

Economic Contribution of Telecommunication Companies Serving Greater Minnesota

**A REPORT OF THE ECONOMIC IMPACT ANALYSIS PROGRAM
UNIVERSITY OF MINNESOTA EXTENSION**

Brigid Tuck, Bruce Schwartau, and Ryan Pesch

Economic Contribution of Telecommunication Companies Serving Greater Minnesota

**A REPORT OF THE ECONOMIC IMPACT ANALYSIS PROGRAM
UNIVERSITY OF MINNESOTA EXTENSION**

February 2012

Brigid Tuck, Analyst/Writer, University of Minnesota
Bruce Schwartau, Extension Educator, University of Minnesota
Ryan Pesch, Extension Educator, University of Minnesota

Report Reviewers:

Matt Kane, Program Leader, Extension Center for Community Vitality, University of Minnesota
William Lazarus, Professor, Department of Applied Economics, University of Minnesota
Hans Muessig, Program Director, Minnesota Intelligent Rural Communities program, University of Minnesota
George Morse, Professor Emeritus, Department of Applied Economics, University of Minnesota
David Nelson, Extension Educator Emeritus, Extension Center for Community Vitality, University of Minnesota
Bruce Sorte, Community Economist, Extension Service/Department of Agriculture and Resource Economics, Oregon State University

Partners/Sponsors:

Center for Rural Policy and Development
Minnesota Telecommunications Alliance

© 2012 Regents of the University of Minnesota. All rights reserved. University of Minnesota Extension is an equal opportunity educator and employer. In accordance with the Americans with Disabilities Act, this material is available in alternative formats upon request. Direct requests to the Extension Store at 800-876-8636. ♻️ Printed on recycled and recyclable paper with at least 10 percent postconsumer waste material.

Table of Contents

1. HIGHLIGHTS	3
2. BACKGROUND OF STUDY	4
3. PROFILE OF THE STUDY AREA ECONOMY	5
4. ECONOMIC CONTRIBUTION	7
Direct Effect	7
Indirect and Induced Effect	8
Total Effect	8
Top Industries Effected	10
5. TAXES	12
6. NOTES ON THE ANALYSIS	13
7. CONCLUSIONS	14
8. APPENDIX 1: METHODOLOGY	15
9. APPENDIX 2: SURVEY	17

“The Economic Contribution of Telecommunication Companies Serving Greater Minnesota”: Summary

The following is a summary of the results of a recent University of Minnesota Extension study titled “The Economic Contribution of Telecommunication Companies Serving Greater Minnesota.”

- *Total effects:* The total economic contribution of the telecommunications industry serving Greater Minnesota in 2011 was an estimated \$1.3 billion. To create this output, businesses employed an estimated 10,300 workers and paid \$600 million in labor income. These estimates include the output and employment of telecommunication companies (direct effects), as well as a measure of increased economic activity in industries supporting telecommunication companies (indirect effects) and their employees (induced effects).
- *Direct effects:* The industry itself directly made an estimated \$870 million worth of expenditures in 2011, including operations, wages and salaries, and capital improvements. These expenditures included an estimated \$370 million in payments to labor. The telecommunications industry serving Greater Minnesota employed an estimated 4,500 individuals.
- *Indirect effects:* Telecommunication companies serving Greater Minnesota have ties to their suppliers, many of whom are also located in Greater Minnesota. Suppliers to the telecommunications industry directly employed an estimated 600 people in order to provide goods and services. These suppliers include cable programming, accounting services, motion picture and video services, engineering firms, printers and publishers, and advertisers.
- *Indirect and induced effects:* Overall, the telecommunications industry had the highest spin-off effects in construction, restaurant, health care, housing, wholesale trade, and retail industries.
- While taxes are not considered in the economic contribution study, telecommunication companies paid an estimated \$30 million in property, sales, and income taxes in 2011.
- There are 48 telecommunication holding companies serving customers in Greater Minnesota. Sixteen responded to a confidential survey regarding their employment and expenses.
- This analysis focuses on telecommunication companies (specifically, local exchange carriers) with customers in Greater Minnesota. See the full report for further definition and clarification. Telecommunication services are primary inputs for many businesses. This study does not attempt to measure the value of these services to Greater Minnesota’s economy.



Background of the Study

Residents of Greater Minnesota receive telecommunications services -- voice, FAX, and data including Internet -- from a variety of providers. There are over 80 telecommunications providers in the state and they vary in size and geographical service area from small companies serving a single community to companies serving a county, multiple counties in a region, to multi-state, national, or multi-national telecommunication corporations.

