

Missouri University of Science and Technology

Business and Technology Incubator Economic Impact Analysis

Prepared by:

The Office of Technology Transfer and Economic Development

May 19, 2009



MISSOURI
S&T

The logo for Missouri S&T is centered on the page. It features the word "MISSOURI" in a green, serif font above the letters "S&T" in a larger, bold, green serif font. The background of the page features a large, faint, light gray watermark of the Missouri S&T logo, which is a stylized house shape with a chimney, overlaid on a green and gray geometric design at the bottom.

2009

A large, green, 3D-style geometric graphic is positioned at the bottom of the page. It consists of several interconnected rectangular and trapezoidal shapes, creating a complex, angular structure. The year "2009" is printed in a bold, black, sans-serif font on the rightmost, slightly elevated rectangular section of this graphic.

Table of Contents

Background	3
Summary of Results	3
Methodology Background	4
Introduction	4
RIMS II Multipliers for Output, Earnings, and Employment.....	5
Final-Demand Multipliers for Output	6
Multipliers for Earnings.....	6
Multipliers for Employment.....	6
Choosing a Multiplier	7
Information Required From Users of RIMS II.....	7
Affected Region.....	8
Project Phases	9
Initial Changes.....	10
Change in Final Demand	10
Change in Earnings and Employment	10
Separating the Initial Changes	11
Economic Impact Calculations	12

Background

Over the past 30 years, the business incubation industry has demonstrated the potential and ability of business incubation to stimulate economic development within communities. Missouri University of Science and Technology (Missouri S&T) is evaluating the possibility of establishing a business and technology incubator on the Innovation Park research park campus. To facilitate this evaluation, the Office of Technology Transfer and Economic Development (TTED) at Missouri S&T has prepared this economic impact analysis of the proposed business and technology incubator. Questions pertaining to this analysis can be directed to the following:

Missouri University of Science and Technology
Office of Technology Transfer and Economic Development
203 Centennial Hall
300 West 12th Street
Rolla, Missouri 65409-1110
<http://ecodevo.mst.edu>

Summary of Results

For the purpose of this analysis, the Rolla economic impact region was assumed to be Phelps County and the six adjacent counties of Crawford, Dent, Gasconade, Maries, Pulaski, and Texas. Other counties were not included because they are close to larger economic centers within the state (e.g., Springfield, Jefferson City, Columbia, and Saint Louis counties) that likely exert stronger economic influence.

The methodology used for the analysis was the Regional Input-Output Modeling System (RIMS II) developed by the United States Department of Commerce Bureau of Economic Analysis. The analysis used Benchmark Series Type II multipliers. The RIMS II multipliers for the Rolla economic impact region for both the 60 aggregated industries and the 473 detailed industries are available as separate documents.

Based on the analysis by TTED, the proposed business and technology incubator will likely generate economic development in three ways. First, the construction of the facility will generate onetime economic impact to the region. This analysis estimated the economic impact from the construction of the facility based on the change in final demand. TTED estimates that there will be a onetime economic impact of roughly \$16.7 million and about 146 jobs from the construction of the incubator facility.

The incubator will also generate ongoing economic impact from the operations of clients of the incubator. This analysis estimated the economic impact from the operations of clients of the incubator based on the initial change in final demand and the direct effect of the initial change in earnings and employment. TTED estimates that clients of the incubator will generate an economic impact of approximately \$1.2 million to \$2 million and between 14 and 30 jobs each year for as long as the incubator operates. Over the first ten years this would represent an economic impact of \$10.8 million to \$18 million and between 126 and 270 jobs. This is based on the assumption that on average one-fifth of the incubator clients will graduate from the incubator program each year and move out of the facility and that 80 percent of the clients that graduate from the incubator program will remain within the economic impact region. Those clients that graduate will be replaced by new start-up and early-stage businesses. To facilitate the study, this analysis used the scientific research and development services

industry (NAICS industry code 5417) as representative of incubator client businesses because there is no one NAICS industry code for the types of client companies that the incubator will target. Clients of the incubator will likely operate within a variety of industries.

Finally, the incubator program will generate ongoing economic impact from its operations. One might argue that the economic impact of the incubator program is factored into the analysis by way of the fees and rents that clients pay to the incubator program. However, it is common practice for business incubators to also generate income through grants and other program services. As such, this analysis includes an estimate of the economic impact of the incubator program. This analysis estimates the economic impact from the incubator program operations based on the initial change in final demand, the initial change in earnings and employment, and the bill-of-goods method. For the analysis based on the initial change in final demand and the direct effects of the initial change in earnings and employment, this analysis used the management consulting services industry (NAICS industry code 541610) as representative of the nature of the incubator program operations. TTED estimates the ongoing economic impact of the incubator program will be between \$139,550 to \$315,680 and approximately 2 to 4 jobs within the community.

