerning whether existing incubators have been successful in achieving these objectives, but the industry is still not mature enough to provide conclusive information with which to address these issues. The Small Business Administration has reported that about 9 out of 11 new firms go out of business during the first five years, but, by contrast, data from the National Business Incubator Association indicates that about 80 percent of businesses gestated in incubators succeed.[14] These statistics are certainly compelling, but should be qualified slightly since many of the general business failures are in retail trade establishments, a class of businesses not encouraged for tenancy by many incubator facilities.[15]

Even though the numbers of jobs created by enterprises that have been nurtured in incubators are not staggering, the quality of employment opportunities offered by many of the types of firms suggested here would be quite high. And, it seems reasonable to expect that the real growth in

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[12]as reported by The University of California, Davis, Business Research Bureau, Developing a Strategic Plan for a Business Incubator, p.71.

[13]However, the Kansas City Business Journal (Week of March 27, 1989) reports that a two-year study of Kansas City's minority-owned businesses done by Consensus, a non-profit community group, found that the minority business community in the greater Kansas City area is struggling. A committee has been organized to implement the recommendations suggested in the study. One of the priorities will be the establishment of a $1 million seed and venture capital fund for start-up and existing minority-owned establishments.

[14]National Business Incubation Association, Fact Sheet

[15]Doescher, William F. "Hatching young companies", D&B Reports, July/August 1988, p.12.

employment for many of these firms will occur after they leave the incubator.[16] Furthermore, there are additional economic benefits to the community due to the multiplier effects which result from the purchases of these firms from area suppliers of raw materials and input services which have not been taken into account in the data provided by the surveys to date.

All of the evidence suggests that long-term economic development goals are the driving forces behind the initiation of this project, not short-term profits. Certainly job creation and diversification of the economic base rank high on the list of such objectives, but unreasonable expectations should not be raised. The types of enterprises suggested here do have good potential for employment growth, but they require a conducive environment to start and grow, including the availability of early-stage risk capital and a sizable local concentration of other technology-oriented firms.

Conclusive quantitative data for the impact of an incubator on the economy will not be available for many years after the initiation of the project, particularly since many of the long-term gains will be realized primarily (when and if) the client firms graduate and achieve maturity in the marketplace, not immediately after the facility becomes functional; therefore, other milestones for achievement should be recognized. As Campbell and Allen point out, the existence of a graduate is itself an

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[16]Control Data's experience indicates that the average Control Data incubator of 95,000 square feet produces about 73 jobs per year. The Allen and Dougherty (1987) study discussed in Chapter IV reported the number of jobs per facility for current occupants was 169, but the median was only 52. For graduates, an average of 142 jobs per facility had been created, "but a median of 4.5 and a standard deviation of 584.6 indicated that a few incubator graduates created hundreds of jobs while most graduates created a few jobs. The University of California, Riverside study reports that, based on their analysis of data from Control Data, not only does the job creation potential increase with the age of the facility but also with the size.

important performance milestone. Other milestones to be recognized include the creation of a responsive business consulting network, the establishment of a financial network for capitalization of tenant companies, and the synergism that occurs among the tenants, leading to joint enterprises and trading relations.[17] Each of these could also provide crucial and necessary links in the effort to sustain (and augment) the relative economic prosperity currently enjoyed by Johnson County and to promote growth in the entire metropolitan region.

B. Management and Governance

A not-for-profit incubator typically creates a board of directors with a private sector majority to design and monitor operational policies, assist with screening and evaluating tenant applicants, and implement fund-raising objectives.[18] Since the incubator is itself a start-up business, it must be operated as such. The experiences of several operations reveal that it is important for there to be a sufficient degree of autonomy for the board and manager from the political influences (i.e. through the sources of funding, etc.) to allow the appropriate decisions to be made.[19] As mentioned in the previous chapter, an influential board will give the incubator some

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[17]Campbell, Candace and David N. Allen (1987), p.189. Many experts feel that the real job gains may not occur until 7-10 years after the firm has left the incubator and established itself in the marketplace. The majority of the existing facilities have not been operating long enough for this to have been registered.

[18]Garcia, Rick, The Role of the Manager in Incubator Development and Operation, a special report prepared for the National Business Incubator Association, 1987, p.7.

[19]One incubator manager interviewed by the Institute referred to the general principle that there are inevitably strings attached to any public funds. There could be a potential conflict if, for example, the incubator is designed for up-scale, technology-oriented firms, but the funding is tied to 50-60 percent job creation for low to moderate income individuals.

credibility from the outset, which is invaluable as the facility gets started, as well as provide the business expertise and network connections that are so crucial to the development of a successful incubator.[20] The composition of this board should be a cross-section of successful private business people, including meaningful representation from small business, corporate business, the banking and financial professions, major legal and accounting firms, and representatives from other partners or co-sponsors of the incubator project.[21] This latter category could include representatives from the educational institutions that are active participants in the incubator development process, including Johnson County Community College, and potentially, the University of Kansas, as well as representatives from various economic development entities and/or from the public sector.

If the Advisory Board does decide that the incubator should be targeted toward technology-oriented, innovative firms, consideration might be given to the formation of a small technical advisory board, composed of individuals from the university and the business community whose areas of expertise are in fields such as engineering and the sciences, or that there be some other explicit link to the research-oriented community.[22]

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[20] Some of these individuals may serve in an advisory, non-voting capacity only, particularly where potential conflicts of interest may arise. If the incubator is to accomplish its goals, it is imperative that management policies, e.g. selection criteria, not be compromised.

[21] An advisory board for the proposed incubator in Johnson County has already been formed with many of these major components.

[22] For example, the Institute has just completed a strategic plan for technology-transfer programs in the state of Kansas. One recommendation involves placing a "branch office" of the proposed broker - Advanced Technology Center (ATC) - for University of Kansas research in the Johnson County area. Ideally, since the incubator should be designed as the focal point for entrepreneurship in the community, this ATC would be located in close proximity to the incubator.

Furthermore, someone working closely with the facility (manager, board member, champion) should have had experience with the successful commercialization of technology-based companies, so that an appropriate environment for this type of firm will be created, since it is unlikely that the facility will be located with a major research institution or research-driven company. Ideally, this individual would have experience with the complete evolution of at least one such enterprise, from product development to managing production, including raising venture capital.

The mission of the incubator manager is to affect successful new business development.[23] To accomplish this, the manager must successfully recruit client companies, nurture and maintain the growth of these new businesses, and prepare these businesses for maturation outside the incubator. Within this framework, an incubator manager has some specific duties which are common to most all incubators, even though each facility is unique.[24] These responsibilities can be expected to vary during the course of incubator development since early focus may be on locating appropriate

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[23]There are several companies that specialize in incubator development, including Pryde, Roberts and Company, and Control Data Corporation. For example, to assist with management, Control Data offers a comprehensive skill-building program for incubator managers (the Incubator Operations Program) and the Network Membership Program for sharing ideas, information, and assistance. The U.S. Department of Commerce, Council of State Community Affairs Agencies has recently published Incubator Training Manual, also designed to prepare the management team for this purpose.

[24]Smilor and Gill reported some annotative data on incubator managers:

The managers that responded to their survey were of all ages: 20.6 percent were under 31 years old; 23.5 percent were in the 31-40 age group; 23.5 percent were 41-50 years old; 26.5 percent were in the 51-60 age category; and 5.9 percent were over 60 years old.

Only 11.4 percent of these managers indicated that they did not have a bachelor's degree. Twenty percent held a master's degree, and 14.3 percent held a doctoral degree.

tenants, and later, on consulting and accessing capital. The four characteristics suggested to be standard in an incubator manager are:[25]

(a) **Personal new business start-up experience** - Direct experience in starting and operating a private enterprise will generate an atmosphere of mutual respect between the manager and the tenant entrepreneurs, and will enable the manager to understand many of the frustrations that are involved in the development of a business. Furthermore, this experience will enable the manager to evaluate better the business plans that are presented as potential candidates for tenancy.

