

Identify and Define: Locating, Describing and Categorizing Missouri Technology Companies

Economic
Development
Administration
University Center Grant
University of Missouri

Prepared by:
Gwen Richtermeyer Martin, Ph.D.
Cassy Dierking Venters, Ed.D.

October 2005



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Table of Contents

Background	1
Strategy One - Identification	1
Strategy Two - Focus Groups with Experts and Service Providers	1
Methodology	1
Focus Group Findings	2
Interviews with Owners	3
Methodology	3
Table 1: Contacts - Attempted & Actual	3
Table 2: Completed Interviews	3
Findings from Business Owners	3
Business Start	4
Years in Business	4
Business Type	4
Technology Focus	5
Produce/Use/Add Value	6
Stage of Business	6
Stage of Innovation	7
Number of Full-time Employees	7
Type of Financing	8
Debt	8
Equity	8
Grants	8
Patents, Copyrights and Trade Secrets	8
Adequacy of Local Infrastructure	9
Located in Technology/Commercial/Industrial Park	9
Motivations for Location	9
Part of a Larger Cluster	9
Involvement in a Local/Regional Business or Technology Network	10
Current Research Resources	10
College or University	10
Public Agencies	10
Private Companies	10
Special Needs	11
Exporting Products and/or Services	11
Future Contact	11
Discussion	12

Appendices 15

Appendix 1 - Tables 15

Table 3: Business Start 15

Table 4: Years in Business 15

Table 5: Type of Business 16

Table 6: Technology Focus 17

Table 7: Technology - Produce/Use/Add Value 18

Table 8: Stage of Business 19

Table 9: Stage of Innovation 20

Table 10: Number of Employees 21

Table 11: Type of Financing - DEBT 21

Table 12: Type of Financing - EQUITY 22

Table 13: Type of Financing - GRANTS 22

Table 14: Number of Patents, Copyrights and Trade Secrets 23

Table 15: Licensed Patents, Copyrights and Trade Secrets 23

Table 16: Adequacy of Local Infrastructure 24

Table 17: Located in Technology/Commercial/Industrial Park 24

Table 18: Motivations for Location 25

Table 19: Part of a Large Cluster 27

Table 20: Involvement in a Local/Regional Business or Technology Network 27

Table 21: Current Research Resources - College or University 28

Table 22: Current Research Resources - Public Agencies 28

Table 23: Current Research Resources - Private Companies 29

Table 24: Special Needs 29

Table 25: Exporting Products and/or Services 30

Table 26: Future Contact 30

Appendix 2 - Technology Map 31

Appendix 3 - Interview Protocol 32

About Us 36

Background

The research portion of the Economic Development Administration's University Center Grant awarded to University of Missouri in 2004 proposed two strategies. The first was to identify the technology-related firms in Missouri, with an emphasis on the Columbia and Rolla corridor and distressed communities. The second was to determine ways to define technology companies. The advice of the experts, service providers, and owners of technology-related firms was sought in order to ground our research in the applied, everyday world of conducting business. Details of each strategy were modified as necessary during the course of this study.

Strategy One – Identification

The Business Research & Information Development Group (BRIDG) created a comprehensive list of technology-related firms located in Missouri. The lists were compiled from many sources, both public and private, using SIC or NAICS codes that have been found to represent the targeted industries. The Dun & Bradstreet Marketplace (or Zap) Database was the foundation. Additional lists from the Department of Economic Development, University of Missouri, Missouri BioTechnology Association, and others were integrated and culled for duplication.

Final lists were sorted into the eight University of Missouri Extension regions. A contact list of all technology-related companies by region was created and provided to the Economic Development Administration (EDA) and the Small Business Development Center (SBDC) Directors for their use. This information enabled the directors to actively seek out companies for potential services as well as become more

familiar with the variety of technology-related firms in their respective geographical spaces. In addition, BRIDG created a map using the technology-related firms from the Dun & Bradstreet Marketplace (Zap) Database. The map shows the wide dispersion of technology-related firms in Missouri (see Appendix 2 on page 31).

These tools – the map showing distribution of technology-related firms in the state, and the area contact lists – have provided a foundation from which the EDA, SBDC's and Extension faculty can actively address the needs of these Missouri firms. It also has provided a base for the development and implementation of a cadre of specially-trained technology business counselors within the SBDC system.

Strategy Two – Focus Groups with Experts and Service Providers

A critical piece of the research into technology companies for the Economic Development Administration's University Center Grant at the University of Missouri-Columbia required development of an effective interview protocol. In order to create a meaningful and useful protocol, experts in the technology field were consulted.

Methodology

BRIDG compiled a list of experts representing various constituencies – technology companies, university faculty and staff, economic developers, state administrators, and technical assistance service providers. Focus group methodology was chosen as the best manner in which to engage these experts in a conversation about the needs of technology companies.

Specifically, we wanted the experts to advise us on the following broad questions:

- *What do we want to know?*
- *What do we not know?*
- *What information must we have to serve this sector to start and grow firms and jobs?*

A set of questions was created to address these topics along with a set of questions that participants could use to jump start their thinking. We conducted focus groups in Columbia, Jefferson City and Rolla. Each conversation was recorded to ensure accuracy of comments and suggestions. The audio tapes were then transcribed. Dr. Gwen Richtermeyer and Amy Light Mills facilitated the focus groups.

Focus Group Findings

The following primary themes emerged from the focus groups:

- Identification
- Definition
- Categorization
- Stages of business
- Barriers
- General versus specific and breadth versus depth

The experts pointed out the enormity of missing information regarding technology companies in Missouri. Technology companies have not been identified in any meaningful way, nor has what represents a technology company been determined. The move from SIC to NAICS has helped, but still remains too broad for practitioner or practical use.

Defining technology companies in a general, broad sense does not add value to our understanding of needs, or how best to serve this sector. Further *categorization* of technology firms into major divisions and sub-

divisions would be helpful. The major definitional split that focus group participants identified was between those who *produce technology* and those who *use technology*.

Two ways to further categorize technology firms is by the current stage of business and stage of innovation. Business stages may be broken out as follows:

- Concept
- Start-up (less than one year old)
- Existing (more than one year old)
 - Growth
 - Mature
 - Declining

Stages of innovation may be broken out as follows:

- Basic Research
- Concept Proofing
- Early Stage Development
- Product Development
- Production and Marketing

Investigating the *barriers to growth and what technology company owners require, want and desire* are the next points of inquiry. Focus group participants were enthusiastic about what they wanted to know in order to better understand and serve this sector.

The focus groups results highlighted the need to modify the original research proposal and conduct the research in two phases. Experience in conducting research in this market has shown that business owners place a high value on time. Therefore, the original research proposal was modified and plans were made to conduct the research in two phases. Phase one included shorter interviews designed to elicit a broad range of information. and this was conducted in 2004 - 2005. The second phase of the research will be conducted in 2005 - 2006, and it will involve longer interviews designed to obtain greater depth of data.

Interviews with Owners

Based on the focus groups, we decided to interview a sample of technology company owners for breadth. A copy of the interview protocol is located in Appendix 3 on page 32.

Methodology

From the lists created by BRIDG, random samples of technology companies through out the state were drawn. Four samples were drawn, totaling 1,500 Missouri companies. The goal of 101 companies was reached prior to exhausting the fourth sample. A total of 101 were completed with 84 percent of the companies located outside the Columbia and Rolla corridor and 16 percent located within the corridor. Interviewers contacted or attempted to contact a total of 1,020 companies throughout the state.

Given the imprecise nature of SIC and NAICS codes, a simple screening question was used to correctly identify *technology* companies. The question was as follows:

Does (company name) develop technology, use advanced technology, or add value to existing technology?

More than one-third of the companies on our lists were not found. A breakout of the 1,020 attempted and actual contacts can be found in Table 1.

	N	Percent
Potential respondents	1,020	100
Disconnected telephones	119	11.67
No answer	130	12.74
Out of business	7	0.68
Wrong number	111	10.88
Remaining potential respondents	653	64

Inquiry results for the remaining 653 valid interview candidates is presented in Table 2.