Depending on where you live in Greater Minnesota you might be served by a locally-owned municipal telephone company, a private for-profit company that serves a single community or a larger region, a cooperative company, or a large corporation. All of these entities provide local telephone service, as well as other services, and are defined as "local exchange carriers" or LECs. Many LECs have operated in and serviced their areas for generations.

The telecommunications industry is undergoing rapid change and evolution. As consumers continue to improve and upgrade their personal technology, telecommunication companies must adapt, grow, and change. Additional pressures arising from changes in legislation and regulation are also challenging telecommunication companies in Minnesota.

In light of these challenges, the Minnesota Telecommunications Alliance (MTA) posed the question "What is the economic contribution of telecommunication companies serving Greater Minnesota?" To answer this question, they asked for assistance from the Center for Rural Policy and Development (Center). Together, MTA and the Center engaged University of Minnesota Extension's Economic Impact Analysis program.

The Economic Impact Analysis program has two deliverables: a written report summarizing the study and a facilitated presentation of the

results. This report is the first deliverable of the program.

To address the question at hand, this study focuses on the economic contribution of telecommunication companies with customers in Greater Minnesota. When most people think of telephone and telecommunications services, they naturally include Internet, traditional long-distance, and cellular services. This report is focused on those local exchange carriers (LECs) operating in Greater Minnesota whose traditional telecommunications role has been, and is to, provide local service. They may also offer -- on their own or through resale arrangements -- those other services we all include as telecommunications services: Internet, long-distance, and wireless services. This report does not include wireless providers such as T-Mobile and Sprint or national or multi-national inter-exchange carriers (IXCs) such as CenturyLink, Verizon, or AT&T (except in those situations where a subsidiary provides local exchange services as CenturyLink does in many portions of the state.)

Profile of the Study Area Economy

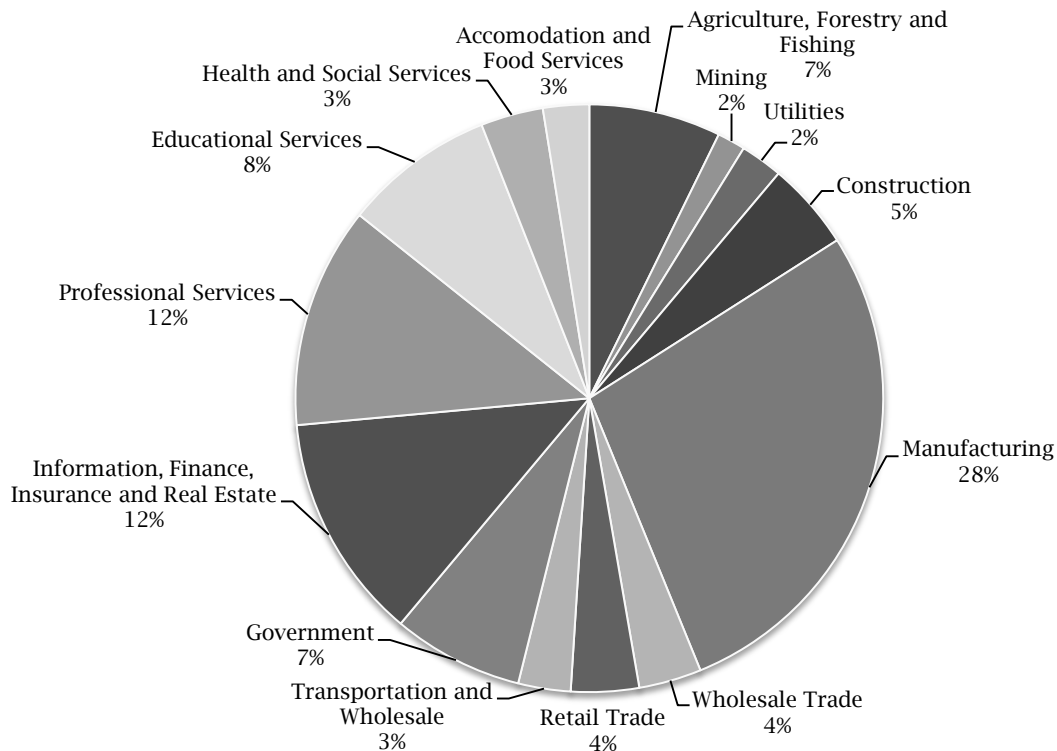
The study area for this analysis is Greater Minnesota. Greater Minnesota is defined as the 80 counties not included in the seven-county Twin Cities metropolitan area.¹ The telecommunications industry contributes to Greater Minnesota's \$172 billion economy. In 2010, there were 1.3 million jobs located in Greater Minnesota, paying \$53 billion in labor income. Chart 1 depicts total output by industry category. The services and manufacturing industries in Greater Minnesota generated nearly two-thirds of output in the region in 2010. In the database used for this analysis, output is defined as the total value of industry sales. Service sectors with high output in the region include: professional services and information, finance, insurance, and real estate.