Methodology Background¹

Introduction

Effective planning for public- and private-sector projects and programs at the State and local levels requires a systematic analysis of the economic impacts of the projects and programs on affected regions. In turn, systematic analysis of economic impacts must account for the inter-industry relationships within regions because these relationships largely determine how regional economies are likely to respond to project and program changes. Thus, regional input-output (I-O) multipliers, which account for inter-industry relationships within regions, are useful tools for regional economic impact analysis.

In the 1970's, the Bureau of Economic Analysis (BEA) developed a method for estimating regional I-O multipliers known as RIMS (Regional Industrial Multiplier System), which was based on the work of Garnick and Drake.² In the 1980's, BEA completed an enhancement of RIMS, known as RIMS II (Regional Input-Output Modeling System), and published a handbook for RIMS II users.³ In 1992, BEA published a second edition of the handbook, in which the multipliers were based on more recent data and improved methodology. Now, BEA is making available a third edition of the handbook, in response to requests by

¹ Excerpted from *Regional Multipliers: A User Handbook for the Regional Input-Output Modeling Systems (RIMS II)*, United States Department of Commerce Bureau of Economic Analysis, Third Edition, (Washington, DC: United States Government Printing Office, March 1997).

² See Daniel H. Garnick, "Differential Regional Multiplier Models," *Journal of Regional Science* 10 (February 1970): 35-47 ; and Ronald L. Drake, "A Short-Cut to Estimates of Regional Input-Output Multipliers," *International Regional Science Review* 1 (Fall 1976): 1-17.

³ See U.S. Department of Commerce, Bureau of Economic Analysis, *Regional Input-Output Modeling System (RIMS II): Estimation, Evaluation, and Application of a Disaggregated Regional Impact Model* (Washington, DC: U.S. Government Printing Office, 1981); and U.S. Department of Commerce, Bureau of Economic Analysis, *Regional Multipliers: A User Handbook for the Regional Input-Output Modeling System (RIMS II)*, (Washington, DC: U.S. Government Printing Office, 1986).

users for additional discussion of the data that they must provide in order to use RIMS II and of the data sources and methods used for multiplier estimation.

RIMS II is based on an accounting framework called an I-O table. For each industry, an I-O table shows the distribution of the inputs purchased and the outputs sold. A typical I-O table in RIMS II is derived mainly from two data sources: BEA's national I-O table, which shows the input and output structure of nearly 500 U.S. industries, and BEA's regional economic accounts, which are used to adjust the national I-O table in order to reflect a region's industrial structure and trading patterns.⁴

Using RIMS II for impact analyses has several advantages.⁵ RIMS II multipliers can be estimated for any region composed of one or more counties and for any industry or group of industries in the national I-O table. The cost of estimating regional multipliers is relatively low because of the accessibility of the main data sources for RIMS II. According to empirical tests, the estimates based on RIMS II are similar in magnitude to the estimates based on relatively expensive surveys.⁶

To effectively use the multipliers for impact analysis, users must provide geographically and industrially detailed information on the initial changes in output, earnings, or employment that are associated with the project or program under study. The multipliers can then be used to estimate the total impact of the project or program on regional output, earnings, or employment.

RIMS II is widely used in both the public and private sector. In the public sector, for example, the Department of Defense uses RIMS II to estimate the regional impacts of military base closings, and State departments of transportation use RIMS II to estimate the regional impacts of airport construction and expansion. In the private sector, analysts, consultants, and economic development practitioners use RIMS II to estimate the regional impacts of a variety of projects, such as the development of theme parks and shopping malls.

RIMS II Multipliers for Output, Earnings, and Employment

RIMS II provides users with five types of multipliers: Final-demand multipliers for output, for earnings, and for employment and direct-effect multipliers for earnings and for employment. These multipliers measure the economic impact of a change in final demand, in earnings, or in employment on a region's economy.⁷

⁴ See U.S. Department of Commerce, Bureau of Economic Analysis, *Benchmark Input-Output Accounts of the United States, 1987*, (Washington, DC: U.S. Government Printing Office, 1994); and U.S. Department of Commerce, Bureau of Economic Analysis, *Local Area Personal Income, 1969–92*, (Washington, DC: U.S. Government Printing Office, 1994).