(b) **Operational strengths** - Since the incubator is itself a business, the manager must be adept at (or learn quickly) the same skills which the facility is designed to nurture in its tenants. These include:

(i) Financial planning - Typically, the manager is responsible for the completion of annual budgets and the long-range capital improvement plan. Consequently, both for the facility's operation and for the evaluation of the feasibility of potential tenant companies, the manager must be proficient at the interpretation of profit and loss statements, balance sheets and cash flow forecasts. There is general consensus in the literature that occupancy levels will be difficult to predict in the early months (and even years) of operation, particularly where there are economic development screening criteria that are strictly enforced. This translates into difficulties in cash flow planning for the facility.

(ii) Leasing responsibilities - Since most managers have tenant leasing responsibilities, the manager must have a fundamental understanding of lease provisions (particularly if there are special provisions which tie rent to specific economic development objectives), as well as be able to coordinate tenant improvements and effectively implement the flexible space requirements of the tenants.

(iii) Marketing - The development of a marketing strategy that is compatible with the facility's goals is also typically the manager's responsibility. The amount of visibility and enthusiasm generated in the

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[25]Garcia, 1987, pp.13-22.

community through this effort will certainly contribute to the success of the facility. Most facilities rely on word-of-mouth communication, so the manager will have to be involved in interactions with many aspects of the community.

(c) **Consulting skills** - In addition to providing direct management and technical support, the manager can coordinate available local resources into an elaborate business support network which provide consulting expertise for tenant companies.

(d) **Manager as Entrepreneur** - The incubator industry is itself a relatively immature industry, and since each facility evolves from its own specific circumstances, the manager must be creative in addressing the problems and opportunities that arise. Managers familiar with the risks involved with starting and developing a new enterprise such as an incubator are prepared to respond to obstacles that may arise as the facility becomes operational. This, in turn, creates an environment of "success breeds success" which client companies will emulate.

Furthermore, the successful manager must be " a political entrepreneur, adept at manipulating the resources at his/her disposal."[26] This is true in general, but will be especially true for a facility that is designed by partnering several community organizations.

C. Relationship with Other Area Incubators, Particularly the Center for Business Innovation

There are several metropolitan areas in which there are multiple facilities, but typically they are not targeted at the same entrepreneurial population.[27] Unless two facilities, with the same "value-added"

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[26]Allen, David N., Jonathan Gorham, and Tripp Peake, "Small Business Incubators, Phases of Development and the Management Challenge", Commentary, Summer 1987, p.7.

[27]According to data from the Small Business Administration provided in Robinson (1988) there are several examples of metropolitan areas with multiple incubators. Most of these have only two, but a few cities have many more. For example, Chicago (8), Minneapolis/St.Paul (7), Pittsburgh (7), and Philadelphia (7). These have also developed under very different

philosophy, are aimed at two clearly defined, disjoint groups of entrepreneurs, it is likely that some duplication of effort will occur. One of the tenant acceptance criterion employed by the Center for Business Innovation is:

> Emphasize one or more of the key technology disciplines consistent with the strengths of UMKC and the Center's organizational mission. These include telecommunications and computer sciences, basic life sciences and innovative technological products and services.[28]

It does not seem feasible for the proposed Johnson County incubator to avoid all of these areas of emphasis, nor would it seem wise to attempt to segment rigidly the targeted entrepreneurs by geographic region. Consequently, in terms of the industries and types of entrepreneurial activities targeted, a purely complementary relationship may not be possible.[29] Furthermore, the incubator industry is itself a growth industry, and it is not inconceivable that other incubator facilities could be developed in the future.[30]

The levels of activity in the Kansas City region, and in Johnson County separately, certainly seem sufficient to accommodate a second business incubator, but given that the ideal group of entrepreneurs for a Johnson

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circumstances - Pennsylvania has a state sponsored incubator program; Minnesota does not, but the majority of the incubators in the Twin Cities are private. In fact, Control Data Corporation has 3 incubators in the Minneapolis/St. Paul area.

[28]The Center for Business Innovation, FY1989 Operating Plan, p.6.

[29]Even though CBI does have some tenants that can be classified as service-type businesses, the management does not encourage firms of this nature. Largely, this is because they do not feel that this type of enterprise meets their "venture-capital" criteria that businesses must have capital structures that can appreciate and become liquid. This clearly depends on the type of service being considered. Most service-oriented firms of the type being proposed for the Johnson County incubator (high-growth, innovative, export-oriented) would be capable of meeting this venture capital requirement.

[30]For example, now it is not uncommon to find traditional venture capital organizations establishing an incubator-type environment to house its portfolio of start-up companies.

County incubator to target will overlap, at least to some degree, those being targeted by CBI, will there be a sufficient number of qualified candidates for both? This would seem to be the true concern of the management of CBI and the Advisory Board for the proposed Johnson County incubator - that the duplication of effort could be counterproductive for one or both of the facilities. The evidence suggests that there is enough potential activity for two such facilities, which, even though similar in purpose, will complement one another by offering different strengths and resources to their tenants.

Each facility will have some obvious advantages over the other which cannot be ignored. And, to some extent, each facility has an obligation to use those advantages in order to meet their stated objectives. For example, CBI is already established in the community, is located on the campus of UMKC which allows contiguous access to university facilities and research capabilities, receives significant funding from the state of Missouri, and has just launched a major fund raising drive in the metropolitan area to establish a seed capital fund for the exclusive use of its tenants.

The proposed Johnson County incubator would be located in the most economically vibrant part of the metropolitan region, would have strong ties to Johnson County Community College and the SBDC, and could be loosely linked to a research institution (University of Kansas). For those entrepreneurs not requiring immediate access to university facilities, the Johnson County incubator because of its location, may have a comparative advantage, but for those whose needs include proximity to research facilities, CBI could be preferable.

The Institute could find no evidence of two incubators located in the same city, that were sponsored by completely different organizations but which were jointly governed or that even shared the same screening committee. A true joint governance would tend to merge the facilities. This would likely result in numerous complications arising from the diverse financial arrangements, exacerbated by the fact that, in this case, the two incubators of particular interest here would also be in separate states. Even though there may be a willingness on the part of those involved to ignore the state line, in order to promote entrepreneurship in the metropolitan community, it is doubtful that the same willingness exists in the state legislatures.[31]

However, steps can be taken which would encourage a cooperative atmosphere, including some overlap in board membership, some of the same support networks, and possibly, a shared seed capital fund.

D. Funding

The existing incubators have been financed with funds from a variety of public and private sources. Several of the incubator surveys discussed in Chapter V addressed the financing arrangements of the responding facilities, but each in a slightly different manner. The types of financial assistance that are available depend on the objectives of the facility, its location, the amount of private financing, and the types of tenants being accepted. Smilor and Gill categorized funding sources into three groups: community-related, state-related, and federal aid. Figure 6 summarizes the data