	N	Percent
Potential respondents	653	100
Did not pass screen	249	38.13
Did not return calls	208	31.85
Refused to be interviewed	81	12.4
E-mailed questionnaire - no response	14	2.14
Completed interviews	101	15.46

The resulting response rate of 15.5 percent represents a contact to interview ratio of nearly 10:1. What is surprising is that more than one-third of the potential respondents did not pass the screening question. The data add to the evidence that the sole use of SIC and/or NAICS codes to identify technology companies is insufficient. This, combined with the focus groups statements regarding the problem of accurately identifying technology companies, demonstrates that proper identification of technology companies is an issue that must be addressed.

Findings from Business Owners

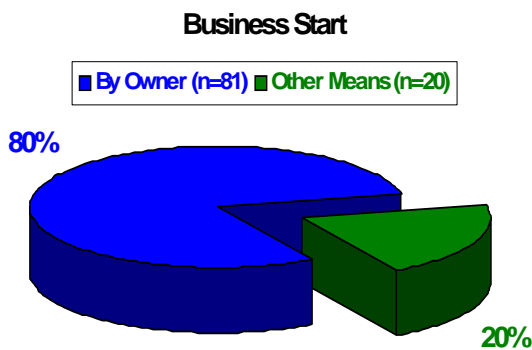
Results presented are based on a total of 101 telephone interviews. Two interviews are not included in the analysis since during the interview it was revealed that they did not fit the technology company profile used for this project.

Eighty-four percent of respondents owned businesses outside of the Columbia and Rolla corridor and 17 percent owned businesses within the corridor. Findings are provided in sequence of the interview questions and differences between companies located in the Columbia and Rolla corridor are compared to those located in other parts of the state.

Business Start

We found out that 80 percent of technology companies interviewed were started by the current business owner. Twenty percent of business owners interviewed acquired their companies through other means (purchased, inherited, etc.).

No statistically significant differences were observed between corridor and non-corridor companies and how the business was started or was acquired. Current business owners started 80 percent of non-corridor companies and started 82 percent of corridor companies.



Years In Business

The number of years in business ranged from one year to 51 years with an average of 11.7 years.

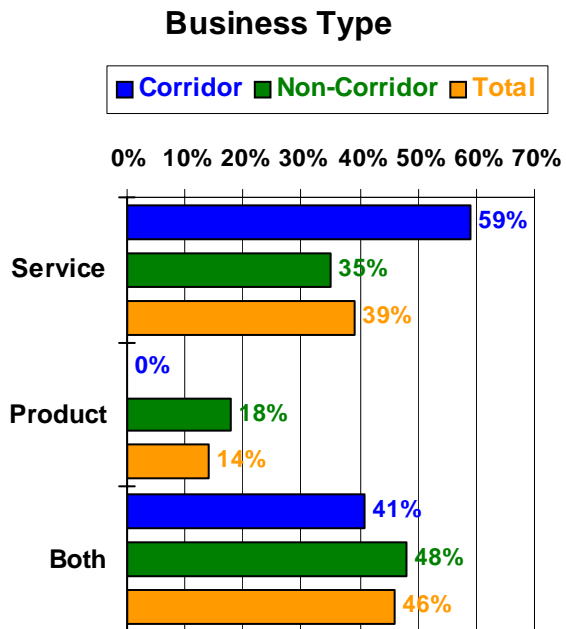
Corridor and non-corridor companies had been in business about the same number of years with corridor companies in business for an average of 10.8 years and non-corridor companies in business for an average of 11.8 years. However, a third of respondents had been in business five years or less.

Business Type

Forty-six percent of technology companies represented both product and service companies; 39 percent represented only service companies and 14 percent represented only product companies.

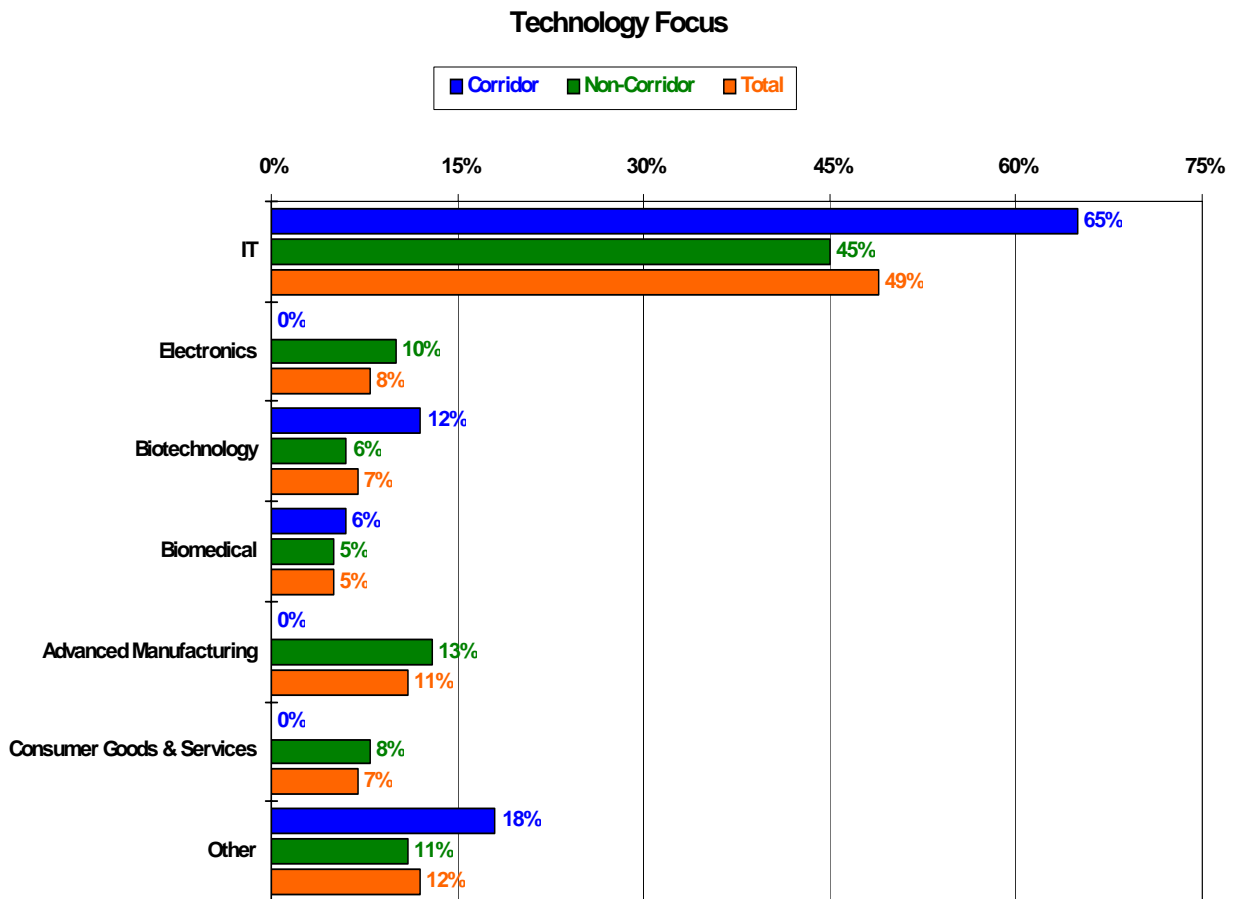
Forty-eight percent of the non-corridor companies and 41 percent of corridor companies identified themselves as both product and service companies. Fifty-nine percent of corridor companies and 35 percent of non-corridor companies identified themselves as service companies.

Eighteen percent of non-corridor companies identified themselves as product companies. None of the corridor companies identified themselves as product companies.



Technology Focus

Almost 49 percent of all technology companies indicated that the primary focus of the company was IT (software, communications, Internet-delivered services). Twelve percent indicated other, and 11 percent indicated manufacturing as the primary technological focus.



Produce/Use/Add Value

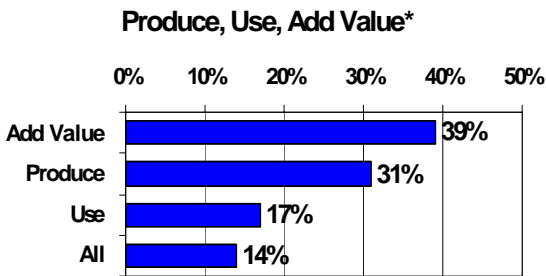
Thirty-nine percent of respondents indicated their companies add value to existing technology and 31 percent indicated their companies primarily produce technology. Seventeen percent of technology companies indicated they use technology and 14 percent indicated they produce, use and add value to existing technology.