Telecommunication companies are classified in the information industry.

Employment by industry category is shown in chart 2. The services industry has the largest share of employees in Minnesota (44 percent). Government and trade have the second and third largest shares respectively. The health and human services sector has the largest single share of service employment.

While manufacturing creates 30 percent of output, it only employs 10 percent of workers. There are two possible reasons for this fact. One, in the database, one job is one job regardless of its status as part-time, full-time, or seasonal. Since the service sector tends to employ more part-time employees and the

Chart 1: Output (Sales) in Greater Minnesota 2010

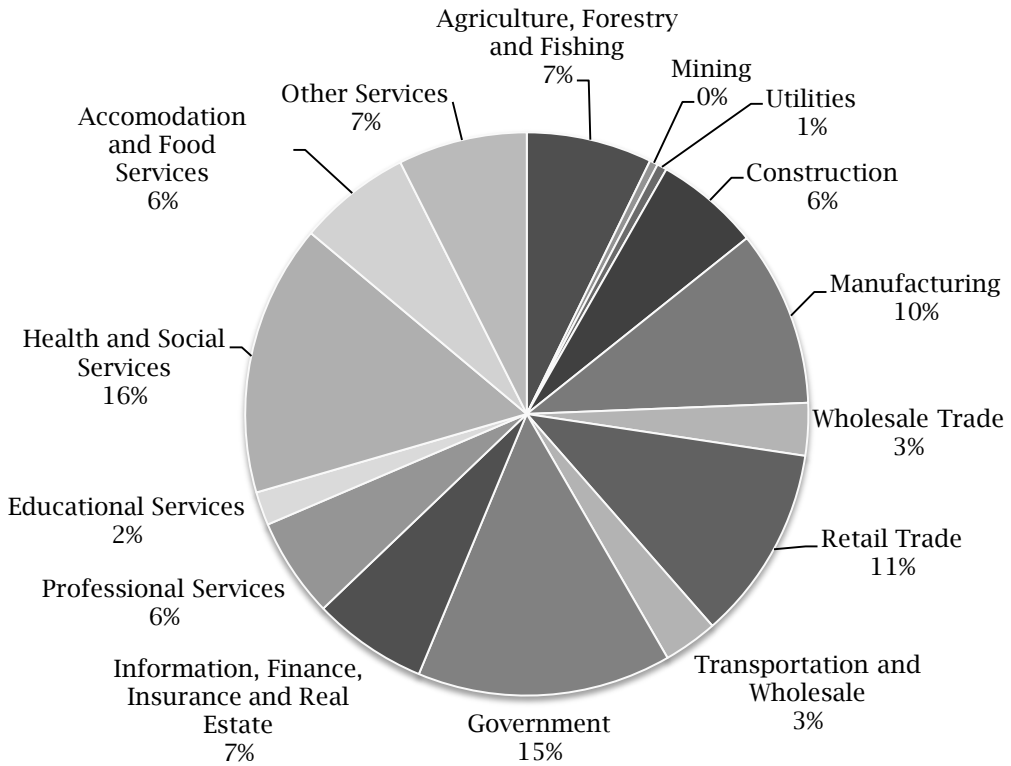


Data from IMPLAN (MIG)

¹ The seven-county Twin Cities metropolitan area includes Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington counties.

manufacturing sector more full-time, manufacturing's share of employment may appear lower. Second, manufacturing tends to have higher dollar-volume-productivity per worker.

Chart 2: Employment in Greater Minnesota 2010



Data from IMPLAN (MIG)

Economic Contribution

Total economic contribution is equal to the summation of direct, indirect, and induced effects. In terms of the telecommunications industry, direct effect is equal to expenditures by telecommunication firms to operate. The direct effect initiates additional economic activity to occur, therefore setting off a ripple in the local economy. These ripples fall into two categories, indirect effects, created by business-to-business transactions, and induced effects, created by consumer-to-business transactions. In an economic contribution analysis, researchers quantify the direct effects. An input-output model then measures the indirect and induced effects. In this study, researchers verified the ground-truth of the data by collecting primary data on the direct effect. The input-output model used was IMPLAN (MIG, Inc).