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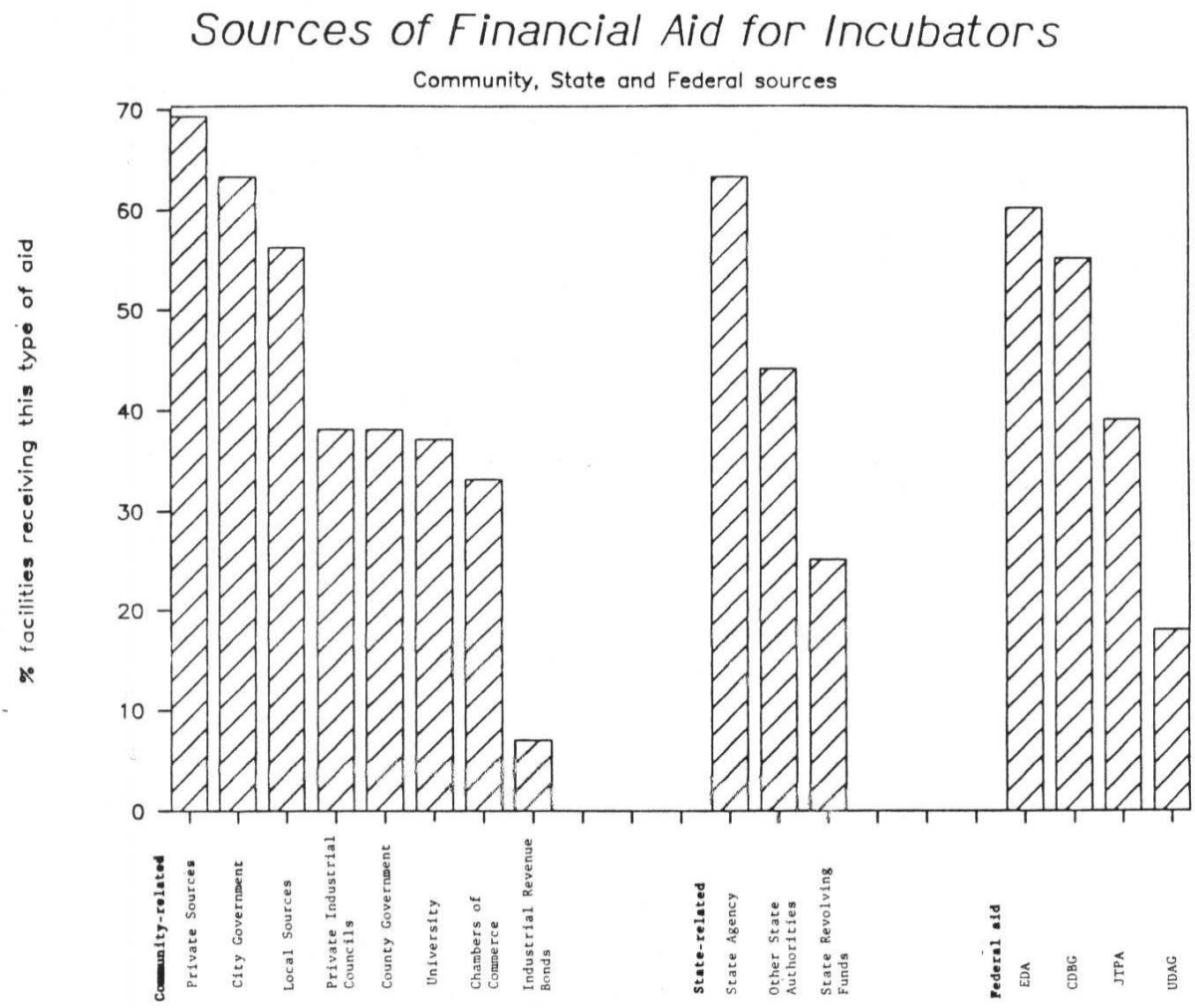
[31] In particular, the state of Missouri is currently providing major funding to CBI, whereas the state of Kansas has not appropriated any funds to support incubators. However, it should be noted that several firms from Kansas have incubated in CBI.

received from the facilities responding to their survey. As indicated, more than half of the responding facilities received some aid from each of the following sources: private sources, city government, local sources, state agencies, EDA, and CDBG.

Figure 6



Source: Smilor and Gill, 1986

With the public/private partnership approach, the creation of an IRS-approved 501 (c) 3 not-for-profit corporation provides the legal mechanism with which to leverage grants from both the public and the private sector.[32] However, as the number of these facilities has grown, the competition for much of the federal assistance has increased, and the eligibility criteria have become more restrictive. As indicated below, due to the relative prosperity that Johnson County experiences, an incubator located there will not qualify for many of the programs.

In recent years, state policy makers have acknowledged the growing importance of the small business sector in economic development programs, and have initiated programs which seek to increase the survival of new businesses. One method that a growing number of states have employed is the small business incubator. According to a paper presented at the Urban Affairs Association Conference last year, approximately sixteen states have fully developed incubator programs and most other states promote incubator development indirectly through other activities.[33] The state of Kansas falls into the latter category, having placed the current emphasis on the development of other initiatives to assist small business, such as tax credits for seed and venture capital funds, expanded SBDCs, export finance, etc., all of which can be accessed by incubator tenants. Although this is a significant effort and should provide much needed support for at least some

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[32]With a 501 (c) 3 nonprofit organization, business and foundation contributions are treated favorably under the tax code. One incubator contacted by the Institute, became a 501 (c) 6 organization which gave them tax exempt status, but which also virtually eliminated foundation support and restricted company giving because these contributions were not deductible.

[33]Hudson, Marianne, Mary Ellen Mazey, and Mark L. Weinberg, "Promoting Small BUsiness Development: A Comparative Case Analysis of State Incubator Programs", presented at the Urban Affairs Association Conference, March, 1988.

of the potential tenants in the proposed incubator, it makes financing the incubator itself in the state more difficult.

Most of the existing incubators in Kansas that receive state assistance do so indirectly through the cooperative support received from its universities and community colleges.

1. Review of Funding Sources Employed by Kansas Incubators

It is informative to review the funding sources for incubators currently being developed elsewhere in Kansas. The Parsons incubator, which opened in August, 1988, received a $300,000 grant from EDA and $200,00 from local public and private funds for the $500,000 renovation of an old facility. Operating revenues, which are expected to be $70,000- $80,000 per year, come from rent, foundation support, and grants. The Sears Foundation and Wal-Mart's Keep America Working Program provided one-time donations totaling $50,000. Since their tenants were unable to acquire seed capital from KTEC or Kansas Venture Capital, Inc., the Parsons project also has put together a seed capital fund. Approximately $600,000 has been collected from the Parsons area, and an additional $400,000 has come from the county seed capital fund. The facility has chosen not to take equity options in tenant companies although they expect tenants to pay money back to the incubator after graduation.

The Manhattan incubator, which has also been operating since August, 1988, is classified as a non-profit corporation. The incubator facility houses four tenants and is located in the basement of the Southwestern Bell Switching Center Office, located only one block from the campus of Kansas State University. This facility was unable to acquire any funding from EDA because the area does not qualify as economically depressed. Local support

was obtained from the city, Riley and Pottawatomie counties, local businesses, the KSU Foundation, and Southwestern Bell. (The university also provided office space before the renovated space was available.) Incubator operating expenses are expected to be $125,000 per year, with rents accounting for approximately 20 percent of that. Since the facility does have a high-tech focus, tenants have received funds through the state's SBIR program, but there are also plans to initiate a seed capital fund to assist the tenants further. The incubator does intend to take equity positions in the tenant companies.

The proceeds from a 1/2 cent sales tax approved through a county election provides a major source of financing for the Hutchinson incubator, which opened in September, 1987. A portion of the revenue collected will be used to finance the incubator for a period of 3-5 years, after which time, the facility is intended to be self-sufficient. Annual operating expenses are expected to be $120,000 - $150,000 which includes the salaries of two full-time employees. Rental income and fees charged for special services account for about 60 percent of yearly expenses. The Hutchinson Community College and the SBDC have provided much in-kind assistance. An existing structure was purchased with 30 year financing obtained through local financial institutions. Thirty thousand square feet were renovated at a cost of $60,000. Although public assistance was not initially used to purchase the facility, future aid may be used to pay off part of the mortgage. The tenants, which are split between manufacturing and services, have received financing from a local seed capital fund, SBA guaranteed loans, and a KTEC basic research grant. The $200,000 seed capital fund was started with community funds. Equity positions are taken in the tenant

companies, as well as notes and convertible bonds. No return is required from the companies for three years after graduation, but the goal is to be able to liquidate the investment made in a company within eight years of graduation.

The newly opened incubator in Wichita is completely sponsored by the WI/SE partnership for growth. This is a consortium formed by the city, Sedgwick county, Wichita State University, the Chamber of Commerce, and local businesses, all of which are major contributors. The partnership is the economic development arm of the community, and is involved in numerous activities, including this incubator. The facility is 22,000 square feet (split between office and manufacturing space) and is leased by the incubator. They did not attempt to acquire any federal funding because they did not expect to qualify.