Larger proportions of non-corridor companies indicated they:

- produce technology (31 percent versus 29 percent)
- add value to existing technology (39 percent versus 35 percent)
- produce, use and add value to existing technology (16 percent versus 6 percent)

A larger proportion of corridor companies indicated they:

- use technology (29 percent versus 14 percent)



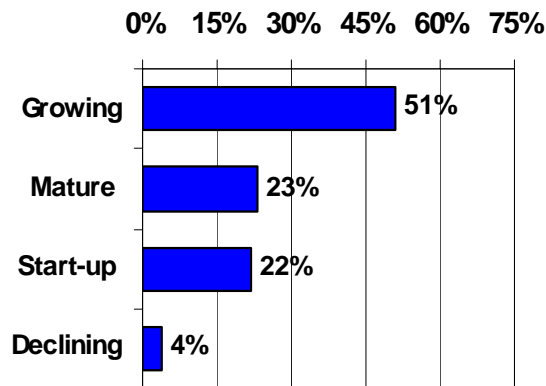
*Proportions will not equal 100 percent due to rounding

Stage of Business

About half (51 percent) of respondents indicated their businesses are growing. Twenty-two percent indicated their businesses were in the start-up stage, 23 percent indicated being in the mature stage of business development and 4 percent indicated their businesses are declining.

Higher proportions of corridor companies indicated their businesses are growing, or declining, while a higher proportion of non-corridor companies indicated their businesses were in the start-up or mature stage.

Stage of Business



Stage of Innovation

Overall, 40 percent of respondents indicated being in the production and marketing stage of innovation and 31 percent indicated being in the product development stage. In addition, 11 percent of respondents indicated being in all stages of innovation.

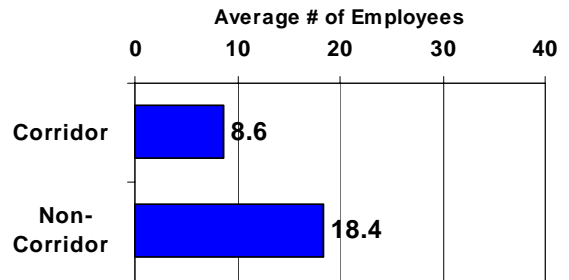
The largest meaningful differences between corridor and non-corridor companies were observed with the production and marketing and the product development stages of innovation. Forty-five percent of non-corridor companies indicated production and marketing as their current stage of innovation compared to 13 percent of corridor companies. Thirty-three percent of non-corridor companies also indicated product development as their current stage of innovation compared to 19 percent of corridor companies.

Number of Full-time Employees

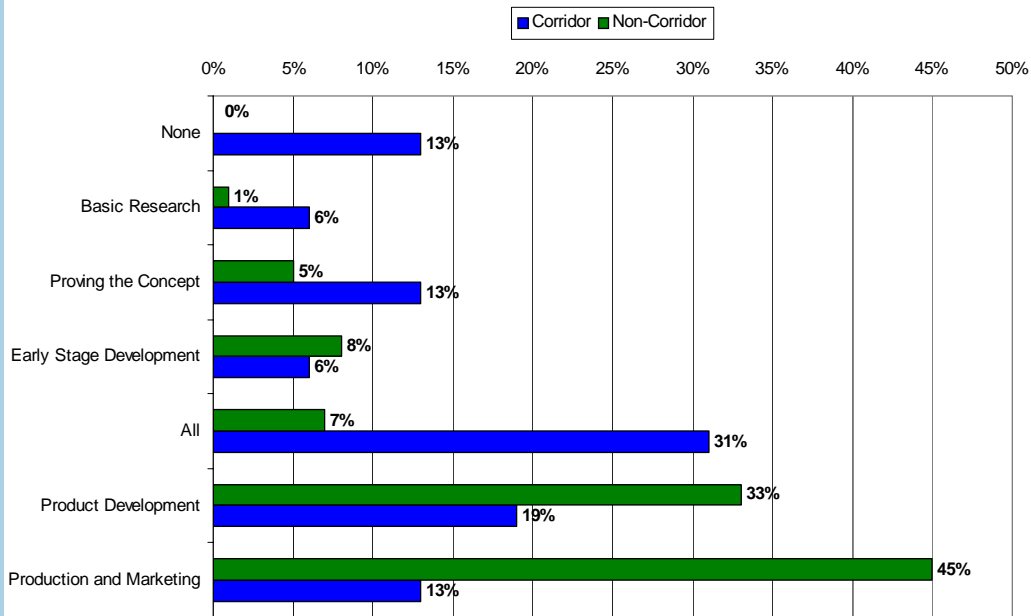
Overall, the number of full-time employees ranged from zero employees to 155 employees with an average number of 16.8 full-time employees. Just over half of interview respondents indicated employing six or fewer full-time employees.

Even though it was not statistically significant, the data shows that non-corridor companies have a higher average number of full-time employees than corridor companies. The average number of full-time employees for non-corridor companies was 18.4 and the average number of full-time employees for corridor companies was 8.6. However, the average number of full-time employees is more than likely skewed since the company with 150 employees is a non-corridor company.

Number of Full-time Employees



Company Location by Stage of Innovation



Type of Financing

Debt

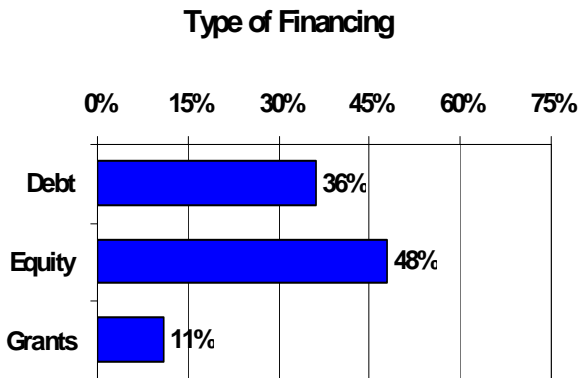
Overall, 36 percent of respondents financed their companies using debt. Even though statistically significant differences were not observed, a larger proportion of corridor companies financed their companies using debt than non-corridor companies (41 percent versus 35 percent).

Equity

Overall, 48 percent of respondents financed their companies using equity (47 percent corridor, 48 percent non-corridor).

Grants

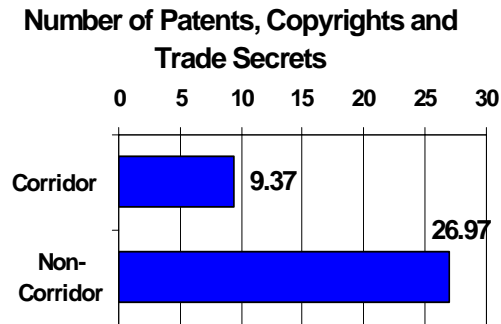
Eleven percent of respondents financed their companies using grants. A larger proportion of corridor companies financed their companies with grants than non-corridor companies (24 percent versus 9 percent).



Patents, Copyrights and Trade Secrets

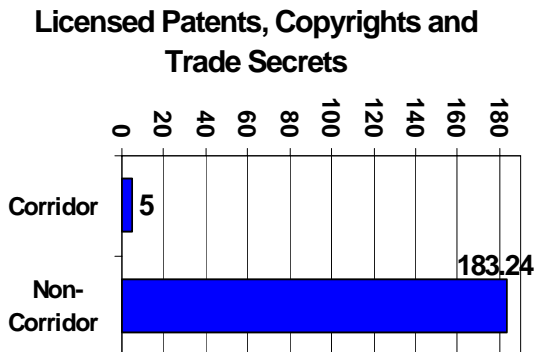
Overall, the number of patents, copyrights and trade secrets ranged from one to 600 with an average of 23.97. Forty-six percent of business owners interviewed reported they did not own any patents, copyrights or trade secrets.

Non-corridor companies had a higher average number of patents, copyrights and trade secrets than corridor companies (26.97 versus 9.37).



The number of licensed patents, copyrights and trade secrets ranged from one to 3,000 with an average of 22. Twenty-two percent of respondents also reported they did not license any patents, copyrights or trade secrets.

