

Economic Impacts of Midwest High Speed Rail on the Orthopedics Industry of Warsaw, Indiana

OrthoWorx, Inc.

FINAL



Prepared by:

Parsons Brinckerhoff

October 2010; revised January 2011

Disclaimer Statement

This report (Report) was prepared by PB Americas Inc. (PB) in accordance with an agreement with OrthoWorx, Inc. and is meant to be read as a whole. Information and statements contained in this Report are based in part on information provided to PB by OrthoWorx, Inc., government organizations, reputable industry organizations and individuals. PB has relied on the accuracy of the information provided – both written and oral – in basing our findings, and has not independently verified all data provided.

In the preparation of this Report and the views contained herein, certain assumptions and forward-looking statements have been made based upon interpretations or assessments of the best available information at the time of writing. Actual future events may differ from those assumed, and expected conditions are subject to change.

These assumptions and statements are made for purposes of assessing the potential economic impacts of High Speed Rail Service to Warsaw Indiana on the orthopedics industry in Warsaw, and to other economic enterprises that are linked to the Orthopedics industry. The level of care and diligence used in preparing this report is consistent with standards of the management consulting industry.

PB shall not be responsible for any damages, losses, liabilities or costs of any type arising out of or in any way connected with the use of this Report by OrthoWorx, Inc. or any other parties as a result of publication, circulation, reproduction, or reliance upon its content.

Contents

1. Executive Summary	1
2. Overview and Methodology	3
Impacts	4
Benefits	4
3. Economic Role of the Orthopedics Industry in Warsaw	7
Industry Overview	7
Industry Structure	8
Industry Outlook.....	9
4. Industry Transportation Needs – Interview Results	14
Access to Airports	14
Access for Training	15
Labor Markets	15
Warsaw Redevelopment.....	16
5. Economic Impacts of HSR	17
Improved Recruitment	17
Downtown Redevelopment in Warsaw.....	18
Quantitative Benefits of Improved Corporate Travel	18
Improved Client Business Travel	26
6. Conclusions.....	28
Further Study Recommendations	29
Appendix A – Total Yearly Trips for Orthopedics Industry Employees	30
Appendix B--Examples from Other HSR Studies and Major Transportation Corridors.....	31
High Speed Rail to Albany, NY - Proposed	31
High Speed Rail to Orlando, FL	32
Interstate 68	32
Corridor D Highway.....	33
Summary	33
Appendix C—Travel Time Assumptions for Various Scenarios	34

Tables

Table 1. Kosciusko County and Indiana State Total and Medical Equipment/Supplies Industry Employment	8
Table 2. Life Sciences Companies in Kosciusko, Indiana	9
Table 3. RIMS II Multipliers for Kosciusko County	13
Table 4. Direct Economic Impacts of HSR on Orthopedics Industry in Warsaw, IN	23
Table 5. Direct, Indirect and Induced Economic Impacts of HSR with Alignment to Union Station, Chicago (2009 \$).....	24
Table 6. Direct, Indirect and Induced Economic Impacts of HSR with Alignment to O’Hare International Airport (2009 \$).....	25
Table 7. Direct Economic Impacts of HSR on Clients and Partners of the Orthopedics Industry	26
Table 8. Direct, Indirect and Induced Economic Impacts of HSR from Benefits to Clients and Partners ...	27

Figures

Figure 1. Alternative Alignment for Northern Indiana / Northwest Ohio Routing Study.....	3
Figure 2. Alternative Alignment for Northern Indiana / Northwest Ohio Routing Study.....	19
Figure 3. Scenario Timetables for HSR.....	20

1. EXECUTIVE SUMMARY

What industry problem would be addressed by HSR? Currently, hundreds of orthopedic industry employees travel each week to destinations around the globe to visit their customers, to collaborate with universities, to visit company satellite locations and to meet with vendors. Most trips start with modes of travel that are unreliable—a drive to Chicago or Indianapolis through unpredictable traffic and weather to catch a direct flight, or a drive to Fort Wayne or South Bend where the traveler hopes the commuter flight will take off on time (or at all) so he or she can make the connecting flight in Chicago or Detroit to their final destination.

The all-too-common commonality of these methods is the amount of **unpredictable, unproductive time spent traveling** to the major airport to catch the airplane that will go the final destination. High speed rail, by contrast, would provide predictable travel times and a productive environment—high speed internet, electrical power, work space, the ability to hold meetings in person or via mobile phone.