Salina has a public incubator under construction that is scheduled for completion in June 1989. The facility will have just less than 20,000 square feet for seven light manufacturing companies, built at a cost of slightly more than $300,000. Financing for the facility came from the Airport Industrial Center and from the Airport Authority. Since these funds were available, no other options were pursued. Non-financial assistance has been provided by the Kansas College of Technology, the Salina Chamber of Commerce, local and county governments, and the SBDC. Operating expenses are expected to be covered by income received as rents ($2.50 per square foot) and from charges for extra services provided to tenants. The incubator intends to be self-sufficient in 2-3 years, and also has plans to develop a seed capital fund. There are no plans at this time to take equity positions in any of the tenant companies.

Garden City is in the midst of a feasibility study for an incubator. They anticipate renovating an existing building, with financial assistance coming from EDA.

2. The Physical Structure

The options for obtaining a structure include (1) purchase a building; (2) acquire a building, through corporate or municipal donation; and (3) a continuing lease arrangement at an appropriate location at reduced rates with developer or other organization.[34] The first option would require substantial financial resources, both for the purchase and for any necessary renovations. If renovations were required, the second option would also require considerable resources. As reported in Chapter IV, most of the existing facilities spent in excess of $100,000 for renovations.

Many of the existing facilities were able to attract funds from federal and state grant programs in order to finance a significant portion of the acquisition of the physical facility. Figure 7 summarizes the data for facility financing sources obtained from the University of California, Riverside survey for all types of sponsorship. Figure 8 summarizes the data obtained from Allen's survey (1985) which pertains to public incubators, a category which also includes nonprofit facilities. It seems apparent that public/nonprofit facilities rely more heavily on private and local government sources than the norm for facilities of any type. Since at this time, Kansas does not have funds allocated to provide assistance for financing the physical structure, if a structure is purchased and/or if renovations are required for the rented or donated structure, the available

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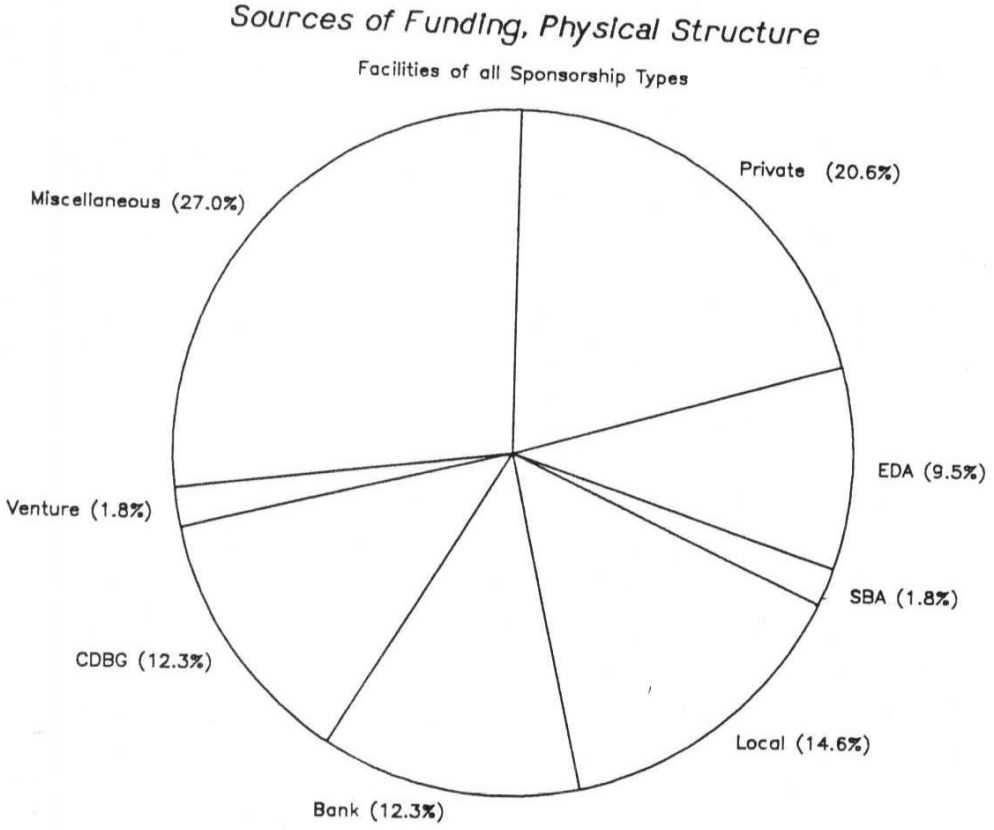
[34]Depending on which survey is consulted, it appears that between 50 and 60 percent of the structures are owned by the organization sponsoring the incubator.

options for Johnson County to pursue include federal and local government sources, and/or private sources. The latter could include both corporate and foundation donations.

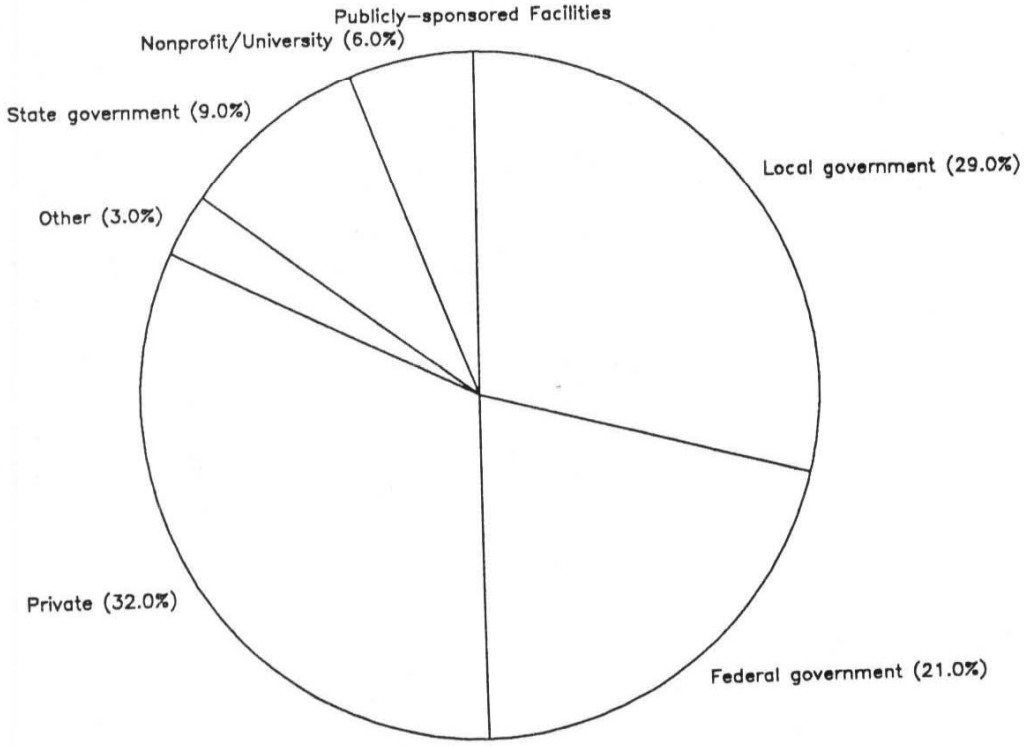
Figure 7



Source: Business Research Bureau, University of California, Riverside, 1988

Figure 8

Sources of Funding, Physical Structure



Source: Allen, 1985

The Small Business Incubator Handbook provided a list of several potential federal sources for financing the facility.[35] These include:

Economic Development Administration Grant
Housing and Urban Development, Urban Development Action Grant
Community Development Block Grant Funds
Small Business Administration Acquired Property Program

Many facilities have received sizable grants (average $400,000) from the U.S. Department of Commerce, Economic Development Administration through its

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[35]The Handbook also listed some U.S. Department of Health and Human Services funds, all of which are now in the Community Services Block Grant program. There are 10 strict federal objectives which must be met to receive funding, so Johnson County does not qualify. Furthermore, no land, buildings, or capital assets may be purchased, constructed, or renovated using these funds.