Non-corridor companies licensed, on average, 183.24 patents, copyrights and trade secrets and corridor companies licensed, on average, five.

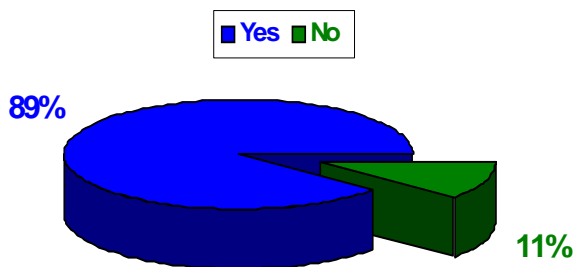


Adequacy of Local Infrastructure

A majority of respondents, (89 percent) regardless of where they are located, indicated their local infrastructure (utilities, highways, broadband access, etc.) was adequate for their needs.

All of the corridor companies indicated their local infrastructures were adequate and 87 percent of non-corridor companies indicated their local infrastructures were adequate for their needs.

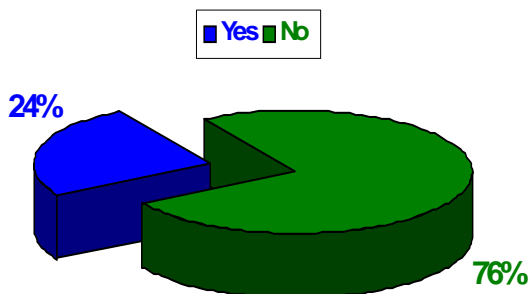
Adequacy of Local Infrastructure



Located in Technology/Commercial/Industrial Park

A majority of respondents indicated their companies are **not** located in a technology, commercial or industrial park (76 percent). It appears that more non-corridor companies are located in technology, commercial or industrial parks than corridor companies (26 percent versus 12 percent).

Technology, Commercial, or Industrial Park Location



Motivations for Location

More than half (53 percent) of respondents indicated their primary motive for locating their business in a particular place was based on where they lived.

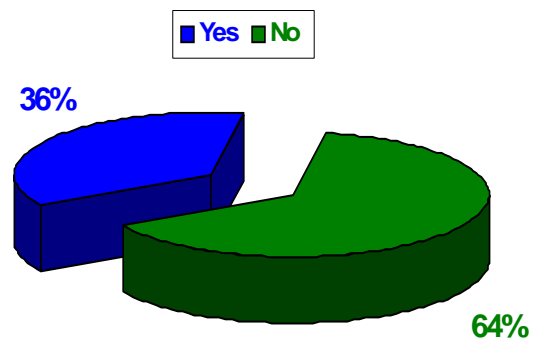
Other motivations included easy access to highways and airports, tax abatements, and low rents and office spaces.

Part of a Larger Cluster

Overall, 64 percent of respondents indicated their companies are **not** part of a larger cluster.

A larger proportion of corridor companies identified their companies as being a part of a larger cluster than non-corridor companies (41 percent versus 35 percent).

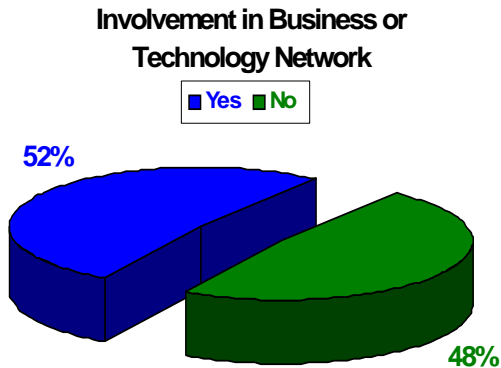
Part of Larger Cluster



Involvement in a Local/Regional Business or Technology Network

Just over half of all respondents indicated they are involved in a local/regional business or technology network (52 percent).

Fifty-three percent of non-corridor business owners reported they were involved and 51 percent of corridor business owners reported they were involved.

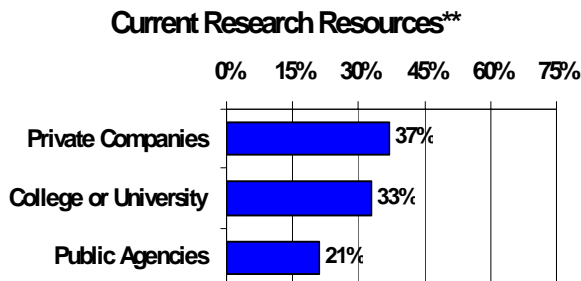


Current Research Resources

College or University

Thirty-three percent of all respondents currently use research resources from a college or university.

Thirty-five percent of corridor and 32 percent of non-corridor business owners reported using research resources from a college or university.



**Proportions will not equal 100 percent since data is derived from three separate questions

Public Agencies

Twenty-one percent of business owners reported using research resources from public agencies.

A larger proportion of business owners within the corridor indicated using research resources from public agencies than business owners outside of the corridor (29 percent versus 19 percent).

Private Companies

Thirty-seven percent of business owners indicated they currently use research resources from private companies.

A larger proportion of business owners with companies inside the corridor reported using research resources from private companies than business owners with companies in other parts of the state (41 percent versus 36 percent).

Overall, corridor companies reported higher proportions of using university, public and private research resources than non-corridor companies.

Special Needs

The top three special needs identified by respondents are: marketing (49 percent), labor (48 percent), and partnerships (40 percent).

Among business owners within the corridor the top three special needs mirror the overall findings: 71 percent identified marketing, 47 percent identified partnerships and 44 percent identified labor.

Special needs identified by business owners outside of the corridor are more equally distributed across the categories. Forty-eight percent of non-corridor business owners identified labor and marketing. In addition, 38 percent identified finance and 38 percent identified partnerships.

A statistically significant difference was observed between company location and the special needs area of marketing. Corridor companies (71 percent) are statistically significantly more likely to indicate marketing as a special needs area than non-corridor companies (44 percent).

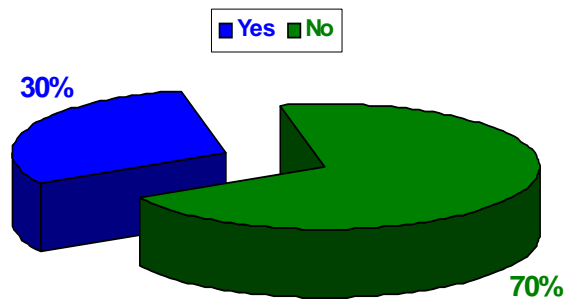
Exporting Products and/or Services

Overall 30 percent of business owners export products or services overseas.

A larger proportion of non-corridor companies reported exporting products or services than corridor companies (32 percent versus 25 percent).

Overall 70 percent of interview respondents indicated their companies do not export products or services. Of these, almost 60 percent indicated they did not want to pursue exporting products or services.

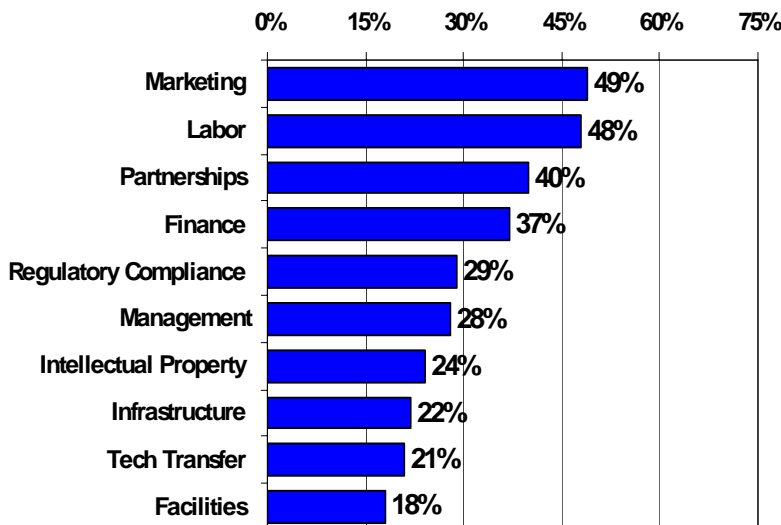
Exporting Products and/or Services



Future Contact

All respondents indicated they could be contacted in the future.