1) **Significant Travel Time Savings:** Based on an analysis of a travel survey among the largest orthopedic companies in the Warsaw region, a High Speed Rail connection to Chicago would save between an estimated 770,000 and 1.1 million person-hours of travel time for orthopedic industry business travelers, clients, and business partners over 20 years, when monetized, this generates between \$32.2 million and \$44.6 million in travel time savings (real 2009 dollars) over the same period, depending on the HSR's final destination in Chicago (Union Station or O'Hare).

2) **Productivity Benefits:** The same survey and analysis estimates additional productivity of between 932,000 and 1.1 million person-hours over 20 years, depending on alignment. When monetized, this translates to between \$39.0 million and \$46.1 million in productivity benefits (real 2009 dollars) over the same period.

3) **Total Regional Economic Impacts:** The benefits extend to the rest of the economy as well, producing indirect and induced impacts. Using an input output model specific to Kosciusko County and the state of Indiana, these impacts are estimated to range between \$62.7 million and \$69.0 million in induced and indirect impacts on the county and state economy over 20 years. The same input-output analysis estimates a jobs impact between 649 and 790 person-years of employment over 20 years, or the equivalent of supporting 33 to 39 additional jobs per year, on average. The total economic impact, measured in terms of the value of products and services sold, on the orthopedics industry, as well as other local and regional businesses is estimated to be between \$133.0 and \$160.5 million over 20 years, depending on the HSR's final destination in Chicago (Union Station or O'Hare). In addition, a 2006 study an estimated \$35 to \$53 million increase in property values in the Warsaw region as a result of high speed rail.

4) **Long Term Competitiveness of the Orthopedics Industry Cluster in Warsaw:** There are significant "economies of agglomeration" from location in Warsaw; the collective strength of the orthopedics cluster in Warsaw draws strength and resilience from its size, proximity, and the economies that come from close proximity and face-to-face relationships. However, poor access to Warsaw means that threats to the centrality of Warsaw and to the domestic orthopedics industry will loom much larger

FINAL

in the future without fast and direct connectivity to the major airports and urban destinations. Firms of the orthopedics industry in Warsaw become more competitive as greater transportation access allows business travelers to reach important clients and markets with greater ease. These clients and business partners will be able to reach Warsaw through HSR, allowing them to identify developments in the industry, provide essential technical, research, and financial information and support, and maintain essential business relationships with OEMs and executives in Warsaw.

5) **Quality of Life Benefits:** *This report notes other potential benefits of a high speed rail connection between Warsaw and Chicago, largely related to recruitment and retention of key talent.* While high speed rail would not be intended for daily commuting, survey respondents believe it will help address trailing spouse issues and be a perceived quality-of-life benefit given improved access to Chicago's civic and cultural amenities. In short, high speed rail would bring Warsaw closer to the world.

2. OVERVIEW AND METHODOLOGY

This report analyzes the potential economic benefits to the orthopedic industry in Warsaw, Indiana -- as well as to the surrounding area -- from a possible High Speed Rail (HSR) connection in Warsaw. HSR service in Warsaw would be consistent with the proposed "Southern HSR Alignment" through Indiana, which would link Chicago to the west with major points to the east in Ohio, including Toledo, with further potential through-connections to Cleveland. This routing is shown in red in Figure 1. The Indiana corridor comprises one segment of a larger proposed Upper Midwest High Speed Rail network. The Southern Alignment is the selected and recommended alternative for HSR service in Indiana, as identified in the most recent program submittal by the Indiana DOT to the Federal Railroad Administration.¹

Figure 1. Alternative Alignment for Northern Indiana / Northwest Ohio Routing Study



Source: INDOT, Northern Indiana / Northwest Ohio Routing Study (2002).

This report reflects a scope of work comprised of four main tasks. The first task describes the overall economic role that the orthopedic industry in Warsaw, Indiana plays in the larger economy. This provides a larger context to understand that the companies making up the Warsaw Orthopedic Cluster provide significant economic contribution to the global orthopedics industry, the county, and the state.

Second, the economic analysis includes a "benchmarking" exercise in which impacts of major transportation corridor improvements (not necessarily high speed rail) on major industry clusters are identified for relevance to the orthopedics industry-HSR connection.

Third, the study identifies the transportation needs of the orthopedics industry in Warsaw through a series of interviews and also a formal transportation survey of the major OEMs located in Warsaw.