DIRECT EFFECT

The direct effect of the telecommunications industry is derived from spending by the telecommunications industry itself. Expenditures for the industry can be divided into two main categories: operations and capital improvements. Within operations, telecommunication businesses make expenditures for labor and for inputs (goods

and services).

In order to determine the direct contribution of the industry, all MTA members were sent an invitation to participate in an online survey. The survey asked telecommunication companies to report their operations and capital improvement expenditures for the most recently completed fiscal year. Respondents also reported on the percentage of those expenditures that were made within Minnesota. A copy of the survey is in appendix 2.

There are 48 telecommunication holding companies in Minnesota, representing roughly 80 operating companies. Holding companies were more likely to respond to the survey. The survey resulted in 16 completed, useable responses, for a response rate of 30 percent. This response rate is lower than ideal and introduces the possibility of non-response error. Non-response error presents a problem when the respondents do not adequately represent the entire population. To guard against non-response error, the researchers looked critically at the respondents. Respondents covered a considerable amount of territory in Minnesota, representing most of the state. Respondents also varied in size, ranging from companies with thousands of customers to those with a few hundred. Survey respondents provide services to 44 percent of the counties covered in this study. Although

Table 1: Direct Effect: Estimated Total Expenditures and Employment by Telecommunication Companies Serving Greater Minnesota

	Total	Percent in Minnesota	Total in Minnesota
Employment (by telecoms)	4,600	96	4,500
Gross Payroll (millions, as paid by telecoms)	\$380	96	\$370
Operating Expenditures (millions, excluding payroll)	\$470	59	\$280
Capital Outlays (millions)	\$380	57	\$220
Total Expenditures (millions)	\$1,230		\$870
Estimates by the University of Minnesota Extension Center for Community Vitality			

data does not exist to allow for direct verification of consistency, researchers were satisfied that the respondents do represent the industry adequately enough to proceed with the analysis; however, the possibility of non-response error does exist and should be considered in the interpretation of the results.

The survey results were analyzed and an average per telecommunication firm was calculated. Several outliers were identified in the analysis. *In a couple of cases, it was determined the entire response was an outlier due to the sheer size of the company. In those cases, the responses were used to calculate the total economic effect, but not the average per firm.* In other cases, individual responses were found to be outliers. These were dropped from the analysis and the calculation of averages.

On average, the businesses surveyed serviced 7,000 residential customers and 2,000 business customers (excludes outliers as outlined above). They employed, on average, 30 people and paid \$2.6 million in gross payroll. The vast majority of their employees, 96 percent, are residents of the state of Minnesota and 92 percent of their employees live within the service area of the telecom. On average, the telecommunication companies surveyed spent \$6.8 million on operating expenses. Nearly 60 percent of those expenditures were spent within Minnesota on items that include fuel, leases, cable, electricity, transportation, fiber, supplies, advertising, and maintenance. On average, the telecommunication companies spent \$3.0 million on capital outlays, the majority of this (\$2.6 million) on broadband expansion and improvements.

Table 1 shows the estimated direct effect, as entered into the model. The third column (total in Minnesota) constitutes the direct effect. This represents the estimated total amount of spending by telecommunication companies in Minnesota.

INDIRECT AND INDUCED EFFECT

Now that the estimated direct effects are quantified, the data can be entered into an input-output model. Input-output models trace the flow of dollars throughout a local economy and can capture the indirect and induced, or ripple effects, of an economic activity.

Indirect effects are those associated with a change in economic activity due to spending for goods and services directly tied to the industry. In this case, these are the changes in the local economy occurring because telecommunication companies need to purchase materials (fuel, office supplies, and electricity, for example) and related services (engineering, law, and advertising, for example). These are business-to-business effects.

Induced effects are those associated with a change in economic activity due to spending by the employees of businesses (labor) and by households. Primarily, in this study, these are economic changes related to spending by telecommunication employees. It also includes household spending related to indirect effects. These are business-to-consumer effects.

TOTAL EFFECT

The estimated total economic contribution of the telecommunications industry serving Greater Minnesota, in 2011, was \$1.3 billion, as shown in table 2. To create this output, businesses employed an estimated 10,300 workers and paid an estimated \$600 million in labor income.