Special Needs



Discussion

These studies strongly indicate that there are opportunities for the EDA University Center to help *start and grow* technology-related companies. One-quarter of the businesses interviewed are in the start-up stage. There is a higher proportion of start-ups in areas outside of the Columbia and Rolla corridor. The average length of time in business for the interviewees is 11.7 years. Both start-up and existing businesses are present and represent target audiences for technology-related business assistance.

Identifying and contacting firms at the right time is critical to building a solid relationship. With more than 31 percent of the firms in the product development stage, there are ample opportunities for research and development assistance from the EDA University Center. The 40 percent of companies in the production and marketing stage of innovation also are potential EDA University Center clients.

A major purpose of this study was to identify meaningful ways to describe and categorize technology-related companies. Technology focus, production versus use of technology, stage of business, and stage of innovation all may be useful in describing and categorizing technology businesses. Nearly five out of 10 companies focus on Information Technology, with only one in 10 focused on biotechnology. A higher proportion of corridor companies are focused in Information Technology (65 percent) than non-corridor companies (45 percent). Likewise, a higher proportion of corridor companies are focused in biotechnology (12 percent) than non-corridor companies (6 percent). These specialties require the EDA University Center to secure and maintain appropriate staff expertise to understand and relate to the inner workings of these types of companies and industries.

Focus groups identified the major definitional split between those that *produce technology* and those who *use technology*. Technology-related companies also can be identified by whether they produce or use technology. Respondents show that they most often *add value (39 percent)* or *produce technology (31 percent)* rather than *use it (17 percent)*. Fourteen percent indicated that they produce, use and add value to existing technology.

Two additional ways to categorize technology firms were proposed by the focus groups: *The current stage of business* and the *stage of innovation*. Fifty-one percent of the interview respondents said their businesses were in a *growth* stage with another 22 percent in a start-up stage. And 71 percent said they were either in a *production and marketing stage (40 percent)* or *product development stage (31 percent)* of innovation.

As noted above, data from this study have implications for the skills needed by EDA University Center staff. In addition to having skills in information technology, EDA University staff need skills in addressing the needs of companies with relatively few employees. Companies interviewed have an average number of full-time employees of 16.8 with half of the interview respondents employing six or fewer full-time employees. Additionally, staff need skills in helping companies obtain financing as 48 percent financed their companies using equity, 37 percent financed their companies using debt and 11 percent financed their companies using grants.

EDA University Center staff need expertise in the top three business needs: marketing, labor and partnerships. Corridor business owners identified marketing needs 71 percent of the time, a statistically significant difference between corridor and non-corridor companies. Special needs identified by non-corridor business owners were more equally distributed across categories.

Data related to the respondents' involvement in local/regional business networks highlights an opportunity to reach businesses. Fifty-two percent of the respondents reported involvement in a network. EDA University Center staff may be able to reach these business owners through existing networks. Further information is needed to identify the reasons that 48 percent of respondents were not involved in a network, and this will be conducted in 2005-06.

Perhaps the greatest opportunity lies in the purpose for having an EDA University Center – to connect the resources of the university to entities to grow local and regional economies. One-third of the respondents indicated that they use university or college resources compared to 37 percent who use private resources. Both numbers indicate that respondents were willing to seek and use external resources. Further information is needed on how these companies found the university resources and what leads to a mutually beneficial relationship between the company and university.

It comes as no surprise that the primary reason companies locate in a specific geographical space is that the owner or founder lives in that area. Fifty-three percent of respondents indicated that their primary motivator for locating their business was to locate their companies in the cities in which they lived. Since only about one-quarter of the interview respondents' businesses are in a cluster and most are not in technology, commercial or industrial parks, these data also may point to the viability of more clusters and/or technology parks within the cities and communities where businesses are located. However, viable clusters or technology parks will need to be premised on the business owner's motivation for locating their company.

The motivation for locating businesses in the geographic area of the owner or founder bodes very well for understanding entrepreneurship as an economic development strategy. These firms' employment ranged from one to 155, with an average of 16.8.

A primary purpose of this research was to identify the technology-related firms in Missouri and provide some of the missing information regarding how technology companies in Missouri could be defined and categorized.

The data in this report adds evidence that locating technology-related companies can be difficult and that the sole use of SIC and/or NAICS codes to identify technology companies is insufficient. One-third of the companies identified could not be located. Thirty-eight percent of the respondents did not pass the screening question. However, 101 companies were identified for the study. Those companies provided data that show that technology focus, production versus use of technology, stage of business and stage of innovation are useful in identifying and describing technology businesses. The data further show that technology companies do represent an important market for EDA University Center staff services.

The University Center is supported by the Economic Development Administration, U.S. Department of Commerce, through its University Centers Program.

The mission of EDA is to lead the federal economic development agenda by promoting innovation and competitiveness, preparing American regions for growth and success in the worldwide economy.

Appendix 1 - Tables

The total number of responses in each table may not be equal across tables due to missing data.

Table 3: Business Start			
	Sample		
Did you start this business?	Corridor	Non-Corridor	Total
Yes			
Count	14	67	81
Expected	13.6	67.4	81
% w/in Sample	82.40%	79.80%	80.20%
Residual	0.4	-0.4	
No			
Count	3	17	20
Expected	3.4	16.6	20
% w/in Sample	17.60%	20.20%	19.80%
Residual	-0.4	0.4	
Total			
Count	17	84	101
Expected	17	84	101
% w/in Sample	100%	100%	100%
(Pearson's Chi-square > .05)			
<i>No statistically significant differences were observed between corridor and non-corridor companies and how the business started or was acquired.</i>			

Table 4: Years in Business	
Corridor / Non-corridor	Number of Years
Corridor	
Mean	10.7647
N	17
Std. Deviation	8.72159
Non-Corridor	
Mean	11.8452
N	84
Std. Deviation	10.71537
Total	
Mean	11.6634
N	101
Std. Deviation	10.37476
(Sig. \geq .05)	
<i>No statistically significant differences were observed between corridor and non-corridor companies and the number of years in business.</i>	

Table 5: Type of Business			
Business Type	Sample		Total
	Corridor	Non-Corridor	
Service			
Count	10	28	38
Expected	6.7	31.3	38
% w/in Sample	58.80%	35.00%	39.20%
Residual	3.3	-3.3	
Product			
Count	0	14	14
Expected	2.5	11.5	14
% w/in Sample	0%	17.50%	14.40%
Residual	-2.5	2.5	
Both			
Count	7	38	45
Expected	7.9	37.1	45
% w/in Sample	41.20%	47.50%	46.40%
Residual	-0.9	0.9	
Total			
Count	17	80	97
Expected	17	80	97
% w/in Sample	100%	100%	100%
(Pearson's Chi-square $\geq .05$)			
<i>No statistically significant differences were observed between corridor and non-corridor companies and business type.</i>			

Table 6: Technology Focus			
Primary Technology Focus	Sample		Total
	Corridor	Non-Corridor	
IT			
Count	11	38	49
Expected	8.2	40.8	49
% w/in Sample	64.70%	45.20%	48.50%
Residual	2.8	-2.8	
Electronics			
Count	0	8	8
Expected	1.3	6.7	8
% w/in Sample	0%	9.50%	7.90%
Residual	-1.3	1.3	
Biotechnology			
Count	2	5	7
Expected	1.2	5.8	7
% w/in Sample	11.80%	6.00%	6.90%
Residual	0.8	-0.8	
Biomedical Devices & Instruments			
Count	1	4	5
Expected	0.8	4.2	5
% w/in Sample	5.90%	4.8%	5.00%
Residual	0.2	-0.2	
Advanced Mfg. Devices & Materials			
Count	0	11	11
Expected	1.9	9.1	11
% w/in Sample	0%	13.10%	10.90%
Residual	-1.9	1.9	
Consumer Goods & Services			
Count	0	7	7
Expected	1.2	5.8	7
% w/in Sample	0%	8.30%	6.90%
Residual	-1.2	1.2	
Environmental Goods & Services			
Count	0	2	2
Expected	0.3	1.7	2
% w/in Sample	0%	2.4%	2.0%
Residual	-0.3	0.3	
Other			
Count	3	9	12
Expected	2	10	12
% w/in Sample	17.60%	10.70%	11.90%
Residual	1	-1	
Total			
Count	17	84	101
Expected	17	84	101
% w/in Sample	100%	100%	100%
<i>Tests for statistically significant differences could not be conducted since 86% percent of cells had expected counts less than five.</i>			