Public Works program for facility acquisition and renovation. However, such a project in Johnson County would not currently qualify for this program because it does not meet the EDA objectives.[36] The strength of the economy in the cities in Johnson County also prohibits qualification for the Urban Development Action Grant through the Department of Housing and Urban Development.[37] Some facilities have also used funds from the U.S. Department of Labor Federal Job Training Partnership Act (JTPA) which are targeted for training of economically disadvantaged youth and unskilled adults to assist with the costs of renovation or construction, although this is not a promising option for Johnson County either.

3. Flexible Financing Sources

The Community Development Block Grant (CDBG) entitlement program is one of the most flexible economic development financing sources available. Many incubators have used these funds to finance the structure or to provide core operating support. Although the primary objective of this program is to assist economically distressed cities, up to 35 percent of the funds can be used for non-disadvantaged areas.[38] Since Johnson County does qualify for these latter funds, this is a potential source for financial assistance for the proposed Johnson County incubator, even though the amount of funds

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[36]According to telephone conversation with regional office. Wyandotte County does meet the EDA objectives. Other EDA programs that have been used for financing the facility - Economic Adjustment Assistance, Long-Term Economic Deterioration program and the Sudden and Severe Economic Dislocation program - are even more restrictive.

[37]The formula used to determine eligibility includes several measures of community poverty and need, including unemployment, per capita income, age of housing, housing overcrowding, etc.

[38]National objectives for eligible projects include: benefit employment opportunities for low and medium income residents, eliminate urban blight, or provide an urgently needed service.

received through this program is still based on an economic needs formula (degree of poverty, etc.).[39] These funds can also be used for operational expenses.

The State of Kansas has provided the legislative authority for counties, including Johnson County, to impose an economic development levy of 0.5 mills. This levy does not require a referendum, unless requested with a petition signed by 5 percent of the electors and filed within 30 days of official publication of the intention to levy the tax. It was estimated by a representative of the League of Kansas Municipalities that such a levy in Johnson County would generate revenues of about $600,000 before reassessment and reappraisal.[40] A portion of these revenues could be used to finance the incubator (either the structural facility or operational expenses). The Johnson County Commission has not yet exercised this option. Even though the total mill levy for Johnson County is slightly lower than other urban counties in Kansas, the rates have risen substantially in the last few years.[41]

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[39] In the current year, about $1 million was received; however, an Olathe project receives about 24% off the top. The ceiling amount for awards depends on the number of projects available, although there is a "soft-cap" of $100,000. Typically funds are awarded to 8 or 9 cities, and to 1 or 2 county departments.

[40] Reassessment could raise this value by 25-35 percent.

[41] The following, obtained from the annual listing published by the League of Kansas Municipalities in the January issue of Kansas Government Journal, summarizes the total county tax rate for the years 1986-89 for four urban Kansas counties:

	1986	1987	1988	1989
Johnson	14.535	15.535	20.236	23.417
Wyandotte	38.040	29.499	28.777	28.569
Sedgwick	19.300	19.595	23.238	24.776
Shawnee	39.340	33.730	37.890	37.560

It is also possible that an incubator could be funded with revenues generated through the General Fund mill levy. Requirements for funded projects are very general, and those with economic development objectives would likely qualify.

A statute also exists for cities in Kansas to impose a maximum 1.0 mill levy for Industrial Development, if approved by a majority referendum. According to a recent Institute study, none of the cities in Johnson County has implemented this levy.[42] It is feasible that one of the major cities could use this tool to become one of the major financial sponsors of the incubator.

4. Operational Expenses

For the first few years, the facility will undoubtedly require substantial up-front financial commitments for start-up and operational expenses. Smilor and Gill reported operating budgets which ranged from $35,000-$1,000,000, with a median of $110,000. It is not uncommon for a facility to take 2-3 years (or longer) to reach 80-90 percent capacity, particularly if special types of entrepreneurs are targeted. Therefore, during this time period, rental revenues and fees will be low because the incubator will be only partially full. In the absence of core funding support, there could be pressure to compromise the objectives of the facility in order to reach the threshold level of occupancy - experience has shown that if the sponsors can't or don't subsidize the real estate function, the project will become real estate driven. This non-rental, non-fee support for the first three years or so would likely need to come from

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[42]Upmeier, Helga, Comparison of Economic Development Expenditures in Kansas Communities, Institute for Public Policy and Business Research, report number 162, March, 1989.

local government support - in some form, private sector grants, and/or some block grant funds.

As the incubator becomes more mature, the rents and fees may allow the facility to become far less reliant on these sources of funding, but too heavy a reliance on rent, even at this stage, would not be optimal. If, in order to become self-sustaining, the incubator is totally dependent on rents and fees, there will be budgeting pressure to raise these to market, or near market, rates, thus defeating one of the primary benefits to the tenants. Consequently, some core support should be maintained for a period of 3-5 more years, perhaps being gradually phased out during that time. If the incubator is to become self-sustaining in the long-run, it is estimated that the facility has to be at least 20,000 square feet, and preferably 30,000 square feet or more. If not at this level, it is highly likely that the project will require long-run subsidization.

Another potential source of revenue, to be realized in the future, would be that generated from equity options in the tenant companies. This has been implemented in several of the existing incubators, including some in Kansas, but since many of these incubators are still fairly young, it is difficult to assess the pros and cons of this. Given that this facility will likely focus on high growth enterprises, this would possibly provide a viable source of revenue for the future.

It is not necessary for the incubator to maintain a large operating budget in order to have an effective facility, although the smaller the management team, the greater the reliance on the enterprise support networks. Nor is it necessary for the sponsoring organization to purchase a building in order to be successful. In fact, it is explicitly recommended

that a burdensome debt not be taken on in order to purchase a building. If sufficient grants cannot be raised or a structure (or its use) donated, the leasing option could be the more appropriate. Whatever the option chosen by the Board, the most important factor is to allow the facility to maintain its economic development objectives rather than become real estate driven.[43]

E. Services and Networks

The provision of on-site office and business support services and access to a wide array of business, financial, and technical networks in the community comprise part of the most important features of an incubator to fledgling businesses. The results of several major surveys reported in Chapter IV provided data on the types of services most frequently provided by incubators, as well as the evaluations of various types of services by both managers and tenants. In addition the following advice seems particularly relevant:[44]

(a) It is a waste of management time to be too concerned with exactly what services to provide in the incubator. Different

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[43]One of the incubators (The Business and Innovation Centers of Jefferson County, Golden, Colorado) visited for this study leases space in an office park that would be comparable to Corporate Woods. This facility might be a good model for the Johnson County Board to consider since it has been developed under some of the same circumstances. The director of the facility is also the director of the local SBDC. They received their initial start with a $100,000 grant from the state of Colorado (for two years) and a lot of private sector support. The annual budget is $50,000-$60,000, but they feel as though it should be about double that. In addition to the (part-time) director, there is a full time secretary and a "hard core" group of 12 volunteers linked to the SBDC that work with the tenant companies. They are able to operate with this low level budget because of the nature of the staffing and because the developer of the Denver West Office Park, hoping that some of the tenants will eventually settle permanently in the park, has given them a special deal with their space. In fact, in the first year, they paid no rent at all.

[44]Taken from Allen, David N., Jonathan Gorham, and Tripp Peake (1987), p.11. The lessons learned are based on the application of Allen's management model to the experiences of two Science Park incubators. The information obtained from this exercise, is in the words of the authors, "generalizable to most nonprofit incubator programs." (p.6)

tenants will have different needs, and since tenants are transitory, the "optimum" mix will always be changing. It is better to strike a balance between what is easiest and cheapest to provide from a supply point of view, and attempt to encourage free-market provision of services through key networks.

(b) The provision of shared office services is important to tenant companies, but the targeted services should be those that normally tie up large amounts of cash, are too expensive, or are not available to small companies due to scale economies.[45]

(c) The provision of services is a means to an end - the objective is to make it easier for the company managers to focus on their businesses.