Directly, the industry employed an estimated 6,300 employees. The majority of these workers were employed by telecommunication companies (4,500), however, the model estimated that an additional 1,800 were employed by companies contracted to perform capital improvements. As a result of spending by telecommunication companies and their employees, an estimated additional 4,000 jobs were supported in the state. Thus, the telecommunications industry contributed an

estimated total of 10,300 jobs to the economy of Greater Minnesota.

The telecommunications industry paid an estimated \$450 million in labor income to its employees. The majority of this income went to workers who were employed directly by telecommunication companies. Additional wages were paid to those employed by companies contracted to perform capital improvements. As a result of spending by telecommunication companies and their employees, an estimated additional \$150 million in labor income was supported in the state. Thus, the telecommunications industry is estimated to have contributed a total of \$600 million in labor income to the economy of Greater Minnesota.

	Direct	Indirect	Induced	Total
Output (millions)	\$870	\$120	\$320	\$1,300
Employment*	6,300	880	3,100	10,300
Labor Income (millions)	\$450	\$40	\$110	\$600

Estimates by the University of Minnesota Extension Center for Community Vitality

*Direct employment and direct labor income includes those employed by telecommunication companies and those directly employed in the implementation of capital improvements (contracted by telecommunication firms).

TOP INDUSTRIES EFFECTED

The total effect provides a broad overview of how the telecommunications industry connects with Greater Minnesota’s economy. Results from the analysis can provide more detail on how the telecommunications industry affects other specific industries. In fact, the model can show the top industries affected by the telecommunications industry. This is useful because it can demonstrate in further detail the

complex interactions between industries in the economy. Further, it can highlight the role of supporting industries.

Since telecommunication companies reported in the survey that they spend an estimated 60 percent of their operating budget in Greater Minnesota, looking at how this spending impacts other industries is of interest. Operating expenditures, as defined in this report, include expenditures for goods and

Table 3: Top 20 Supplier Industries Affected by Telecommunications *Operations Only*, Sorted by Estimated Employment

Industry	Total Estimated Employment Effect
Telecommunications	4,500
Cable and other subscription programming	40
Accounting-tax preparation-bookkeeping	33
Motion picture and video	20
Maintenance and repair of nonresidential structures	20
Architectural-engineering-and related services	20
Employment services	20
Real estate establishments	20
Services to building and dwellings	20
Monetary authorities and depository credit institutions	20
Civic-social-professional organizations	20
Automotive repair and maintenance	10
Wholesale trade	10
Business support services	10
Advertising and related	10
Printing	10
Newspaper publishers	10
Radio and television broadcasting	10
Private hospitals	10
Commercial and industrial machinery and equipment	10

This table includes operating budget effects only; it does not include wages/salaries or capital improvements. Estimates by the University of Minnesota Extension Center for Community Vitality

services used in the production of the telecommunication services: they do not include expenditures for wages and salaries or for capital improvements.

Table 3 details how the *operations* of telecommunication companies affect suppliers. Spending for supplies alone by the industry generates an estimated 600 additional jobs in Minnesota. In other words, suppliers to the telecommunication industry in Greater Minnesota employ 600 people in order to provide goods and services to the industry.

Cable programming, accounting services, motion picture and video services, engineering firms, printers and publishers, and advertisers located in Greater Minnesota all benefit economically from the industry. These industries constitute the main suppliers.² Many telecommunication companies provide television services in their region, using the same infrastructure as used for telephone and internet service. Therefore, it is not surprising to see cable programming and motion picture/video services in the top operating effects.

Table 3 focuses on spending for operations only. Table 4 includes *all spending* by telecommunication companies. Therefore, this table includes economic effects generated by operating expenditures, capital improvements, and wages and salaries. Total expenditures by telecommunication firms support an estimated 4,000 jobs in Greater Minnesota. Table 4 details the top 15 industries in which these jobs were created.

Due to the labor-intensity of the industry, a major source of its impact derives from spending by employees. Thus, table 4 reflects high impacts to service industries including restaurants, health care providers, and retail establishments. Other industries affected

reflect purchases made by the telecommunication firms in their production process and include construction, wholesale trade, architecture and engineering, and banking.

The IMPLAN model treats one job as one job. It does not use full-time equivalents. Therefore, one full-time job is equal to one part-time or seasonal job. It is typical to see high employment effects in industries that are dominated by part-time employment, such as retail and dining.