⁵ For a discussion of the limitations of using I-O models in impact analysis, see Daniel M. Otto and Thomas G. Johnson, *Microcomputer-Based Input- Output Modeling*, (Boulder, CO: Westview Press, 1993), 28–46.

⁶ See *Regional Input-Output Modeling System (RIMS II)*, 39–57; and Sharon M. Brucker, Steven E. Hastings, and William R. Latham III, "The Variation of Estimated Impacts from Five Regional Input-Output Models," *International Regional Science Review* 13 (1990): 119–39.

⁷ The term "change in final demand," rather than the "change in output delivered to final users," is used in this handbook because of its widespread use in regional impact analysis. The impact of an increase in final demand, earnings, or employment differs from that of a decline only by the sign of the impact.

Final-Demand Multipliers for Output

The final-demand multipliers for output are the basic multipliers from which all the other RIMS II multipliers are derived. They are presented in the final-demand output multiplier table. The total impact on regional output is calculated by multiplying the final-demand change in the column industry by the sum of all the multipliers for each row except the household row.⁸

Multipliers for Earnings

RIMS II provides two types of multipliers for estimating the impacts of changes on earnings: Final-demand multipliers and direct-effect multipliers. These multipliers are derived from the table of final-demand output multipliers. The final-demand multipliers for earnings can be used if data on final-demand changes are available. In the final-demand earnings multiplier table, each column entry indicates the change in earnings in each row industry that results from a \$1 change in final demand in the column industry. The impact on each row industry is calculated by multiplying the final-demand change in the column industry by the multiplier for each row. The total impact on regional earnings is calculated by multiplying the final demand change in the column industry by the sum of the multipliers for each row.

The direct-effect multipliers for earnings can be used if data on the initial changes in earnings by industry are available. In the direct-effect earnings multiplier table, each entry indicates the total change in earnings in the region that results from a \$1 change in earnings in the row industry. The total impact on regional earnings is calculated by multiplying the initial change in earnings in the row industry by the multiplier for the row.

Multipliers for Employment

RIMS II provides two types of multipliers for estimating the impacts of changes on employment: Final-demand multipliers and direct-effect multipliers. These multipliers are derived from the table of final-demand output multipliers.

The final-demand multipliers for employment can be used if data on final-demand changes are available. In the final-demand employment multiplier table, each column entry indicates the change in employment in each row industry that results from a \$1 million change in final demand in the column industry. The impact on each row industry is calculated by multiplying the final-demand change in the column industry by the multiplier for each row. The total impact on regional employment is calculated by multiplying the final-demand change in the column industry by the sum of the multipliers for each row.

The direct-effect multipliers for employment can be used if data on the initial changes in employment by industry are available. In the direct-effect employment multiplier table, each entry indicates the total change in employment in the region that results from a change of one job in the row industry. The total impact on regional employment is calculated by multiplying the initial change in employment in the row industry by the multiplier for the row.

⁸ The household row is excluded to avoid double counting, because each of the other row entries already includes earnings paid to households.

Choosing a Multiplier

The choice of multiplier for estimating the impact of a project on output, earnings, and employment depends on the availability of estimates of the initial changes in final demand, earnings, and employment. If the estimates of the initial changes in all three measures are available, the RIMS II user can select any of the RIMS II multipliers. To assess the reasonableness of the impact estimates based on the multiplier selected, the user can compare these estimates with the estimates based on the other multipliers.

In theory, all the impact estimates should be consistent.⁹ If the available estimates are limited to initial changes in final demand, the user can select a final-demand multiplier for impact estimation. If the available estimates are limited to initial changes in earnings or employment, the user can select a direct-effect multiplier.¹⁰

In some instances, such as estimating the impact of shutting down an industry in a region, the user must select the output-driven multiplier for impact estimation.¹¹ The output-driven multiplier measures the change in output in each row industry that results from a \$1 change in total industry output in the column industry under study. Using the output-driven multiplier instead of the final-demand output multiplier ensures that the impact of the industry's shutdown on its own output will not exceed that output.

Information Required From Users of RIMS II

To effectively use the RIMS II multipliers for impact analysis, users must provide geographically and industrially detailed information on the initial changes in output, earnings, or employment that are associated with the project or program under study. To provide this information, the user must answer five questions about the project or program.

1. What is the affected region?
2. Which industries are initially affected?
3. Is there more than one phase of the project or program?
4. What are the initial changes in output, earnings, or employment?
5. Should the initial changes be separated into production costs, transportation costs, and trade margins?