The three major categories of support systems which must be offered through some means include (1) the provision of shared office services and flexible, **inexpensive** space to keep operating costs low; (2) the provision of or access to professional assistance (lawyers, accountants, management consultants, etc.) and (3) the provision of or access to seed and venture capital.

A fourth category of services - access to technical assistance - should also be offered if the facility is geared to technology-oriented products or businesses. Furthermore, if the emphasis is placed on such firms, a decision must be made concerning the options that will be available for space and equipment.

As discussed in Chapter V, Johnson County is a prime location for accessing professional assistance services, since offices of Big Eight accounting firms and major law firms are already in the area. For these services, the incubator management and Board of Directors can establish an exclusive relationship with a particular provider or may establish a

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[45]The recent widespread accessibility and use of personal computers for word processing (as well as numerous other activities) has reduced the need for some office services.

cooperative arrangement with several providers from which each tenant is given the option to negotiate and choose.[46] The latter arrangement probably provides more flexibility, although the former may offer a better (total) financial package.

Interviews conducted by the Institute to determine the willingness of University of Kansas faculty and staff (both Lawrence campus and Medical Center) to cooperate with such a project were encouraging. However, for access to ongoing technical expertise, it would seem preferable to form a Technical Advisory Board and/or other systematic relationship, (e.g. with the Johnson County office of a University of Kansas Advanced Technology Center if these technology transfer mechanisms are funded by the state), as the incubator develops.

F. Recommendations

Given the evidence discussed throughout this study, the optimum approach to the development of a business incubator in Johnson County would involve the following elements:

1. Goals and Objectives

The Institute recommends that the proposed Johnson County small business incubator be established as a 501(3)(c) not-for-profit facility designed to stimulate economic development through a "value-added" approach and geared to innovative, up-scale enterprises whose growth potential, in jobs, revenues, and profits, is strong. This would include businesses in key technology areas with new products, new processes, or products/services that are unique to the area. The management and advisory board would be

[46] CBI operates with the latter option. According to the management, this has been quite successful.

responsible for developing and maintaining the specific selection criteria, although special consideration should be given to businesses which fit the above characteristics and which complement existing industry strengths and/or other tenants. The facility should be a public/private partnership so that it can be a part of, and coordinated with, the area's long-run strategy for economic development, and can serve as a focal point for entrepreneurship in the community. Broad-based community support is thought to be vital to its successful development.

2. **Management and Governance**

Since the incubator is itself a start-up business, it must be operated and nurtured as such. To facilitate this, the incubator should have an active Board of Directors with a private sector majority of prominent business leaders. In conjunction with the management team, the Board would be responsible for designing and monitoring operational policies, evaluating and screening tenants, providing business and technical expertise, and implementing fund-raising objectives. A strong connection to Johnson County Community College, including the SBDC and the Business and Industry Institute, is essential. A technical advisory board, or the equivalent, and an operative affiliation with the University of Kansas is also recommended.

3. **Relationship with the Center for Business Innovation**

The Johnson County incubator should be perceived as complementary to the Center for Business Innovation, since both will be working to promote small business growth and to foster innovation and entrepreneurship. Even though the two facilities would operate separately, cooperation and a close working relationship would likely be mutually beneficial and would extend the opportunities for entrepreneurs in the metropolitan community. The

natural cooperation that would evolve from the shared objectives, the overlap of strategic Board membership, as well as some common support linkages, could also be augmented with a development liaison.

4. Choice of a Physical Structure

Ownership of a structure is not considered to be requisite for success and should be considered only if an acceptable facility can be acquired through a private donation, public sector grant, or combination of the two. This would require a substantial commitment since it is not uncommon for the appropriate renovations to an existing structure to cost several hundreds of thousands of dollars. An alternative to this would involve a long-term subsidized lease arrangement in an office park or other suitable location that would require minimal renovation. Since rent will likely be an important source of operating revenue whichever option is adopted, it is recommended that the facility be a minimum of 25,000 square feet, and preferably 30,000-40,000 square feet.

5. Operating Budget

Without core operating support for several years, the project will be vulnerable. During at least the first three years, the facility will itself be functioning as a start-up enterprise and will need extensive public/private contributions to avoid becoming real estate driven. As the facility matures (3-5 years more), this core support could be phased out by degrees, although even with a graduated rent structure, it is unlikely that the facility can become self-sustaining on rent revenue alone. Additional amounts of revenue could be generated through user charges for some services and in the future, by exercising minority equity options in tenant companies in exchange for the value-added by the incubation process. The equity

option is an alternative that has been implemented in similar facilities and appears to be a feasible source of capital, but due to the infancy of the incubator industry, its viability is difficult to evaluate. A budget of $125,000 is a "ball-park" estimate of minimum annual operating expenses.

6. Potential Sources of External Support

The overall strength of the Johnson County economy will disqualify the proposed facility from accessing funds from several federal programs which have provided significant support for incubator development in other areas. However, Johnson County does receive funds through the U.S. Department of Housing and Urban Development, Community Development Block Grant entitlement program (CDBG), and typically, one or two eligible county projects receive awards of not more than $100,000.

Since the State of Kansas has placed its current emphasis on the development of other initiatives to assist the development of small businesses, it is improbable that significant funding for the incubator could be obtained through a state program.

Given the circumstances in Johnson County, it is likely that the community, through both private and public mechanisms, will have to be asked to supply the financial initiative. The incubator project should be viewed in the context of long-term strategic planning since any measurable impact on the economy will largely occur in the future. Corporate and foundation support should be actively pursued by the Board. Public support could be generated from County general fund revenues or through the imposition of the economic development levy. Funds could also be committed from a city-based industrial development levy, although this would have to be mandated.

7. Services

There are essentially three categories of assistance that the incubator should provide, in addition to the reduced overhead costs associated with the affordable space and shared office support services: business support/management assistance, technical assistance, and financial assistance. In addition to the on-site consulting contributed by the management team, the facility should be extensively networked with existing business development resources in the community, and act as liaison for obtaining contractual consulting agreements.

It has already been recommended that the creation of a technical advisory board, composed of individuals from the university and business community, be considered in order to enhance the facility's ability to provide technical assistance. Since there are extensive resources in the Johnson County/Kansas City vicinity that could provide valuable consulting and research support when needed, the absence of a major research university in the County should not inhibit the ability of the facility to attract clients in innovative and technology-related industries.

Since start-up firms need risk capital, it would enhance the incubator's ability to assist its tenants if the incubator could be connected to one or more such funds. The more technology-intense clients could qualify for the state sponsored programs (KTEC seed capital fund,SBIR matching grants for basic research, etc.) but other possibilities would include a linkage to a community-sponsored fund, if one were established, the creation of a small internal fund to provide direct assistance to qualified tenants, or possibly, a linkage to the Mid-Continent Capital Trust fund currently being established by the Center for Business Innovation.

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APPENDIX A

List of Incubators Visited by the Institute

List of Incubators Visited by the Institute

Center for Business Innovation - Kansas City, MO

The Business and Innovation Center of Jefferson County - Golden, CO

The Denver Growth Center - Denver, CO

Business and Technology Center - Columbus, OH

Ohio University Innovation Center - Athens, OH

Northest Tier Ben Franklin Partnership Technology Center - Bethlehem, PA

New Opportunity Development (Eastman Kodak) - Rochester, NY

Omaha Business and Technology Center - Omaha, NE

APPENDIX B

Survey Instrument, Advanced Technology Firms

The University of Kansas

Institute for Public Policy
and Business Research

December 16, 1988

_____
ID Code #

Advanced Technology Start-Up Firm Survey

The purpose of this survey is to determine the impact of technology upon Kansas firms, to determine need for incubator facilities, and to determine what academic/industrial linkages could be used to assist firms' growth and competitiveness in national and international markets.