Table 7: Technology - Produce/Use/Add Value			
	Sample		
Produce / Use / Add Value	Corridor	Non-Corridor	Total
Produce			
Count	5	26	31
Expected	5.2	25.8	31
% w/in Sample	29.40%	31.00%	30.70%
Use			
Count	5	12	17
Expected	2.9	14.1	17
% w/in Sample	29.40%	14.30%	16.80%
Add Value			
Count	6	33	39
Expected	6.6	32.4	39
% w/in Sample	35.30%	39.30%	38.60%
All			
Count	1	13	14
Expected	2.4	11.6	14
% w/in Sample	5.90%	15.50%	13.90%
Total			
Count	17	84	101
Expected	17	84	101
% w/in Sample	100%	100%	100%
<i>Tests for significant differences were not conducted between corridor and non-corridor companies and whether they produce, use or add value to existing technology since half of the cells did not meet minimum expected counts.</i>			

Table 8: Stage of Business			
Stage of Business	Sample		Total
	Corridor	Non-Corridor	
Start-up			
Count	3	19	22
Expected	3.5	18.5	22
% w/in Sample	18.80%	22.60%	22.00%
Growing			
Count	9	42	51
Expected	8.2	42.8	51
% w/in Sample	56.30%	50.00%	51
Mature			
Count	3	20	23
Expected	3.7	19.3	23
% w/in Sample	18.80%	23.80%	23.00%
Declining			
Count	1	3	4
Expected	0.6	3.4	4
% w/in Sample	6.30%	3.60%	4.00%
Total			
Count	16	84	100
Expected	16	84	100
% w/in Sample	100%	100%	100%
<p><i>Tests for statistically significant differences could not be conducted since 75 percent of cells did not meet minimum expected counts. However, since the cells sizes are small, these differences actually reflect differences of one or two companies, except when examining the start-up stage of business.</i></p>			

Table 9: Stage of Innovation			
Stage of Innovation	Sample		Total
	Corridor	Non-Corridor	
Proving the concept			
Count	2	4	6
Expected	1	5	6
% w/in Sample	12.50%	4.80%	6.00%
Early stage development			
Count	1	7	8
Expected	1.3	6.7	8
% w/in Sample	6.30%	8.3%	8.00%
Product development			
Count	3	28	31
Expected	5	26	31
% w/in Sample	18.80%	33.30%	31%
Production & marketing			
Count	2	38	40
Expected	6.4	33.6	40
% w/in Sample	12.50%	45.20%	40.00%
All			
Count	5	6	11
Expected	1.8	9.2	11
% w/in Sample	31.30%	7.10%	11.00%
None			
Count	2	0	2
Expected	0.3	1.7	2
% w/in Sample	12.50%	0%	2.00%
Total			
Count	16	84	100
Expected	16	84	100
% w/in Sample	100%	100%	100%
<i>Tests for statistically significant differences could not be conducted since 75 percent of cells did not meet the minimum expected counts.</i>			

	<u>Number of</u>
Corridor / Non-corridor	Full-Time Employees
Corridor	
Mean	8.6471
N	17
Std. Deviation	16.48462
Non-Corridor	
Mean	18.4167
N	84
Std. Deviation	30.37088
Total	
Mean	16.7723
N	101
Std. Deviation	28.68027
(Sig > .05)	
<i>No statistically significant differences were observed between corridor and non-corridor companies and the number of full-time employees.</i>	

	<u>Sample</u>		
Debt Financing	Corridor	Non-Corridor	Total
No			
Count	10	53	63
Expected	10.8	52.2	63
% w/in Sample	58.80%	64.60%	63.60%
Residual	-0.8	0.8	
Yes			
Count	7	29	36
Expected	6.2	29.8	36
% w/in Sample	41.20%	35.40%	36.40%
Residual	0.8	-0.8	
Total			
Count	17	82	99
Expected	17	82	99
% w/in Sample	100%	100%	100%
(Pearson's Chi-square \geq .05)			
<i>No statistically significant differences were observed between corridor and non-corridor companies and whether they financed their companies using debt.</i>			

Table 12: Type of Financing - EQUITY			
Equity Financing	Sample		Total
	Corridor	Non-Corridor	
No			
Count	9	43	52
Expected	8.9	43.1	52
% w/in Sample	52.90%	52.40%	52.50%
Residual	0.1	-0.1	
Yes			
Count	8	39	47
Expected	8.1	38.9	47
% w/in Sample	47.10%	47.60%	47.50%
Residual	-0.1	0.1	
Total			
Count	17	82	99
Expected	17	82	99
% w/in Sample	100%	100%	100%
(Pearson's Chi-square \geq .05)			
<i>Statistically significant differences were not observed between corridor and non-corridor companies and whether they financed their companies using equity.</i>			

Table 13: Type of Financing - GRANTS			
Grant Financing	Sample		Total
	Corridor	Non-Corridor	
No			
Count	13	75	88
Expected	15.1	72.9	88
% w/in Sample	76.50%	91.50%	88.90%
Yes			
Count	4	7	11
Expected	1.9	9.1	11
% w/in Sample	23.50%	8.50%	11.10%
Total			
Count	17	82	99
Expected	17	82	99
% w/in Sample	100%	100%	100%
<i>Statistical tests were not conducted since only four corridor and three non-corridor companies indicated using grants to finance their companies.</i>			

Table 14: Number of Patents, Copyrights, and Trade Secrets	
Corridor / Non-corridor	Number of Patents, Copyrights and Trade Secrets
Corridor	
Mean	9.37
N	8
Std. Deviation	11.66
Non-Corridor	
Mean	26.97
N	39
Std. Deviation	99.79
Total	
Mean	23.97
N	47
Std. Deviation	91.06
<i>No statistically significant differences were observed between corridor and non-corridor companies and the number of patents, copyrights and trade secrets owned.</i>	

Table 15: Licensed Patents, Copyrights, and Trade Secrets	
Corridor / Non-corridor	Licensed Patents, Copyrights and Trade Secrets
Corridor	
Mean	6.8
N	5
Std. Deviation	4.38
Non-Corridor	
Mean	183.24
N	17
Std. Deviation	725.91
Total	
Mean	143.14
N	22
Std. Deviation	638.12
<i>No statistically significant differences were observed between corridor and non-corridor companies and the number of licensed patents, copyrights and trade secrets owned.</i>	

Table 16: Adequacy of Local Infrastructure			
	Sample		
Adequate Local Infrastructure	Corridor	Non-Corridor	Total
Yes			
Count	17	72	89
Expected	15.1	73.9	89
% w/in Sample	100.00%	86.70%	89.00%
No			
Count	0	11	11
Expected	1.9	9.1	11
% w/in Sample	0%	13.30%	11.00%
Total			
Count	17	83	100
Expected	17	83	100
% w/in Sample	100%	100%	100%

Table 17: Located in Technology/Commercial/Industrial Park			
Technology/Commercial/ Industrial Park?	Sample		
	Corridor	Non-Corridor	Total
Yes			
Count	2	22	24
Expected	4	19.8	24
% w/in Sample	11.80%	26.20%	23.80%
No			
Count	15	59	74
Expected	12.5	61.2	74
% w/in Sample	88.20%	70.20%	73.30%
Total			
Count	17	81	101
Expected	17	81	101
% w/in Sample	100%	100%	100%
<i>Statistical tests were not conducted since 25 percent of cells did not meet minimum expected counts.</i>			