Finally, the report estimates economic productivity benefits of HSR to the orthopedics industry in Warsaw, relying in particular on the results of the travel survey. Here, quantitative benefits are

¹ Indiana Department of Transportation. Track 2 Submittal, OMB No. 2130-0583. IN-Chicago-Cleveland-HSR Service, October 2010.

http://www.in.gov/indot/files/IN_CHI_CLEV_HSRService_hsiapprack2_3.pdf

estimated, focusing on one major segment of the travel market – travel by orthopedics industry employees. These estimates represent an important, but by no means the only travel segment. It has been selected for analysis as representative of the order of magnitude of direct travel benefits that HSR would deliver to the industry. The analysis utilizes an economic impact analysis methodology, the PB Regional Input-Output Scenario Model (PRISM), to derive benefits which orthopedics firms would directly enjoy, as well as secondary benefits to the surrounding region, as increased industry productivity and cost savings would generate “spin-off” benefits to other industries, businesses and households.

Impacts

Both qualitative and quantitative methods were employed to identify the economic benefits of a HSR line to this industry, and to Warsaw, Kosciusko County and the surrounding region. Input to the analysis of impacts were, as noted, obtained from benchmarking studies, interviews with industry representatives in Warsaw, and a formal travel survey of the major orthopedics firms in Warsaw. The following summarizes these inputs:

- 1) **Benchmarking Studies:** HSR is viewed by comparable cities such as Orlando, FL and Albany, NY as a potential and significant boost to their local economies. Both cities view HSR as a means to revitalize a particular industry or cluster of Industries. Through increased access and further development, Orlando and Albany intend to broaden their economic base and foster growth industries in their region. Other studies, including “after the fact” studies of the actual impacts of major transportation corridor improvements have found that access to once underserved regions can have significant impacts on the local economy. These areas are able to benefit from employment opportunities in a broader region, and businesses gain a larger pool of human capital at their disposal. As the diversity of the local economic base expands, both businesses and residents benefited from the added access to a broader region that resulted from major transportation infrastructure investment.
- 2) **Industry Interviews:** Interviews of orthopedics industry representatives were conducted in Warsaw, Indiana by the PB consultant team and OrthoWorx on July 26th and 27th, 2010. Overall, the interviews revealed four major points. The first was the importance of connectivity to airports and transportation hubs for business travel for employees and visiting partners and clients. Secondly, access to regional transportation was necessary for the training of employees in the industry. Third, the industry executives were increasingly concerned with their ability to retain and recruit talent, indicating that increased transportation options may add to the available labor pool. Finally, businesses were optimistic about the possibility of local redevelopment if Warsaw, Indiana had HSR service.
- 3) **Formal Travel Surveys:** The surveys indicated that in the most recent year, the total demand for airport related travel on the part of major orthopedic industry employees – the travel market segment which would benefit the most from HSR – was approximately 39,900 trips (departing and returning). A detailed breakdown of this travel survey information, including origins and destinations, can be found in Appendix A of this report.

Benefits

Based on the benchmarking studies, interviews, and the travel surveys, the following summarizes the most important and significant benefits to the orthopedics industry in Warsaw from a HSR connection:

- 1) **Long Term Viability of the Orthopedics Cluster in Warsaw:** Interviews with Warsaw orthopedics industry executive leaders and other industry representatives, as well as market driven data, indicate that the orthopedics cluster in Warsaw is strong. While access to Warsaw is far from optimal, there are significant “economies of agglomeration” from location in Warsaw; the collective strength of the orthopedics cluster in Warsaw draws strength and resilience from its size, proximity, and the economies that come from close proximity and face-to-face relationships. However, there are threats. U.S. tax and regulatory policy have caused companies to increasingly consider greater investments abroad. The industry is currently manufacturing in overseas facilities for both growing international and domestic markets. A share of future growth can be expected to occur overseas, especially in China and other growing economies such as India, Brazil, and Russia. Companies must recruit diverse employees who understand new geographies and market segments. Domestic market growth will continue to occur, but the core functions in the industry face increased risk of relocation without global connectivity. Other countries, states and localities can be expected to compete aggressively for future expansions by the Warsaw companies. It is vital for the orthopedics industry to achieve greater global access.
- 2) **Recruitment and Retention:** By making Warsaw less geographically remote, HSR would benefit orthopedics firms in their efforts to recruit certain high level professional employees, and to retain them. Interviews with industry representatives consistently focused on how HSR would improve their ability to attract and retain employees. As case studies in this report demonstrate, additional transportation investments can have a significantly positive impact for employers seeking a broader labor pool as well as employees seeking jobs. By reducing travel times and making Warsaw accessible, the potential HSR line could allow for more successful recruitment and retention of employees.
- 3) **Local Land Use and Development Benefits:** The local region – the city of Warsaw and Kosciusko County most particularly – can be expected to benefit from added development along a HSR train station and new businesses and hospitality activity. Case studies of HSR proposals serving Albany, New York, Orlando, Florida, and other locations conclude that HSR lines will have significant, measurable impacts on local development and industry activity. Furthermore, the 2006 Midwest Regional Rail Initiative Benefit Cost and Economic Analysis study estimates that Warsaw, including areas surrounding the Warsaw HSR station could experience an increase from 105 to 160 jobs, \$9 to \$13 million in household income, and \$35 to \$53 million in additional property values.² These benefits come from the additional economic activity generated by greater travel and subsequent development. The orthopedics industry benefits from this development as the local capacity for meetings and conferencing would expand with greater hospitality-related businesses. The potential for expanded industry conference demand could stimulate development of a conference hotel in Warsaw, to accommodate such demand. A conference hotel/facility proximate to the station would represent a consolidation of activities which are somewhat dispersed now throughout the area.
- 4) **Travel Time and industry Productivity Benefits:** HSR would provide significant travel time and productivity benefits to the employees of the orthopedics industry, as well as clients and business partners, who could ride HSR to travel for business. This study estimates that over 20 years, HSR would lead to travel time savings for industry employees alone of between \$28.4 and \$40.1 million, as well as additional worker productivity increases valued between \$34.3 and \$40.7 million. This translates to region-wide economic impacts between \$118.6 and \$141.7 million over 20 years, and between 591 and 697 person-years of employment over the same period.

² MWRI. Midwest Regional Rail Initiative Benefit Cost and Economic Analysis, November 2006.

5) **Industry Competitiveness:** In addition to these quantified benefits, firms of the orthopedics industry in Warsaw become more competitive as greater transportation access allows business travelers to reach important clients and markets with greater ease. Furthermore, these clients and business partners will be able to reach Warsaw through HSR, allowing them to identify developments in the industry, maintain business relationships with OEMs and executives in Warsaw.

6) These quantified benefits are only for business travelers in the orthopedics industry in Warsaw, as well as an estimate of client and business partner travel. Other travelers along this region would benefit from travel time savings and productivity increases, and those savings would increase over time as roadway congestion in the major urban destinations such as Chicago worsens.

3. ECONOMIC ROLE OF THE ORTHOPEDICS INDUSTRY IN WARSAW

Industry Overview

Known as the "Orthopedic Capital of the World," Warsaw, Indiana is home to over 30 orthopedic device manufacturing, supply and technical service companies that together earn more than \$11 billion in annual revenues. The orthopedics companies located in Warsaw are a significant portion of that industry's market, representing more than 50 percent of the U.S. market share and 30 percent of the global market. This industry provides significant economic impacts to the local economy as it employed 6,800 skilled employees in 2009, an employment force about half the size of Warsaw, Indiana's population.³ There are several key points regarding the Warsaw orthopedic industry, in relation to the local and regional economy.

First, the Warsaw-based orthopedic industry is one of the largest employers in Kosciusko County, Indiana. According to the Bureau of Labor Statistics, in 2009, the medical equipment and supplies manufacturing industry employed over 6,800 individuals, representing over 22 percent of all jobs in Kosciusko County. Statewide, these jobs comprise 2.7 percent of the state's total employment. The concentration of medical equipment and supplies manufacturing jobs in Kosciusko County is nearly 80 times greater than the national average.

The Orthopedics Capital of the World—Not an Idle Boast

- More than \$11 billion in annual revenues
- Three of the world's top five companies headquartered in Warsaw
- Nearly one-third of the world's orthopedic market share concentrated in local companies
- More than 30 companies devoted to orthopedic medical devices
- Nearly 7,000 direct jobs in a city of approximately 12,000
- Each orthopedic industry job generates two additional jobs in Kosciusko County

Secondly, the medical equipment device manufacturing industry is one of the fastest growing sectors in Kosciusko County and in the state of Indiana. Compared to other industries in Kosciusko County, employment growth in medical equipment and supplies manufacturing has been much greater over the past decade. From 2001 to 2009, the industry increased at a compound annual growth rate (CAGR) of 6.3 percent, while total county employment increased only by a CAGR of 0.2 percent. It should also be noted that the medical device businesses in Kosciusko County has also been expanding at a greater rate than those located in other areas of the state. As shown in Table 1 below, Indiana's medical equipment and supplies industry increased at a CAGR of 2.7 percent, compared with the previously noted 6.3 percent for the County.