⁹The impact estimates based on the product of the initial change in final demand and the final-demand multiplier for earnings (or employment) reflect the impact estimates based on the product of the initial change in final demand and the final-demand multiplier for earnings (or employment) reflect national average relationships between output and earnings (or employment). In contrast, the impact estimates based on the product of the initial change in earnings (or employment) and the direct-effect multiplier for earnings (or employment) reflect regional relationships between output and earnings (or employment). If the regional relationships differ from the national relationships, the two sets of estimates will differ and the estimates based on the direct-effect multipliers are preferable.

¹⁰ In this instance, the user typically estimates earnings or employment impacts. However, by converting the initial changes in earnings or employment into final-demand changes, the user can also estimate output impacts. For the conversion method, see the section "Initial Changes."

¹¹ This multiplier, though not a part of RIMS II, can be derived from the final-demand output multiplier table. See appendix A.

Affected Region

The user must determine the region that is affected by the project or program under study. The choice of the region depends on the purpose of the study. For example, suppose the user wants to estimate the impact of an increase in final demand for the output of a motor vehicle and equipment factory in Jackson County, Missouri, a county in the Kansas City metropolitan area and economic area that is closely linked economically to the other counties in the economic area. Assume further that most of the factory's labor force lives in the other counties and that most of the factory's non-labor inputs are purchased from businesses in the other counties. If the study focuses on the impact in the vicinity of the factory, then the region of choice is the county.¹² Alternatively, the focus might be the factory's impact on the surrounding metropolitan area. Finally, if the study seeks a comprehensive estimate of the factory's impact, then the region of choice is the economic area.¹³

The use of a multi-county region can sometimes complicate the impact analysis because of offsetting effects. For example, suppose that a new shopping mall in a county draws a large share of its shoppers from nearby counties where they previously shopped. For the county with the mall, the impact on sales and sales tax revenues is substantial. However, for the multi-county region, the impact of the mall also reflects the offsetting declines in sales and sales tax revenues in the nearby counties, so the impact on sales and sales tax revenues is smaller than that for the county.

Affected Industries

The user must determine which industries are initially affected by the project or program. The specification of these industries in the maximum possible detail will promote the accuracy of the impact analysis. If possible, the industries should be selected from the list of detailed industries for which RIMS II multipliers are available. Otherwise, the industries must be selected from the list of aggregations of industries for which the multipliers are available.

For example, suppose that the user plans to analyze the impact of a new meat-packing plant in the Kansas City economic area. The impact should be calculated with the multiplier for the industry of meat-packing plants and sausages and other prepared meat products (the meatpacking industry), not with the multiplier for the industry of food and kindred products and tobacco products, which comprises the meat-packing industry and 44 other industries.

In addition, if detailed data are available on the purchases of goods and services (including labor) made by the initially affected industry, these "bill-of-goods" data should be used in impact estimation. For example, for the impact estimate for the meat-packing plant, instead of using the increase in final demand for meat packing, the user could use the change in the meat-packing industry's purchases of goods and services—such as food products, chemicals, printing, and labor—that are needed to manufacture the additional packaged meat. The impact would be calculated by multiplying the change

¹² For one-county regions, impacts are sometimes underestimated because RIMS II multipliers do not reflect "feedback" effects, such as purchases made in the county by commuters from nearby counties.

¹³ For a multicounty region, impacts are sometimes overestimated because RIMS II multipliers reflect economic activity in industries that are unaffected by the project or program under study, but overestimation is likely to be less severe for economic areas than for States because of the strong economic links among counties in economic areas.

in the purchases of each product by the appropriate final-demand output multiplier and then by adding the results to the initial change in the meat-packing industry.

The impacts calculated from changes in the bill-of-goods will equal the impacts calculated from final demand changes if the shares of an industry's bill-of-goods that are accounted for by each purchased good and service equal the inputs per dollar of output for the industry in the RIMS II model. When the impact estimates differ, the bill-of-goods approach is likely to be more accurate because it reflects data for the project and the region under study.¹⁴

Project Phases

The user must determine if the project or program has more than one phase. If so, the user should calculate the impact of each phase. For example, if a project has two phases—construction and operation—then the impact of the construction phase should be calculated separately from the impact of the operation phase. In addition, if the operation changes over time, the impact of each phase of the operation should be estimated. RIMS II, like all I-O models, is a “static equilibrium” model, so impacts calculated with RIMS II have no specific time dimension. However, because the model is based on annual data, it is customary to assume that the impacts occur in one year. For many situations, this assumption is reasonable.