This survey should be completed by a person that:

* is active in the management of the firm AND
* (if possible) had a major responsibility for starting the firm

All information specific to individual firms will be kept confidential. The identity of all firms involved in the survey will remain anonymous.

Business name: _____

Business address: _____
Street

_____
City State ZIP

Phone: _____

Corporate Headquarters address (if different from above):

_____
Street City State ZIP

Person completing survey: _____
Name

_____
Title

NOTE: If your firm is part of a larger corporation, answer all questions as they pertain to your site only.

607 Blake Hall • Lawrence, Kansas 66045-2960 • (913) 864-3701

I. Demographic

ID Code # _____

Q1 How many years has the firm been in operation? _____

Q2 What is the major product or service provided by your firm?

_____

Q3 Do you consider your company or product to be classified as "Advanced Technology" or technology driven? (Circle number of your answer)

1. Yes
2. No

Q4 How would you rate the level of technology used by your firm? (Circle number)

1. Cutting edge
2. Current
3. Traditional

Q5 Are you the founder of the firm? (Circle number)

1. Yes (If Yes, go to Q6a)
2. No (If No, go to Q6b)

Q6a What was your education level when you started the firm? (Circle number)

1. High School
2. Some college
3. Associates degree
4. Undergraduate degree
5. Graduate degree
6. Other_____

Q6b If NO, when did you join the firm?

_____

(Go to Q8)

Q7 How many years had you worked in industries similar to that of your new firm prior to starting the new firm? _____

Q8 What is your area of expertise/training?

_____

Q9 How would you describe the career shift you made to this firm? (Circle number)

1. School/college to new firm
2. Established firm to new firm
3. One new firm to another new firm
4. Unemployment to new firm
5. Retirement to new firm
6. Other, please specify _____

II. Milestones

Q10 When did members of the start-up team first begin to make major investments - personal time, personal resources - in the new firm?

Month _____, Year _____

Q11 When was the first significant outside financial support obtained?

Month _____, Year _____,

Not applicable _____

Q12 When did the firm receive its first sales income/revenue?

Month _____, Year _____,

Not applicable _____

Q13 When did the firm first hire anybody, full or part time?

Month _____, Year _____,

Not applicable _____

III. Employment

Q14 How many individuals do you employ currently?

_____ Full time _____ Part time

Q15 What percentage of your workforce is:

1. _____Clerical
2. _____Data processors
3. _____Technicians
4. _____Scientists and engineers
5. _____Business/management personnel
6. _____General labor
7. _____Other, please specify_____

Q16 Has locating and hiring individuals with critical skills or training been a major problem for the firm?

1. Yes (If yes, go to Q16a)
2. No (If no, go to Q17)

Q16a If YES, what types of skills, training, or education are the most difficult to find?

_____

_____

IV. Choice and Evaluation of Location

Q17 Was this firm started in this city (metro area)?

1. Yes (If yes, go to 17a)
2. No (If no, go to 17b)

Q17a If yes, what were the most important reasons for starting this firm in this city?

_____

Q17b If no, why did you relocate to this city?

_____

Q18 Listed below are issues often considered when choosing the area in which to locate a firm. Please rate how important each issue is or was in the choice of your firm's location to this city. (Circle number in scale at left). In addition, rate your satisfaction with your firm's current location as it relates to each issue. (Circle number in scale at right)

LOCATION DECISION: LEVEL OF IMPORTANCE						CURRENT LOCATION: LEVEL OF SATISFACTION			
Not Considered	Very Important	Somewhat Important	Not Important			Very	Somewhat	Not	
0	1	2	3	1.	Availability of professional science and technology staff	1	2	3	NA
0	1	2	3	2.	Availability of professional business staff	1	2	3	NA
0	1	2	3	3.	Availability of technical staff	1	2	3	NA
0	1	2	3	4.	Education and training opportunities for professional staff	1	2	3	NA
0	1	2	3	5.	Education and training opportunities for technical staff	1	2	3	NA
0	1	2	3	6.	Access to research and development facilities	1	2	3	NA
0	1	2	3	7.	Access to consumers	1	2	3	NA
0	1	2	3	8.	Access to suppliers of production equipment	1	2	3	NA
0	1	2	3	9.	Access to suppliers of raw materials and component parts	1	2	3	NA
0	1	2	3	10.	Access to business support services (financial, legal, etc)	1	2	3	NA
0	1	2	3	11.	Local government support for business	1	2	3	NA
0	1	2	3	12.	Access to seed capital for initial development	1	2	3	NA
0	1	2	3	13.	Access to venture capital for commercialization	1	2	3	NA
0	1	2	3	14.	Access to operating capital	1	2	3	NA
0	1	2	3	15.	Taxes on business income & property	1	2	3	NA
0	1	2	3	16.	Building space availability	1	2	3	NA
0	1	2	3	17.	Building space expenditures (rent, etc.)	1	2	3	NA
0	1	2	3	18.	Access to airports	1	2	3	NA
0	1	2	3	19.	Access to interstate highway networks	1	2	3	NA
0	1	2	3	20.	Infrastructure (roads, water, sewers, etc.)	1	2	3	NA

V. Sales and Asset Information

Q19 What were your total sales/revenues in 1987? (estimates acceptable)

$_____ Total

Q20 Approximately what percentage of sales were in:

1.	Kansas	_____%
2.	Adjacent states (CO,NB,MO,OK)	_____%
3.	The rest of the U.S.	_____%
4.	Outside the U.S.	_____%
	TOTAL	100%

Q21 Approximately what percentage of sales were in your city? _____%

Q22 What was the 1987 year-end total net asset value $_____

Q23 What percent of the firm's gross income was devoted to Research and Development? _____%

VI. Start-up Problems

Q24 How severe were the following problems as the firm was being established or during its early development phase? (Circle number)

	SEVERITY				
		No Problem	Minor	Moderate Problem	Major Problem
A. Products Processes and Markets					
1. Analyzing markets	NA	1	2	3	4
2. Developing new products and/or services	NA	1	2	3	4
3. Planning market strategy	NA	1	2	3	4
4. Commercialization of product	NA	1	2	3	4
5. Process development and control	NA	1	2	3	4
B. Financial					
6. Obtaining financing	NA	1	2	3	4
7. Establishing a banking relationship	NA	1	2	3	4
8. Developing/managing an accounting and control system	NA	1	2	3	4
9. Obtaining insurance	NA	1	2	3	4
C. Management/Organizational					
10. Coping with government regulations	NA	1	2	3	4
11. Preparation/use of a business plan	NA	1	2	3	4
12. Setting and implementing goals	NA	1	2	3	4
13. Finding qualified managers and executives	NA	1	2	3	4
14. Finding qualified technical and professional staff	NA	1	2	3	4
15. Finding other qualified employees	NA	1	2	3	4
16. Managing personnel	NA	1	2	3	4
17. Systems maintenance	NA	1	2	3	4
D. Selecting/Developing a Location					
18. Identifying/selecting a suitable site	NA	1	2	3	4
19. Locating suitable rental space	NA	1	2	3	4
20. Access to customers, clients	NA	1	2	3	4
21. Access to suppliers, vendors	NA	1	2	3	4

VII. Start-up Assistance

A business incubator is generally understood to be a facility with adaptable space which can be leased by small businesses typically on flexible terms and with affordable rents. Support services and business development services, such as financing, marketing, and management are available and shared by the tenants of the facility. The basic purpose in formulating an incubator is to enhance the chance for survival of young business.

Q25 Was a small business incubator facility available in your area during your start-up phase? (Circle number)

1. Yes (If yes, go to Q26a)
2. No (If no, go to Q26b)

Q26a If YES, did you use it?

1. Yes
2. No (If no, why not?)

_____

_____

_____

Q26b If NO, would you have considered using an incubator incubator facility had one been available in your area?