² Of note, this does not account for industries that benefit from the services of the telecommunications industry.

Table 4: Top 15 Supplier Industries Affected by *All Telecommunications Spending*, Sorted by Estimated Employment

Industry	Total Estimated Employment Effect	Associated Output Effect (millions)
Telecommunications	4,500	\$640
Construction, new nonresidential	1,700	\$210
Food services and drinking places	430	\$21
Private hospitals	200	\$30
Nursing and residential care	160	\$9
Offices of physicians, dentists, and other health care	160	\$24
Retail - food and beverage	150	\$7
Wholesale trade	140	\$22
Retail - general merchandise	140	\$7
Civic-social-professional organizations	120	\$5
Real estate establishments	100	\$11
Architectural-engineering-and related services	90	\$11
Retail - nonstores	90	\$3
Monetary authorities and depository credit institutions	80	\$21
Retail - motor vehicle	80	\$5

This table includes all spending: operating budget, wages and salaries, and capital improvements. Estimates by the University of Minnesota Extension Center for Community Vitality

Table 4 also includes the output effects tied to the industries with the highest employment effects. As the table demonstrates, high employment effects do not always translate into high output effects. This is due in part to the treatment of employment in the model. It is also partially attributable to the ratio of output per worker.

responses of large corporations, telecommunication companies serving Greater Minnesota are estimated to have paid \$30 million in property, sales, and income taxes in 2011.

TAXES

While taxes are not technically part of the economic contribution analysis, telecommunication companies in Minnesota do contribute to the tax base of the state. Based on average taxes paid for the 16 responding telecommunication companies and the

Notes on the Analysis

As mentioned previously, non-response error is a concern in this study. Two checks for the error were completed as part of the study. First, the researchers and the Executive Director of the Minnesota Telecommunications Alliance thoroughly reviewed the respondents. The respondents were found to represent a diverse sub-set of the telecommunication industry in Minnesota. Second, once the total expenditures and employment figures were calculated, they were checked against the default IMPLAN data. Results of this study were found to be consistent with IMPLAN estimates.

This study was completed using economic contribution analysis methodology. Economic contribution analysis quantifies the amount of economic activity generated by a project or industry. Economic contribution studies differ slightly from the methodological viewpoint of economic impact studies. Economic impact studies require a “*but for*” test to be met. That is, but for, the industry, what would the economy look like? Clearly, this type of analysis would not be feasible for the telecommunication industry. It is difficult enough to contemplate an economy without telecommunications, and even more difficult to try and model one.

The focus of this study is on Greater Minnesota. Greater Minnesota is the study area. Respondents to the survey serve customers outside of the Twin Cities seven-county metropolitan area. However, it does include all expenditures by those companies that occur in Minnesota, regardless of where and so the impacts include those on the Twin Cities metro.

This study also assumes that respondents have accurately estimated important measures used to carry out this economic analysis, including for example, expenditures for labor, operations, and capital investments and the percentages of those that were locally made. Errors in this regard would affect the accuracy of the analysis.

This study does not include telecommunication companies that exclusively provide service to customers living in the metropolitan area. Telecommunication companies providing service in both the metropolitan area and Greater Minnesota are included in the analysis. In addition, this study does not include the four national cell phone carriers who provide physical cellular networks. Local telecommunication companies provide cell service by purchasing network use from the major carriers. The service provided by the local telecommunication company is included in this analysis, but the service provided by the national cellular carrier is not.

Finally, this analysis focuses on backwards linkages, or on the suppliers to the telecommunication industry and its employees. It does not measure the likely significant benefits the industry provides to rural Minnesotans. In an increasingly global economy, access to telephone and internet service is crucial. As the economy advances, the speed of internet connectivity also becomes essential to users. Many organizations in Minnesota, including University of Minnesota Extension, are working to improve internet connectivity and usage in Greater Minnesota.

Telecommunication services are primary inputs for many businesses. This study does not attempt to measure the value of these services to Greater Minnesota’s economy.

Conclusions

The total estimated economic contribution of the telecommunications industry serving Greater Minnesota, in 2011, was \$1.3 billion. To create this output and meet indirect and induced demand, businesses employed 10,300 workers and paid \$600 million in labor income.

Residents of Greater Minnesota receive telecommunication services from a broad range of companies, known as local exchange carriers. These companies are facing increasing challenges and pressures. In order to address some of these issues, the Minnesota Telecommunications Alliance (MTA) posed the question “What is the economic contribution of telecommunication companies serving Greater Minnesota?” MTA partnered with the Center for Rural Policy and Development and University of Minnesota Extension to determine the answer.