³ BioCrossroads (2009). "Warsaw, Indiana: The Orthopedics Capital of the World," p. 8.

Table 1. Kosciusko County and Indiana State Total and Medical Equipment/Supplies Industry Employment

Industry	2009 Employment (thousands)	CAGR, 2001-2009	2009 Location Quotient
State of Indiana			
All Industries	2,788	-0.6%	-
Medical equipment and supplies	20.1	2.7%	3.1
Kosciusko County			
All Industries	33.3	0.2%	-
Medical equipment and supplies	6.8	6.3%	79.4

Source: Bureau of Labor Statistics

Due to the sustained and growing demand for orthopedic surgical procedures, Warsaw’s orthopedic industry has been resilient during the recent economic downturn. Kosciusko County’s medical equipment and supplies industries continued to expand, increasing industry employment by 11.0 percent year-to-year growth in 2008 and 3.0 percent in 2009. On the other hand, overall state employment decreased by 1.0 percent in 2008 and 5.7 in 2009.

Finally, the medical device and supplies manufacturing industry is one of the highest paying sectors in Kosciusko County and in Indiana. The highly specialized skill set required in the high-tech medical device industry translates into higher average earnings for workers. In 2009, the average annual wage of the medical equipment and supplies manufacturing industry in Kosciusko County was \$70,418, approximately 1.7 times that of private industry wages (\$40,791). It is also interesting to note that the average wage for the medical equipment manufacturing industry is 17 percent higher in Kosciusko County than the nationwide U.S. wage for the same industry.

Industry Structure

Since the founding of the first orthopedic device firm in 1895, Warsaw has seen a deep integration of its orthopedic industry and has become the center for all elements of the supply chain of the business—from research and development to product manufacturing and distribution. According to the Kosciusko County Chamber of Commerce, there are currently 33 life sciences companies fully located or headquartered in the town of Warsaw and neighboring townships within the county, including Biomet, Zimmer and DePuy—three of the largest and most profitable players in the industry with a combined revenue base of over \$11 billion in 2008, representing nearly 30 percent of the \$37.1 billion global musculoskeletal market.

Four of the 33 registered orthopedic companies in Kosciusko County are original equipment manufacturers (OEMs), while contract manufacturers of orthopedic devices make up a significant portion of the remaining firms. There are also ten companies that manufacture inputs to orthopedic products or

equipment that are related to the musculoskeletal market, employing approximately 190 people in the county.

Table 2. Life Sciences Companies in Kosciusko, Indiana

Firm Type	No. of Firms (Warsaw)	No. of Employees (Firmwide)
Orthopedic Original Equipment Manufacturer (OEM)	4	6,100
Contract Orthopedic Device Manufacturer	19	1,385
Other Medical Device Manufacturer	2	22
Medical Device Supplier Industry	5	142
Research, Testing, and Medical Labs	3	24
Total	33	7,673

Source: Kosciusko County Chamber of Commerce

The larger original equipment manufacturers are all multinational enterprises, with manufacturing locations, operating subsidiaries, suppliers and customer bases extending across the United States and around the globe. Biomet, for example, has 58 offices in over 30 countries, while DePuy is connected to its parent company, Johnson & Johnson’s global network and has a physical presence in more than 50 countries. Given the importance of global markets to these firms, they are active in nearly every country around the world that has health care delivery infrastructure.

Over the past five years, the publicly held orthopedic companies in Warsaw have reported healthy profit margins and revenue growth. Zimmer and Biomet reported sales increases of 5.7 percent and 7.4 percent respectively from 2005 to 2009. Zimmer also reported net profit margins of 16 percent in 2009. The industry cites growing demand for hip and knee replacements for the Baby Boomer generation, as well as the success of newly launched products as reasons for this strong performance.

The orthopedics industry is also a substantial contributor of property taxes in Kosciusko County. Under current tax rates, the industry contributed over \$1.7 million in property taxes in 2009. It is estimated that the orthopedics businesses located in Warsaw and the surrounding towns collectively comprise 18 percent of the commercial and industrial property tax base in Kosciusko County.