However, for long-term projects, RIMS II should be carefully used because of the difficulty of accounting for the effects of changes in prices and wages.¹⁵ For example, a factory is shut down, but a reduction in economic activity may not be the only result. The reduction in economic activity can lead to an increase in the supply of inputs—for example, an excess supply of labor—and a corresponding decline in input prices. The decline in input prices can encourage the use of these inputs in other activities, so economic activity picks up. The pickup in economic activity may partially offset the decline in economic activity initiated by the shutdown of the factory.

If the user can determine which industries are likely to increase their output as a result of the decline in input prices, then RIMS II multipliers can be used to estimate the output impacts of the new activity. The net impact of the project can be estimated by adding the impact of the factory shutdown to the impact of the increases in output in other industries.

Users should note that the impacts estimated with RIMS II multipliers provide information only about the project or program under study and not about the optimal use of resources, such as public funds or land. If the optimal use of resources is an issue, the user must estimate the impacts of all the feasible projects involving those resources and then compare the results.

¹⁴ In contrast, the final-demand approach reflects the national average inter-industry relationships that are incorporated in RIMS II. See appendix A.

¹⁵ RIMS II, like all I-O models, does not automatically account for these effects.

Initial Changes

The user must determine the initial change in final demand, earnings, or employment due to the project.¹⁶ Depending on the availability of data, the user can estimate the initial change either as a change in final demand in the initially affected industry or as a change in earnings or employment in the initially affected industry.¹⁷

Change in Final Demand

If the user can estimate the change in final demand in the initially affected industry, the user can estimate the impact on output, earnings, or employment on the basis of final-demand multipliers. In some instances, estimating the final-demand change is easy. For example, suppose all of the output of a new manufacturing plant in a region is shipped out of the region and does not compete with the output of the existing plants. The final-demand change for the region's manufacturing industry is calculated as the difference between the sum of the final-demand output of the new plant and that of the existing plants and the final demand output of the existing plants. Thus, the change in final demand is simply the output of the new plant.

When the activity of a new project competes with the existing regional activity, estimating the change in final demand is more difficult, because it is necessary to estimate how much of the new project's output replaces the existing output. For example, suppose a shopping mall is constructed in a region that already has similar shops. If a portion of the sales at the new mall would have occurred at the existing shops in the absence of the new mall, then the final-demand change due to the mall is only the net increase in regional sales. If in the extreme case, all the sales at the new mall would have occurred at the existing shops, the final-demand change due to the mall is zero.

Change in Earnings and Employment

If the user can estimate the change in earnings or employment in the initially affected industry, the user can estimate the impact on earnings or employment on the basis of direct-effect multipliers. These estimates, which reflect data for the affected region, are preferable to estimates on the basis of final-demand multipliers, which reflect national average data. If only data on the initial change in earnings or employment are available, the RIMS II user can still estimate the change in final demand and thus estimate the output impacts. First, the final-demand multiplier for earnings (or employment) is divided by the direct-effect multiplier for earnings (or employment) to yield the change in earnings (or employment) per dollar of final demand. Next, the initial change in earnings (or employment) is divided by the change in earnings (or employment) per dollar of final demand to yield the change in final demand. The change in final demand is then multiplied by the final-demand output multiplier to yield the impact on output.

¹⁶The RIMS II multipliers are then used to estimate how these initial changes affect all industries in the regional economy. The total impact of the project on the regional economy is thus composed of the initial change in the directly affected industry plus the sum of the changes in all industries in the region.

¹⁷ To be consistent with BEA's national I-O table for 1987, which underlies the current RIMS II multipliers, initial changes that are specified in terms of dollars of final demand or of earnings should be deflated.

Separating the Initial Changes

If the initial changes are expressed as final-demand changes—which are valued in purchasers', or final users', prices—then the user must separate the changes into components for production costs, transportation costs, and trade margins before doing an impact study.¹⁸ The separation of the changes is necessary because RIMS II follows the convention used in the national I-O accounts of valuing output at producers' prices, which exclude distribution costs, such as transportation costs and wholesale and retail trade margins, but include excise taxes collected and paid by producers. Transportation costs and trade margins are shown as purchases by the users of commodities.

For example, suppose that a consumer spends \$100 to buy a car battery at an auto parts store. The price of the battery is the sum of (1) the producer's price that the manufacturer charges the wholesaler; (2) the wholesale margin, which is the difference between the price the wholesaler charges the retailer and the cost to the wholesaler; (3) the retail margin, which is the difference between the price the retailer charges the consumer and the cost to the retailer; and (4) the transportation costs, which consist of the costs of transporting the output from the manufacturer to the wholesaler and from the wholesaler to the retailer. Accordingly, the final-demand changes associated with the battery purchase are the final-demand changes for manufacturing, for wholesale trade, for retail trade, and for transportation. The impact of the purchase is then calculated by multiplying these final-demand changes by the respective final-demand multipliers.