In late 2011, Extension conducted a survey of members of the MTA. These survey results were in turn used to calculate the economic contribution of the industry. Sixteen of the 48 holding companies (representing 80 operating companies) responded to the survey. Their average responses and the responses from major corporations were used to determine the total direct effect of the industry in Minnesota. Directly, telecommunication companies serving Greater Minnesota are estimated to have employed 4,500 workers, paid \$370 million in payroll, spent \$280 million on operations, and expended \$220 million in Minnesota on capital outlays.

Telecommunication companies serving Greater Minnesota have ties to their suppliers. Suppliers to the telecommunication industry in Greater Minnesota employ an estimated 600 people in order to provide goods and services to the industry. These suppliers include: cable programming services, accounting services, motion picture and video services, engineering firms, printers and publishers, and advertisers.

Due to the labor-intensity of the telecommunications industry, a major source of its impact derives from spending by employees. Thus, high impact effects occur in service industries including restaurants, health care providers, and retail establishments. Other industries affected reflect purchases made by telecommunication firms in their production process and include construction, wholesale trade, architecture and engineering, and banking.

Telecommunication services are primary inputs for many businesses. This study does not attempt to measure the value of these services to Greater Minnesota’s economy. These impacts are likely significant.

Appendix 1: Methodology

Special models, called input-output models, exist to conduct economic impact analysis. There are several input-output models available. IMPLAN (IMpact Analysis for PLANning, Minnesota IMPLAN Group)³ is one such model. Many economists use IMPLAN for economic contribution analysis because it can measure output and employment impacts, is available on a county-by-county basis, and is flexible for the user. IMPLAN has some limitations and qualifications, but it is one of the best tools available to economists for input-output modeling. Understanding the IMPLAN tool, its capabilities, and its limitations will help ensure the best results from the model.

One of the most critical aspects of understanding economic impact analysis is the distinction between the “local” and “non-local” economy. The local economy is identified as part of the model-building process. Either the group requesting the study or the analyst defines the local area. Typically, the study area (the local economy) is a county or a group of counties that share economic linkages. In this study, the study area is the entire State of Minnesota with a focus on Greater Minnesota.

A few definitions are essential in order to properly read the results of an IMPLAN analysis. The terms and their definitions are provided below.

Output

Output is measured in dollars and is equivalent to total sales. The output measure can include significant “double counting.” Think of corn, for example. The value of the corn is counted when it is sold to the mill, again when it is sold to the dairy farmer, again as part of the price of fluid milk, and yet again when it is sold as cheese. The value of the corn is built into the price of each of these items and then the sales of each of these items are added up to get total sales (or output).

³ IMPLAN Version 3.0 was used in this analysis. The trade flows model with SAM multipliers was implemented.

Employment

Employment includes full- and part-time workers and is measured in annual average jobs, not full-time equivalents (FTE’s). IMPLAN includes total wage and salaried employees, as well as the self-employed, in employment estimates. Because employment is measured in jobs and not in dollar values, it tends to be a very stable metric.

Labor Income

Labor income measures the value added to the product by the labor component. So, in the corn example when the corn is sold to the mill, a certain percentage of the sale goes to the farmer for his/her labor. Then when the mill sells the corn as feed to dairy farmers, it includes some markup for its labor costs in the price. When dairy farmers sell the milk to the cheese manufacturer, they include a value for their labor. These individual value increments for labor can be measured, which amounts to labor income. Labor income does *not* include double counting.

Direct Impact

Direct impact is equivalent to the initial activity in the economy. In this study, it is spending by telecommunication companies on operations, wages and salaries, and capital improvements.

Indirect Impact

The indirect impact is the summation of changes in the local economy that occur due to **spending for inputs** (goods and services) by the industry or industries directly impacted. For instance, if employment in a manufacturing plant increases by 100 jobs, this implies a corresponding increase in output by the plant. As the plant increases output, it must also purchase more inputs, such as electricity, steel, and equipment. As the plant increases purchases of these items, its suppliers must also increase production, and so forth. As these ripples move through the economy, they can be captured and measured. Ripples related to the purchase of goods and services are indirect impacts. In this study, indirect

impacts are those associated with spending by the telecommunication companies for operating items (engineering, advertising, subscription programming, as examples) and for capital outlays (construction and engineering, for example).