Table 18: Motivations for Location		
City	N	Motivator
-	1	Best deal on best building
Ash Grove	1	Close to home
Atlanta	1	Home city of first president
Ballwin	3	Residence
		Residence
		Location; close to the highway
Belton	1	Low overhead
Blue Springs	2	Location close to home
		Rent and personnel
Brentwood	1	Money for rent for office space
Butler	1	Close to his residence
Chesterfield	2	Center provide a real launching pad - great facilities
		Residence
Chillicothe	1	Residence
Columbia	12	Lived here
		Where we were; proximity; if they had the choice they would not be in Missouri.
		We live here
		We live here
		We live here
		Parent company located here
		Lived here; MU graduate
		Live here
		Wanted to be here; raise family here, market was here; less competition
		Already here; state has poor incentive to stay; inadequately set-up for these types of companies.
		Access to clients
		His physical location
Dora	1	Wife could grow tomatoes, to please his wife.
Duenwey	1	More centrally located to highway
Fayette	1	Quality of life
Fenton	1	Demographics
Galena	1	Quality of life
Holts Summit	1	Live here
Independence	1	Area was centrally located to customer base
Jefferson City	2	Lack of congestion; easy access; great community; 40 year resident
		State business is here
Joplin	2	Where customers are located and owners live here
		Tax abatements
Kansas City	4	Live here
		Major client lived here
		Got jobs there
		Residence
Kearney	2	Convenience
		Good use of broadband
Marilyn Heights	1	Owner's residence
Mokane	1	Own land and buildings
Newark	1	Hometown, boredom
Nixa	1	Convenience

<u>City</u>	<u>N</u>	<u>Motivator</u>
Platte City	1	It was central in area to the East and West coast
Potosi	1	Market need was there
Raymore	1	Convenience.
Scott City	1	In the middle of two large cities.
Springfield	8	Great place to live and raise kids
		None
		Convenient location of residence
		Residence
		Residence
		Residence
		Residence
		Easy access to airports, easy business access
St. Charles	4	Missouri Research Park.
		Place of Residence
		Lots of power, larger space at a good rate
		Residence
St. Genevieve	1	Residence
St. Joseph	4	Residence was there
		Primary residence
		Residence
		Residence
St. Louis	24	Where it was located.
		Founder resides in St. Louis.
		Lived here.
		Where we live; convenience.
		Access to personnel; qualified personnel.
		Worked there; tax credit advantage in downtown St. Louis; rebuilding communities.
		Live here.
		Incubator brought us here.
		Residence was in St. Louis
		Business contacts needed were in area
		Proximity to home residence
		Operating cost and time zone
		Residence was there, convenience
		Residence
		Residence
		Residence
		Residence
		Started out in St. Louis
		Near Home
		Technology
		Residence
		Residence
		Residence
		Availability of potential customers
St. Peters	4	Close to residence
		Demand for service was here
		Location
		Cheap land
Troy	1	Residence
Union	1	Most comfortable in acquiring help

Table 19: Part of a Large Cluster			
Part of a Larger Cluster?	Sample		Total
	Corridor	Non-Corridor	
Yes			
Count	7	29	36
Expected	6.1	29.9	36
% w/in Sample	41.20%	34.50%	35.60%
Residual	0.9	-0.9	
No			
Count	10	55	65
Expected	10.9	54.1	65
% w/in Sample	58.80%	65.50%	64.40%
Residual	-0.9	0.9	
Total			
Count	17	84	101
Expected	17	84	101
% w/in Sample	100%	100%	100%
(Pearson's Chi-square $\geq .05$)			
<i>No statistically significant differences were observed between corridor and non-corridor companies regarding being part of a larger cluster.</i>			

Table 20: Involvement in a Local/Regional Business or Technology Network			
Involved in Business or Technology Network	Sample		Total
	Corridor	Non-Corridor	
Yes			
Count	9	42	51
Expected	8.8	42.2	51
% w/in Sample	52.90%	51.2	51.50%
Residual	0.2	-0.2	
No			
Count	8	40	48
Expected	8.2	39.8	48
% w/in Sample	47.10%	48.80%	48.50%
Residual	-0.2	0.2	
Total			
Count	17	82	99
Expected	17	82	99
% w/in Sample	100%	100%	100%
(Pearson's Chi-square $\geq .05$)			
<i>No statistically significant differences were observed between corridor and non-corridor companies and involvement in a business or technology network.</i>			

Table 21: Current Research Resources			
College or University			
	Sample		
College or University	Corridor	Non-Corridor	Total
No			
Count	11	57	68
Expected	11.4	56.6	68
% w/in Sample	64.70%	67.90%	67.30%
Residual	-0.4	0.4	
Yes			
Count	6	27	33
Expected	5.6	27.4	33
% w/in Sample	35.30%	32.10%	32.70%
Residual	0.4	-0.4	
Total			
Count	17	84	101
Expected	17	84	101
% w/in Sample	100%	100%	100%
(Pearson's Chi-square $\geq .05$)			
<i>No statistically significant differences were observed between corridor and non-corridor business owners and their use of research resources from a college or university.</i>			

Table 22: Current Research Resources			
Public Agencies			
	Sample		
Public Agencies	Corridor	Non-Corridor	Total
No			
Count	12	68	80
Expected	13.5	66.5	80
% w/in Sample	70.60%	81.00%	79.20%
Residual	-1.5	1.5	
Yes			
Count	5	16	21
Expected	3.5	17.5	21
% w/in Sample	29.40%	19.00%	20.80%
Residual	1.5	-1.5	
Total			
Count	17	84	101
Expected	17	84	101
% w/in Sample	100%	100%	100%
(Pearson's Chi-square $\geq .05$)			
<i>No statistically significant differences were observed.</i>			

Table 23: Current Research Resources			
Private Companies			
Private Companies	Sample		Total
	Corridor	Non-Corridor	
No			
Count	10	54	64
Expected	10.8	53.2	64
% w/in Sample	58.80%	64.30%	63.40%
Residual	-0.8	0.8	
Yes			
Count	7	30	37
Expected	6.2	30.8	37
% w/in Sample	41.20%	35.70%	36.60%
Residual	0.8	-0.8	
Total			
Count	17	84	101
Expected	17	84	101
% w/in Sample	100%	100%	100%
(Pearson's Chi-square $\geq .05$)			
<i>No statistically significant differences were observed.</i>			

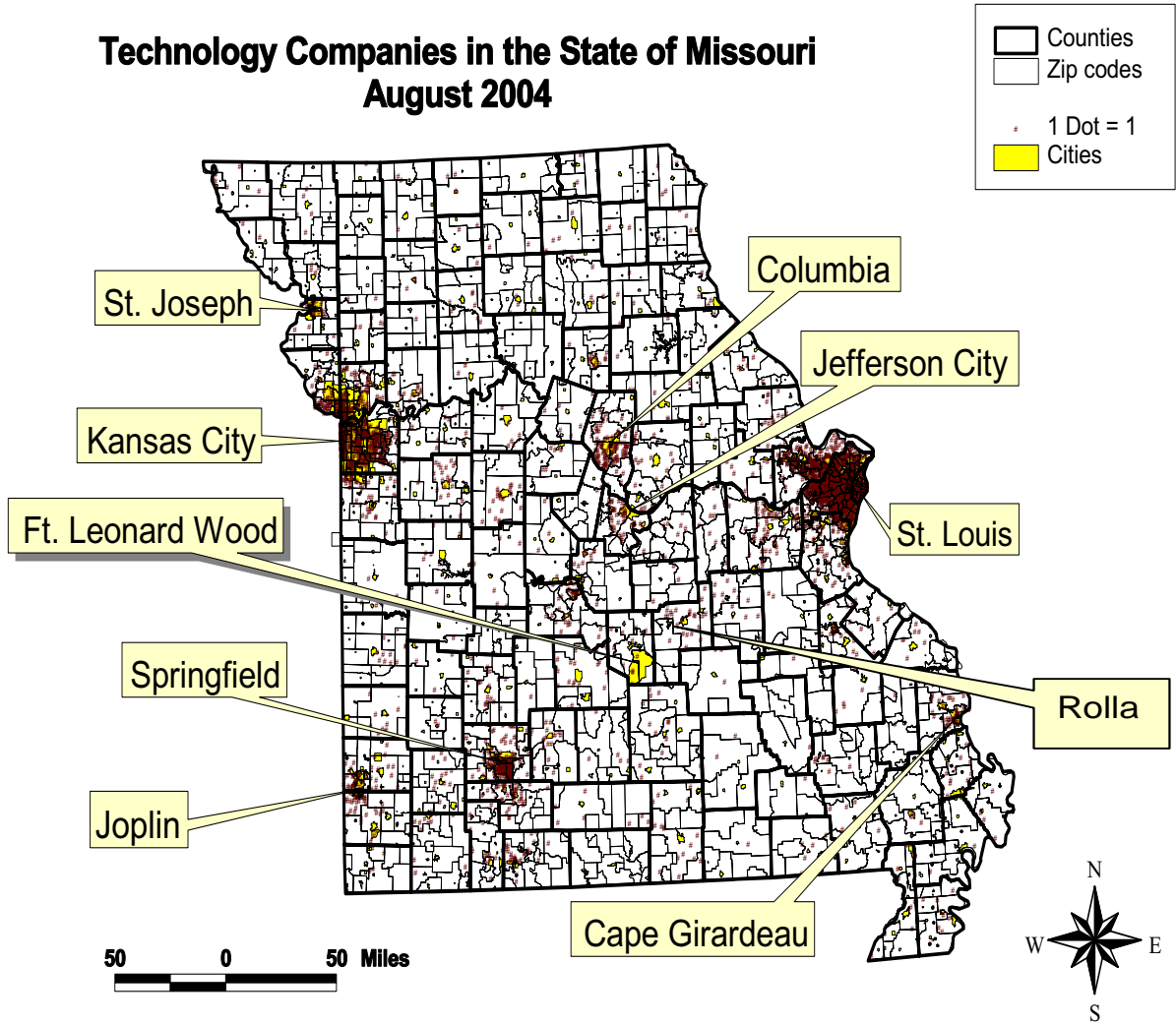
Table 24: Special Needs						
Special Needs	Corridor		Non-Corridor		Total	
	N	%	N	%	N	%
Finance	5	29%	32	38%	37	37%
Labor	8	47%	40	48%	48	48%
Management	3	18%	25	30%	28	28%
Tech Transfer	4	24%	17	20%	21	21%
Marketing	12	71%	37	44%	49	49%
Infrastructure	2	12%	20	24%	22	22%
Facilities	3	18%	15	18%	18	18%
Intellectual Property	5	29%	19	23%	24	24%
Partnerships	8	47%	32	38%	40	40%
Regulatory Compliance	6	35%	23	27%	29	29%