¹⁸ Data on transportation costs and trade margins from the national I-O accounts are provided to RIMS II users as part of the RIMS II product.

Economic Impact Calculations

Incubator Economic Impact Analysis Assumptions Rolla Economic Impact Region

	Basis of Estimate	Estimate**
Incubator facility construction costs	OTTED assumption †	\$9,000,000
Incubator program revenue	NBIA 2006 rural median*	\$170,000
Incubator program payroll (wages, salaries, and benefits)	OTTED assumption	\$134,447
Average hourly wage for incubator employees	U.S. Bureau of Labor Statistics ‡	\$30.78
Incubator program total expenses (including payroll)	OTTED assumption	\$170,000
Number of incubator staff (i.e., number of full-time equivalents)	NBIA 2006 median*	1.5
Number of resident clients	OTTED assumption	10
Number of affiliate clients	OTTED assumption	4
Number of anchor tenants	2006 NBIA median*	2
Combined client (resident and affiliate) annual revenues	2006 NBIA technology incubator median*	\$5,500,000
Combined client (resident and affiliate) equity investments	2007 NBIA technology incubator median*	\$7,000,000
Combined client annual payroll	OTTED assumption	\$4,072,227
Combined full-time employment by incubator clients (resident and affiliate)	2006 NBIA median*	60
Combined part-time employment by incubator clients (resident and affiliate)	2006 NBIA median*	10
Average hourly wage for employees of incubator clients	U.S. Bureau of Labor Statistics ***	\$30.12

† Based on estimate provided by the Physical Facilities Department of Missouri University of Science and Technology

* National Business Incubation Association 2006 State of Business Incubation Industry report

** Calibrated to 2006 dollars

*** May 2006 National Industry-Specific Occupational Employment and Wage Estimate median hourly wage for all occupations of NAICS industry code 541700 (Scientific research and development services)

‡ May 2006 Missouri State Occupational Employment and Wage Estimate median hourly wage for occupation 13-1111 (Management Analysts)

Incubator Economic Impact Analysis Rolla Economic Impact Region Historical National Price Index Data

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Consumer Price Index (1980-1982=100)	159.40	162.00	164.70	169.30	175.60	177.70	182.60	186.30	191.80	199.40	203.57	212.50	212.17
Producer Price Index (1982=100)	133.00	130.70	131.70	135.20	141.70	137.70	141.10	145.90	152.00	160.60	160.80	173.40	171.10

* All index values are for January of that year

Estimation of Economic Impacts of Incubator Construction Rolla Economic Impact Region Industry - NAICS 230000 Construction

1	Impact based on data on the change in final demand:	
2	Change in final demand (2008 US Dollars)	\$9,548,700
3	Change in final demand (2006 US Dollars) [CPI ₂₀₀₆ /CPI ₂₀₀₈]	\$8,960,051
4	Final demand multipliers:	
5	Output (2006 dollars)	1.7595
6	Earnings (2006 dollars)	0.5514
7	Value-added (2006 dollars)	0.8840
8	Employment (jobs per \$1,000,000)	16.3337
9	Impacts on:	
10	Output (2006 dollars) [line 3 x line 5]	\$15,765,209
11	Earnings (2006 dollars) [line 3 x line 6]	\$4,940,572
12	Value-added (2006 dollars) [line 3 x line 7]	\$7,920,685
13	Employment (jobs) [line 3 x line 8 / \$1,000,000]	146.4
14	Adjusted Impacts on:	
15	Output (2009 dollars) [line 10 x CPI ₂₀₀₉ /CPI ₂₀₀₆]	\$16,774,847
16	Earnings (2009 dollars) [line 11 x CPI ₂₀₀₉ /CPI ₂₀₀₆]	\$5,256,977
17	Value-added (2009 dollars)[line 12 x CPI ₂₀₀₉ /CPI ₂₀₀₆]	\$8,427,942
18	Employment (jobs) [line 3 x line 8 / \$1,000,000]	146.4