Induced Impact

The induced impact is the summation of changes in the local economy that occur due to **spending by labor**. For instance, if employment in a manufacturing plant increases by 100 jobs, the new employees will have more money to spend to purchase housing, buy groceries, and go out to dinner. As they spend their new income, more activity occurs in the local economy. Induced impacts also include spending by labor generated by indirect impacts. So, if the telecommunication business purchases services from an engineering firm, spending of the engineers' wages would also create induced impacts. Primarily, in this study, the induced impacts are those economic changes related to spending by telecommunication employees and construction workers hired to implement capital improvements.

Total Impact

The total impact is the summation of the direct, indirect, and induced impacts.

Input-Output, Supply and Demand, and Size of Market

Care must be taken when using regional input-output models to ensure they are being used in the appropriate type of analysis. If input-output models are used to examine the impact or the contribution of an industry that is so large that its expansion or contraction results in such major shifts in supply and demand that prices of inputs and labor change, input-output can overstate the impacts or contributions. While the telecommunications industry is a major component of the Minnesota economy, it is not likely that its existence has an impact on national prices. Hence, the model should estimate the contributions reliably.

Appendix 2: Telecommunication Company Survey

Thank you for your willingness to participate in this confidential survey. You are being asked to complete this survey as part of a University of Minnesota study to determine the economic impact of Greater Minnesota's telecom industry.

Our goals from this survey are to:

1) Quantify total expenditures for labor, operations, and capital investments by all of Greater Minnesota's telecoms.

2) Determine which percentage of these expenditures are local (defined here as within 50 miles of the telecom's service territory). Local is based on the location of the direct purchase. For example, if you buy a truck from the local dealership, that is a local purchase, even if the truck is made elsewhere.

3) Identify local businesses which are significantly impacted by Greater Minnesota's telecoms.

Your information will be kept confidential. Only aggregated responses will be shared with the public. University of Minnesota will destroy your responses upon completion of the study. You may opt to skip any question.

1. Which counties does your service territory cover? (Please include all counties, even if your territory only partially covers the county).

2. How many customers do you currently have?

- Residential
- Business
- Other

3. Thinking of your most recently completed fiscal year, what was your total employment?

Please include full-time, part-time, seasonal, and administrative employees.

4. Again, thinking of your most recently completed fiscal year, what was your total gross payroll? Please include benefits.

5. According to your best guess, what percent of your employees live...

- In Minnesota?
- Within 50 miles of your service territory?

6. If you need a place to comment on the last three questions, please do so here.

7. Thinking of your most recently completed fiscal year, what was your annual non-labor operating expense? Do not include labor costs or capital investment expenditures. Enter numbers only (no dollar sign or commas necessary).

8. Thinking of your most recently completed fiscal year, what percent of your non-labor operating purchases were from businesses.....

(Consider where the purchase was made..if it was made at a location within the area, it is a local purchase regardless of where the company is based or where the item purchased originated)

- In Minnesota?
- Within 50 miles of your service territory?

9. Looking at your operating budget, what three categories (or line items) compose the largest share of your local expenditures (within 50 miles of your service territory)?

10. Please name any businesses/industries within 50 miles of your service territory from which you make major purchases.

11. If there are any comments you would like to make regarding the last four questions, please do so here.

12. Thinking of your most recently completed fiscal year, what were your capital expenditure outlays for each of the following?

- Expanding/Enhancing Broadband Connectivity and Services
- Land

- Building/Remodeling/Fixtures, etc.
- Machinery/Vehicles/Equipment, etc.

13. Again, thinking of your most recently completed fiscal year, what percent of your capital expenditures were from businesses....

(Consider where the purchase was made...if it was made at a location within the area, it is a local purchase regardless of where the company is based or where the item purchased originated)

- In Minnesota?
- Within 50 miles of your service territory?

14. Looking at your capital expenditure budget, what three categories (or line items) compose the largest share of your local expenditures (within 50 miles of your service territory)?

15. Thinking of your average expenditures on capital expenditures in the last ten years, is this year's total expenditure: greater than, less than, or about the same as the ten year average?

16. If there are any comments you would like to make regarding the last four questions, please do so here.

17. Thinking of your most recently completed fiscal year, what were your expenditures for the following taxes?

- Property
- Sales
- Income

18. If there any comments you would like to make regarding the last question, please do so here.

19. Given our goal of trying to quantify your local (within 50 miles of your service territory) spending, are there any other expenses (from your most recently completed fiscal year) that we did not measure in the previous questions? Please list and quantify.