Industry Outlook

Major Drivers

The driver of market opportunities for the orthopedic device industry comes from aging populations that increasingly need hip and knee replacements. According to the U.S. Census Bureau, the population of 60 to 84 year-olds is generally growing worldwide—from 2005 to 2030, the CAGR of people in that age group is expected to be 2.5 percent in the U.S.; 3.7 percent in Mexico and Brazil; 1.6 percent in the U.K.; 2.4 percent in Australia and 3.6 percent in China. The market opportunity in the U.S. is especially

compelling in the short term, as the oldest Baby Boomers approaching 67 years of age, the average age for total knee or hip replacement.

Another significant trend in the musculoskeletal market in the U.S. is related to increasing obesity rates in the country. A 2009 report in the Archives of Internal Medicine predicts a dramatic increase in the need for knee and hip replacements in the next twenty years. According to the Journal of Bone and Joint Surgery, it is expected that there will be a 674 percent increase in the demand for knees and a 174 percent increase in demand for hips through 2030.

Finally, innovations in the industry have further expanded the market for these orthopedic device companies. According to public industry sources, orthobiologics for cartilage repair and partial and bone-conserving implants are increasingly used as interim steps to provide relief to patients until they are ready to undergo total joint replacement surgery. Natural tissue grafts are increasingly popular in the market for cartilage repair and engineered tissue grafts are currently being evaluated in clinical trials to serve the expanding market.

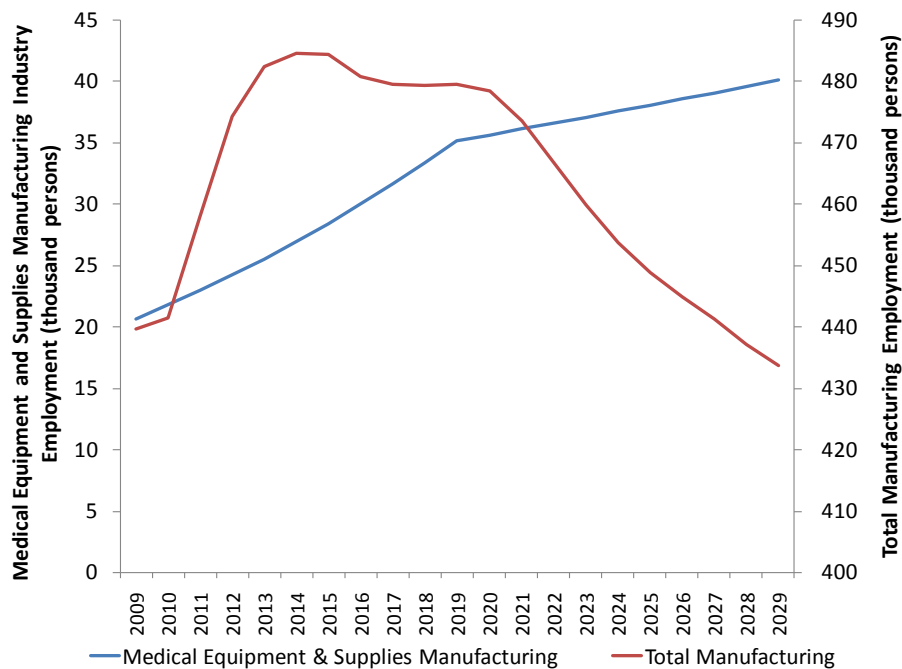
Industry Forecast, 2010 to 2029

According to IHS Global Insight, the medical equipment and supplies manufacturing industry is expected to be the fastest growing manufacturing industry in Indiana over the next three decades. Over the medium term, employment in the industry is expected to increase from 20,588 to 35,155 employees, exhibiting a CAGR (2009-2019) of 5.5 percent. From 2020 onwards, employment growth in the industry is expected to slow to a CAGR of 1.3 percent to reach 40,091 employees in 2029.

The positive outlook for the medical equipment and supplies manufacturing stands in contrast to the rest of the manufacturing sector in Indiana. Overall manufacturing employment in the state is expected to decrease at an average of 0.1 percent per year from 2009 to 2019. The lack of employment gains in manufacturing is primarily due to expected outsourcing of electrical equipment and plastics production to countries with cheaper labor costs, such as Mexico. Outsourcing is also a significant threat to medical equipment jobs in Indiana.

As seen in Figure 2 below, the medical equipment and supplies manufacturing industry is projected to have significant statewide employment gains through 2029. These employment gains stand in sharp contrast to overall manufacturing employment declines in Indiana over the same period, illustrating that this industry is a vital growth industry necessary to buffer much of the future expected job losses.