Estimation of Economic Impacts of Incubator Client Operations

Rolla Economic Impact Region

Industry - NAICS 541700 Scientific research and development services

1	Impact based on data on the change in final demand:	
2	Change in final demand (2006 US Dollars) [CPI_{2006}/CPI_{2008}]	\$1,100,000
3	Final demand multipliers:	
4	Output (2006 dollars)	1.6902
5	Earnings (2006 dollars)	0.6754
6	Value-added (2006 dollars)	1.0515
7	Employment (jobs per \$1,000,000)	12.5102
8	Impacts on:	
9	Output (2006 dollars) [line 3 x line 5]	\$1,859,220
10	Earnings (2006 dollars) [line 3 x line 6]	\$742,940
11	Value-added (2006 dollars) [line 3 x line 7]	\$1,156,650
12	Employment (jobs) [line 3 x line 8 / \$1,000,000]	13.8
13	Adjusted Impacts on:	
14	Output (2009 dollars) [line 10 x CPI_{2009}/CPI_{2006}]	\$1,978,288
15	Earnings (2009 dollars) [line 11 x CPI_{2009}/CPI_{2006}]	\$790,519
16	Value-added (2009 dollars) [line 12 x CPI_{2009}/CPI_{2006}]	\$1,230,724
17	Employment (jobs) [line 3 x line 8 / \$1,000,000]	13.8

Estimation of Economic Impacts of Incubator Client Operations

Rolla Economic Impact Region

Industry - NAICS 541700 Scientific research and development services

1	Impact based on direct effect of change in earnings and employment:	
2	Initial change:	
3	Earnings (2006 US dollars)	\$814,445
4	Employment (number of jobs)	14.0
5	Direct-effect multipliers:	
6	Earnings (2006 US dollars)	1.3967
7	Employment (jobs)	2.1414
8	Impacts on:	
9	Earnings (2006 US dollars) [line 3 x line 6]	\$1,137,535
10	Employment (jobs) [line 4 x line 7]	30.0
11	Adjusted Impacts on:	
12	Earnings (2009 US dollars) [line 10 x CPI_{2009}/CPI_{2006}]	\$1,210,385
13	Employment (jobs) [line 4 x line 7]	30.0

Estimation of Economic Impacts of Incubator Program Operations

Rolla Economic Impact Region

Industry - NAICS 541610 Management consulting services

1	Impact based on data on the change in final demand:	
2	Change in final demand (2006 US Dollars) [CPI ₂₀₀₆ /CPI ₂₀₀₈]	\$170,000
3	Final demand multipliers:	
4	Output (2006 dollars)	1.6564
5	Earnings (2006 dollars)	0.7059
6	Value-added (2006 dollars)	1.1111
7	Employment (jobs per \$1,000,000)	22.4819
8	Impacts on:	
9	Output (2006 dollars) [line 3 x line 5]	\$281,588
10	Earnings (2006 dollars) [line 3 x line 6]	\$120,003
11	Value-added (2006 dollars) [line 3 x line 7]	\$188,887
12	Employment (jobs) [line 3 x line 8 / \$1,000,000]	3.8
13	Adjusted Impacts on:	
14	Output (2009 dollars) [line 10 x CPI ₂₀₀₉ /CPI ₂₀₀₆]	\$299,621
15	Earnings (2009 dollars) [line 11 x CPI ₂₀₀₉ /CPI ₂₀₀₆]	\$127,688
16	Value-added (2009 dollars)[line 12 x CPI ₂₀₀₉ /CPI ₂₀₀₆]	\$200,984
17	Employment (jobs) [line 3 x line 8 / \$1,000,000]	3.8

Estimation of Economic Impacts of Incubator Program Operations

Rolla Economic Impact Region

Industry - NAICS 541610 Management consulting services

1	Impact based on direct effect of change in earnings and employment:	
2	Initial change:	
3	Earnings (2006 US dollars)	\$96,034
4	Employment (number of jobs)	1.5
5	Direct-effect multipliers:	
6	Earnings (2006 US dollars)	1.3657
7	Employment (jobs)	1.4649
8	Impacts on:	
9	Earnings (2006 US dollars) [line 3 x line 6]	\$131,153
10	Employment (jobs) [line 4 x line 7]	2.2
11	Adjusted Impacts on:	
12	Earnings (2009 US dollars) [line 10 x CPI ₂₀₀₉ /CPI ₂₀₀₆]	\$139,552
13	Employment (jobs) [line 4 x line 7]	2.2

Estimation of Economic Impacts of Incubator Program Operations
 Rolla Economic Impact Region
 Based on Bill of Goods Analysis