1. Yes
2. No
3. Don't know

Q27 If no cost or low cost assistance were available and accessible during your firm's early development phases, which of the following services would you have used? Circle 0 if you would NOT have used that service. If you WOULD have used the service, rate how beneficial it would have been by circling a number (1=Slightly beneficial; 2=Moderately beneficial; 3=Very beneficial; 4=Extremely beneficial)

	Would Not Use:	Would Use: Level of benefit			
		Slight	Mod.	Very	Extreme
1. Access to technical consultants (e.g. university faculty, other specialists) regarding:					
1a. products and/or manufacturing processes	0	1	2	3	4
1b. new product development, including technical research	0	1	2	3	4
1c. commercialization of products	0	1	2	3	4
1d. product analysis/improvement	0	1	2	3	4
1e. new or existing technology transfer	0	1	2	3	4
1f. preparation of grant proposals (e.g., SBIR)	0	1	2	3	4
1g. other, please specify _____	0	1	2	3	4
_____	0	1	2	3	4
2. Access to scientific instruments and equipment	0	1	2	3	4
3. Access to high-powered computers	0	1	2	3	4
4. Access to library or computer searches	0	1	2	3	4
5. Access to business/managerial professionals regarding:					
5a. starting a business	0	1	2	3	4
5b. market research and planning	0	1	2	3	4
5c. preparation and use of a business plan	0	1	2	3	4
5d. financial planning/management	0	1	2	3	4
5e. advertising and promotion	0	1	2	3	4
5f. inventory control	0	1	2	3	4
5g. personnel management	0	1	2	3	4
5h. other, please specify _____	0	1	2	3	4
_____					
6. Access to other professionals regarding:					
6a. legal services	0	1	2	3	4
6b. insurance services	0	1	2	3	4
6c. other, please specify _____	0	1	2	3	4
_____					
7. Access to general office services	0	1	2	3	4
8. Other, please specify _____	0	1	2	3	4

VIII. Future Plans

Q28 What are your business plans for the next 2-3 years? (Circle all that apply.)

1. No major changes
2. Development of new products
3. Change mix of products or services
4. Significant **increase** in employees
5. Significant **decrease** in employees
6. Spin off new firm(s)
7. Sell the firm
8. Don't know

Q29 Has this firm already spun off any new firms?

1. Yes Q29a If YES, how many? _____
2. No

Q30 If you were to start a new business, rate how interested you would be in using an incubator facility? (Circle number)

Very interested Not interested

1 2 3 4 5

IX. Technology

Q31 What are your firm's source(s) of information on current technological developments? (Circle all that apply)

1. Have no source
2. Sources within the company
3. Equipment manufacturers
4. Trade associations
5. Sales representatives
6. Universities and colleges
7. Magazines/journals
8. Consultants
9. Private laboratories
10. Government laboratories
11. Other (specify)_____

Q32 Are your present sources for science and technology information adequate for you to be competitive and to innovate? (Circle number)

1. YES
2. NO

Q33 Mark your firm's source(s) of information on current management practices. (Circle all that apply)

1. Have no source
2. Sources within the company
3. Trade associations
4. Universities and colleges
5. Magazines/journals
6. Consultants
7. Other (Specify)_____

Q34 Are your present sources for business/management practices information adequate?

1. YES
2. NO

X. Technological Changes

Q35 What is your firm's ability to predict technological change in your industry? (Circle number)

1. Excellent
2. Good
3. Fair
4. Can't predict
5. NA

Q36 In the next five years, how likely is your firm to make changes in the technologies it uses? (Circle number)

1. Very likely
2. Somewhat likely
3. Somewhat unlikely
4. Very unlikely
5. Not likely

Q37 Has any technology or technical system been identified as potentially valuable for the firm but not been adopted?

1. YES
2. NO

Q38 If YES, what type?_____

Why not adopted?_____

_____

Q39 What are the barriers to introducing new or existing technology or technical systems into the firm? (Circle all that apply)

1. No barriers
2. Lack of engineers
3. Lack of skilled workers
4. Lack of technical expertise
5. Lack of technical information
6. Lack of financial resources
7. Lack of managerial commitment
8. Risk too high
9. Other (specify)_____

_____

Q40 How can barriers to introducing new or existing technology or technical systems into the firm be overcome?

XI. Academic Linkages

Q41 In the past five years, has the firm used the services of any non-Kansas university, community college, or vocational/technical school? (Circle number)

1. YES
2. NO

Q42 If yes, was this because the services needed were not available from Kansas institutions?

1. Yes
2. No

Q43 In the past five years, has the firm used the services of any Kansas university, community college, or vocational/technical school? (Circle number)

1. YES
2. NO (If No, go to Q48)

Q44 Which types of TECHNICAL assistance did the firm use from Kansas universities and colleges in the past five years? (Circle all that apply)

1. Technical consultation with faculty regarding products and/or processes
2. Plant layout & materials handling
3. Product analysis/improvement
4. New product development
5. Manufacturing process analysis/improvement
6. Technical research for future products or processes
7. Commercialization
8. Explanation of existing technology
9. Explanation of new technology
10. Technical training of workers

11. Library or computer searches
12. Use of scientific instruments and equipment
13. Use of computers
14. Assistance in proposal preparations
15. Joint research
16. Other (specify)_____

Q45 What type of BUSINESS/MANAGERIAL assistance did the firm use from Kansas universities and colleges in the past five years? (Circle all that apply)

1. Market research & planning
2. Financial analysis & cost control
3. Development/management of accounting systems
4. Preparation & use of a business plan
5. Advertising & promotion
6. Feasibility studies
7. Inventory control
8. Personnel and organization
9. Management development training
10. Use of library
11. Use of computer(s)/computer applications
12. Production management
13. Other (specify)_____

Q46 With which institution(s) did you interact? (circle all that apply)

1. Emporia State University
2. Fort Hays University
3. Kansas State University
4. University of Kansas
5. Pittsburg State University
6. Wichita State University
7. Kansas College of Technology (formerly Kansas Technical Institute)
8. Washburn University
9. Community college (specify)_____
10. Technical/Vocational School(specify)_____
11. Private institution (specify)_____
12. Other (specify)_____

Q47 What were the reasons for the choice of institution(s)? (Circle all that apply)

1. Located close to firm
2. School/department has state/national reputation interest area
3. Knew of an individual whose expertise you could use
4. Institution was familiar to you (alumnae, friends attended, etc.)
5. Institution/department/faculty agreed to help while others didn't
6. Institution/department/faculty was recommended to you by others
7. Other (specify)_____

Q48 Why has your firm not used university and college resources more? (Circle all that apply)

1. Do not know how to make contacts
2. Do not know whom to contact
3. Do not have time to make contacts
4. Tried but got no response
5. Problems cannot be solved by faculty (lack of experience, expertise)
6. Faculty/schools seen as too out of touch with business problems
7. Response time is too slow
8. Other (specify)_____

Q49 Would your firm seek more assistance from state/local academic institutions if it were available?

1. YES
2. NO

Q50 How interested would your firm be in the following services? (Circle number)

		Interest Level			
		Great	Moderate	Little	None
1.	Research and development activities to develop new technology, products, processes, etc.	1	2	3	4
2.	Access to state-of-the-art science and technology to improve current products and processes	1	2	3	4
3.	Access to technical expertise to facilitate technical problem identification & assistance	1	2	3	4
4.	Access to business/managerial expertise to facilitate business/managerial problem identification & assistance	1	2	3	4
5.	Computer access to university libraries for information retrieval and/or networking	1	2	3	4
6.	Access to labs and equipment	1	2	3	4
7.	Access to training programs to improve employee technical skills	1	2	3	4
8.	Access to management development training	1	2	3	4
9.	Other_____	1	2	3	4

Q50 Would you prefer to make your own initial contact with universities and other postsecondary institutions, or would it be helpful to have a liaison office help you locate and contact persons who could best solve your business and technical problems? (Circle number)

1. Own contacts
2. Liaison office
3. Other (specify)_____
4. Don't know

Is there anything else you would like to tell us about your firm's needs that could be used to design academic/industrial linkages to assist you to be competitive nationally and internationally?

_____

Your contribution to this effort is greatly appreciated.
Please insert in envelope provided and return by December 23, 1988.