Figure 2. Indiana Employment in Medical Equipment and Supplies Manufacturing and Total Manufacturing, 2009 to 2029



Source: IHS Global Insight

The Future of the Orthopedics Industry in Warsaw

A key question for this study relates to the stability and potential for growth of the orthopedics businesses in Warsaw, Indiana in particular. While the industry as a whole has growth potential that exceeds the overall economy and many manufacturing industries, this study considered the possibility that growth for this industry in Warsaw may not be the same as overall industry growth. Most importantly, if the possibility exists that industry activity shifts away from Warsaw to other locations, this would negatively influence some of the growth expected in the region.

Interviews conducted with leading executives of the major original equipment manufacturers (OEMs) in Warsaw in July 2010 highlight the “centrality” of Warsaw as the focal point of research, development, and corporate leadership. However, there are threats. U.S. tax and regulatory policy have caused companies to increasingly consider greater investments abroad. A share of future growth can be expected to occur overseas, especially in China and other growing economies such as India, Brazil, and Russia. So while the core business functions of this industry are expected to continue in Warsaw, companies increasingly rely on global access. These core functions—manufacturing, R&D and other activities—face increased risk of relocation without global connectivity. Other countries, states and localities can be expected to compete aggressively for future expansions by the Warsaw companies.

Interviews with Warsaw orthopedics industry executives also indicated that the industry is currently manufacturing in overseas facilities for domestic markets, and this trend will continue in the future. Domestic market growth will continue to occur, but the core functions in the industry face increased risk

of relocation without global connectivity. Thus, it is vital for the orthopedics industry to achieve greater global access.

Impact of the Orthopedics Industry on the Regional Economy

The orthopedics businesses in Warsaw sustain many other businesses throughout the local and regional economy, as firms supply needed inputs and services to the industry, and also as workers within the industry consume products and services offered by local businesses. Moreover, the structure of orthopedics manufacturing is itself interconnected – many of the smaller firms classified within this industry group are small manufacturers supplying inputs to the larger OEMs. As a result the effect of increased demand at the top tier of the industry filters down to smaller firms within the industry category. As a result, the impact of increased demand for implants and other final products is more stimulating to total economic activity in the area than the numbers might actually suggest. The growth of the Warsaw-based orthopedic industry is expected to have a significant impact on the regional economy, given the significant value of its output and the large number of jobs it provides. Presented in this section of the report is the economic impact of growth in the medical equipment and supplies industry in Kosciusko County under existing conditions, i.e. without transportation improvements.

The Regional Industrial Multiplier System II (RIMS II) data from the U.S. Bureau of Economic Analysis (BEA) is useful as an indicator of the overall impact of orthopedics industry activity. RIMS II is an economic input-output model that estimates the impact on a region's economy from an initial change in sales, income or jobs created by a particular event. More specifically, RIMS II estimates the resulting economic output, earnings and employment. Output is defined as additional economic activity and spending in a region; earnings include the wages earned by individuals in the region and employment refers to the number of jobs.

In this analysis, the region of the RIMS II analysis is defined as Kosciusko County. The registered industries selected to represent the economic activity of the Warsaw-based orthopedic industry includes: 33911A "Laboratory Apparatus and Surgical Appliance and Supplies Manufacturing"; 339112 "Surgical and Medical Instrument Manufacturing"; and "541700 Scientific Research and Development Services."

According to RIMS II analysis, for each dollar of output delivered to final demand (i.e., the dollar value of products produced for final sale) by the orthopedic sector representative industries, approximately \$1.4 of output is generated for all industries in Kosciusko County. Thus, a 1 percent increase in the \$11-billion Warsaw-based orthopedic industry is expected to generate about \$1.54 million of total economic activity in the County, as demand for such activities as transportation services, building maintenance, parts and component fabrication, legal services and other professional services increase to support the industry's expansion.

From an employment perspective, \$1 million in output of the orthopedic industry generates between five and ten jobs in total, for all industries, in Kosciusko County. The magnitude of the employment effect depends on the function of the output—research and development activities tend to generate more employment, as demand for professional services are relatively greater to support such activity. Also, for each job addition in the orthopedic industry, approximately two jobs are generated in Kosciusko County, as the orthopedic employees create demand for services that ripple through the economy.

In terms of earnings, each dollar of output realized by the orthopedic industries generates earnings for all households in Kosciusko County between \$0.31 and \$0.53. Furthermore, for each additional dollar paid

to those employed in the orthopedic industry, the earnings of all households in the county is expected to increase by \$1.2 to \$1.4, a result of increased spending of the orthopedic employees.