Goods and Services Purchased	NAICS Code RIMS (RMA)	Total Purchases in Purchaser's Prices (2009 Dollars)	Percent of Purchases in Region*	Regional Purchases in Purchaser's Prices (2009 Dollars)	Industry Average Percent of Production Costs**	Regional Purchases in Producer's Prices (2009 Dollars)	Regional Purchases in Producer's Prices (2006 Dollars)	Final Demand Multipliers (Calibrated to 2006 Dollars)				Final Demand Multipliers (Calibrated to 2006 Dollars)				Final Demand Multipliers (Calibrated to 2009 Dollars)			
								Output	Earnings	Value added	Employment	Output	Earnings	Value added	Employment	Output	Earnings	Value added	Employment
Payroll Expenses	---	\$134,447	100%	\$134,447	100%	\$134,447	\$126,355	0.8999	0.2544	0.5544	9.4481	\$113,707	\$32,145	\$70,051	1.2	\$120,989	\$34,203	\$74,537	1.2
Training & Development	611800	\$1,200	50%	\$600	57%	\$343	\$322	1.5078	0.4193	0.9036	17.3620	\$485	\$135	\$291	0.0	\$517	\$144	\$310	0.0
Dues & Subscriptions	511120	\$600	0%	\$0	38%	\$0	\$0	1.5398	0.3814	0.8687	9.4084	\$0	\$0	\$0	0.0	\$0	\$0	\$0	0.0
Licenses & Fees	5111A0	\$300	0%	\$0	38%	\$0	\$0	1.0000	0.0000	0.0000	0.0000	\$0	\$0	\$0	0.0	\$0	\$0	\$0	0.0
Office Expense	561400	\$300	100%	\$300	92%	\$277	\$260	1.4678	0.4412	0.9892	17.7493	\$382	\$115	\$257	0.0	\$406	\$122	\$274	0.0
Office Supplies	561400	\$440	100%	\$440	923%	\$4,061	\$3,817	1.4678	0.4412	0.9892	17.7493	\$5,602	\$1,684	\$3,776	0.1	\$5,961	\$1,792	\$4,017	0.1
Marketing & Promotion	541800	\$1,200	100%	\$1,200	37%	\$449	\$422	1.4178	0.3521	0.8957	8.7669	\$598	\$149	\$378	0.0	\$636	\$158	\$402	0.0
Advertising	541800	\$1,200	100%	\$1,200	37%	\$449	\$422	1.4178	0.3521	0.8957	8.7669	\$598	\$149	\$378	0.0	\$636	\$158	\$402	0.0
Accounting Services	541200	\$600	60%	\$360	59%	\$211	\$199	1.5463	0.5715	1.0706	18.1039	\$307	\$114	\$213	0.0	\$327	\$121	\$226	0.0
Legal Services	541100	\$600	60%	\$360	80%	\$286	\$269	1.6392	0.7146	1.1206	13.1206	\$441	\$192	\$301	0.0	\$469	\$205	\$321	0.0
Insurance	524100	\$9,000	100%	\$9,000	85%	\$7,686	\$7,223	1.4691	0.3602	0.7117	8.5699	\$10,612	\$2,602	\$5,141	0.1	\$11,292	\$2,768	\$5,470	0.1
Utilities	2211A0	\$14,000	100%	\$14,000	21%	\$2,982	\$2,803	1.3670	0.2765	0.8436	5.3087	\$3,831	\$775	\$2,364	0.0	\$4,076	\$825	\$2,516	0.0
Web Hosting	14100 (S181)	\$120	100%	\$120	48%	\$58	\$54	1.6640	0.6901	1.0070	18.8779	\$91	\$38	\$55	0.0	\$96	\$40	\$58	0.0
Telecommunications	13300 (S171)	\$1,400	0%	\$0	92%	\$0	\$0	1.4382	0.3338	0.8256	7.2789	\$0	\$0	\$0	0.0	\$0	\$0	\$0	0.0
Travel - transportation	481000	\$1,000	0%	\$0	54%	\$0	\$0	1.5836	0.4383	0.7103	10.2756	\$0	\$0	\$0	0.0	\$0	\$0	\$0	0.0
Travel - hotel	7211A0	\$500	0%	\$0	81%	\$0	\$0	1.5010	0.4593	0.9812	20.5007	\$0	\$0	\$0	0.0	\$0	\$0	\$0	0.0
Meals & Entertainment	722000	\$300	100%	\$300	56%	\$168	\$158	1.6112	0.5350	0.8501	35.3682	\$254	\$84	\$134	0.0	\$271	\$90	\$143	0.0
		\$167,207		\$162,327		\$151,417	\$142,303					\$136,909	\$38,180	\$83,339	1.4	\$145,676	\$40,625	\$88,676	1.4

* Estimate by Office of Technology Transfer and Economic Development
 ** Estimate based on Risk Management Association (RMA) benchmark data