Table 25: Exporting Products and/or Services			
Export Products or Services	Sample		Total
	Corridor	Non-Corridor	
Yes			
Count	4	27	31
Expected	5	26	31
% w/in Sample	25.00%	32.10%	31.00%
Residual	-1	1	
No			
Count	12	57	69
Expected	11	58	69
% w/in Sample	75.00%	67.90%	69.00%
Residual	1	-1	
Total			
Count	16	84	100
Expected	16	84	100
% w/in Sample	100%	100%	100%
(Pearson's Chi-square $\geq .05$)			
<i>No statistically significant differences were observed between corridor and non-corridor companies and exporting products or services.</i>			

Table 26: Future Contact			
Contact Method	Sample		Total
	Corridor	Non-Corridor	
Telephone			
Count	10	42	52
Expected	8.8	43.2	52
% w/in Sample	62.50%	53.20%	54.70%
Residual	1.2	-1.2	
E-mail			
Count	6	37	43
Expected	7.2	35.8	43
% w/in Sample	37.50%	46.80%	45.30%
Residual	-1.2	1.2	
Total			
Count	16	79	95
Expected	16	79	95
% w/in Sample	100%	100%	100%
(Pearson's Chi-square $\geq .05$)			
<i>No statistically significant differences were observed between corridor and non-corridor companies regarding contact method.</i>			

Appendix 2 - Technology Map

Technology Companies in the State of Missouri August 2004



Appendix 3 - Interview Protocol

ECONOMIC DEVELOPMENT ADMINISTRATION UNIVERSITY CENTER GRANT – RESEARCH

University of Missouri-Columbia
May 2005

INTERVIEW PROTOCOL

POTENTIAL INTERVIEWEES MUST BE SCREENED AS FOLLOWS:

“Hello, I am _____ (your name) with (name of research organization) and we are working with the University of Missouri to gather information on technology companies in the state. Does _____ (name of the company called) develop technology, use advanced technology, or add value to existing technology?”

IF NO,
“Thank you very much.”
END CALL AND MARK LIST ACCORDINGLY.

IF YES,
“We are interested in talking with _____ (name if you have it; if not, the owner or someone who can speak on the owner’s behalf) regarding the business. This will only take about 10 minutes. Is now a good time or should I make an appointment?”

CONTINUE INTERVIEW WITH OWNER/HIGHEST RANKING PERSON

- OR -

SCHEDULE APPOINTMENT – GET PHONE NUMBER AND REPEAT DAY/TIME

Answers to possible questions:

1. Who is funding the study?

“This research is funded by the Economic Development Administration and the University of Missouri and is being done to provide better and more useful services to technology business owners in the state.”

2. Why do you need to talk to the owner?

“Many of the questions relate to when and how the business started and motivations. If there is someone who can reliably answer those types of questions who is not the owner, that would be fine.”

3. What do you mean by technology?

“We consider technology companies to be in the primary business of design, innovation, research, development, simulation, experimentation, and/or testing of new applications which use technical, biological, advanced manufacturing, or other science base to solve problems.”

ONCE THE INTERVIEWEE IS ON THE PHONE:

“Thank you very much for taking a few minutes to provide us with information that we hope will translate into better and more useful services to you and businesses like yours. This will only take about ten minutes. Let’s begin.”

INTERVIEW PROTOCOL
QUESTIONS

PHRASE ALL QUESTIONS TO PERSON SPEAKING – IF NOT THE OWNER, THEN PHRASE IT ABOUT THE OWNER

1. Did you start this business? Yes _____ No _____
If no, did you purchase the business? Yes _____ No _____

If no, how did you become the owner?

2. How many years or months have you owned the business?
_____ years / months (circle one)

3. Is the company primarily a: (check one)
Service company _____
Product company _____
Company that provides both products and services _____

4. What is the primary technological focus of this company? (check one)
IT (software, communications, and internet-delivered services) _____
Electronics (hardware and electronic devices and instruments) _____
Biotechnology (biologics, therapeutics and diagnostics) _____
Biomedical devices and instruments _____
Advanced manufacturing devices and materials _____
Consumer goods and services _____
Environmental goods and services _____
Other (please specify) _____

5. Does the company primarily: (check one)
Produce technology _____
Use technology _____
Add value to existing technology _____

6. Of the following, which stage of business would you place the company? (check one)
Start-up _____
Growing _____
Mature _____
Declining _____

7. Of the following, which stage of innovation would you place the company? (check one)
Basic research _____
Proving the concept _____
Early stage development _____
Product development _____
Production and marketing _____

8. How many full-time employees does the company currently have? _____

9. What type of financing has the company received? (check all that apply)

Debt _____

Equity _____

Grants _____

10. How many patents, copyrights or trade secrets does the company own? _____

11. How many patents, copyrights or trades secrets has the company licensed from another company, university, federal labor, or research institution? _____

12. Is the local infrastructure adequate for the company's needs?

Yes _____ No _____

If no, what is needed?

13. Is the company located in a technology or commercial/industrial park?

Yes _____ No _____

14. Do you consider the company part of a larger cluster?

Yes _____ No _____

If yes, how is the cluster identified?

15. Are you actively involved in a local or regional business or technology network?

Yes _____ No _____

16. Do you export products (or services)?

Yes _____ No _____

If no, is this a market you would like to pursue? Yes _____ No _____

17. Do you currently use research resources from: (check all that apply)

A college or university? _____

Public agencies? _____

Private companies? _____

18. Of the following, does the company have any special needs in the areas of:

Finance _____

Infrastructure _____

Labor _____

Facilities _____

Management _____

Intellectual property _____

Tech transfer _____

Partnerships _____

Marketing _____

Regulatory compliance _____

19. What was the primary motivator for locating the company in _____ (name of town/city)?

20. Looking out a few years, what do you think the company's greatest needs will be?

21. May we contact you in the future for more information? Yes _____ No _____

22. Would you prefer a telephone call or email?

If email, get email address _____

Thank you very much for your time and valuable answers.

About Us

BRIDG focuses solely on researching small business and entrepreneurship. Its research lays the foundation for the creation and delivery of quality programming, products, services, and organizational processes specifically developed for small business owners and entrepreneurs to start, operate and grow their businesses.

BRIDG is supported by University of Missouri Extension.

For more information, please contact:

BRIDG
University of Missouri Extension
410 S. Sixth St.
200 Engineering North
Columbia, MO 65211
(573) 882-8855
ventersc@missouri.edu

BRIDG is supported by University of Missouri Extension