Presented in the table below is the estimated impact of the growth in the orthopedic industries on Kosciusko County.

Table 3. RIMS II Multipliers for Kosciusko County

Industry	Final-demand Output (dollars)	Final-demand Earnings (dollars)	Final-demand Employment (number of jobs)	Final-demand Value-added (dollars)	Direct-effect Earnings (dollars)	Direct-effect Employment (number of jobs)
Laboratory apparatus and surgical appliance and supplies manufacturing	1.38	0.31	5.26	0.76	1.40	1.96
Surgical and medical instrument manufacturing	1.42	0.34	6.17	0.81	1.41	1.84
Scientific research and development services	1.41	0.53	10.38	0.82	1.24	1.56

4.INDUSTRY TRANSPORTATION NEEDS – INTERVIEW

RESULTS

This section reports on the orthopedic industry's views of its transportation problems and needs, along with how industry leaders view the potential benefits to their business from a HSR connection in Warsaw. As a first step toward identifying these transportation needs, PB and OrthoWorx conducted interviews with key orthopedics industry representatives. These semi-structured interviews allowed PB to identify the various roles that transportation plays in this industry, and the participants' comments helped them better understand the potential benefits of HSR to the industry and the community. As described in the next section, a formal data request concerning travel needs, patterns, and frequencies was also submitted to the industries, and responses to these formed the basis for a quantitative assessment of benefits.

Interviews of orthopedics industry representatives were conducted in Warsaw, Indiana by the PB consultant team and OrthoWorx on July 26th and 27th, 2010. A preliminary list of interview questions was distributed in advance by OrthoWorx. Representatives from Biomet, DePuy, Paragon Medical, Zimmer, Symmetry Medical and Medtronic, were interviewed during this process. The employees interviewed represented executive management, sales, research and development and engineering functions of the industry.

Overall, the interviews revealed four major points. The first was the importance of connectivity to airports and transportation hubs for business travel for employees and visiting partners and clients. Secondly, access to regional transportation was necessary for the training of employees in the industry. Third, the industry executives were increasingly concerned with their ability to retain and recruit talent, indicating that increased transportation options may add to the available labor pool. Finally, businesses were optimistic about the possibility of local redevelopment if Warsaw, Indiana had HSR service.

Access to Airports

Because of Warsaw, Indiana's relatively remote location, access to airports for company employees, vendors and collaborators is an important element in the day-to-day functioning of the industry. We have concluded that the lack of proximity to a major, global airport costs the companies millions because these "road warriors" depend so heavily on frequent travel.

The airports most frequently used by the interviewed companies are: Fort Wayne International (50 miles); Chicago Midway International (123 miles); Indianapolis International (133 miles); and Chicago O'Hare International (140 miles).

The major benefit provided by HSR in terms of transportation access would be the ability to connect efficiently and with much greater predictability to O'Hare International Airport in Chicago, which is currently not easily accessible from to and from Warsaw. Ft. Wayne and Indianapolis provide reasonably good "second best" solutions to air travel, but they do not offer the same number of connections as airports in Chicago. Ft. Wayne, the closest commercial airport, has very few flights other than hub airports such as O'Hare and Detroit. Indianapolis has more direct service, but using Indianapolis involves

a drive of at least two-and-a-half hours and its range of connections is also limited, especially to international destinations.

Comments from interview participants illustrate the challenges:

- 1) If you go out of Ft. Wayne or South Bend, then you have a connecting flight and the risk goes up of missing your connection. This has happened three times in the last month for [a colleague].
- 2) Driving between Warsaw and O'Hare can take anywhere from three to six hours depending on the weather and Chicago-area traffic
- 3) O'Hare is a key airport because it has direct flights to most key domestic destinations and the best international service in the region
- 4) It's dangerous to try to drive and work, especially in traffic; high speed rail, with internet service, would eliminate that problem

Interviewees said these challenges greatly limit industry productivity and leads to higher costs both internally and externally (e.g., surgeons, sales representatives and vendors have a difficult time traveling to and from Warsaw). HSR would lead to lower travel costs, increased travel efficiency, and business enterprise productivity

Access for Training

Chicago serves as a major destination for conferences and other orthopedic industry activities. Companies frequently hold meetings in Chicago due to its centrality and ease of access for employees traveling from other parts of the world. One common destination in the Chicago region is the Orthopaedic Learning Center (OLC) in Rosemont, Illinois, near O'Hare. The OLC is associated with the American Academy of Orthopedic Surgeons and serves orthopedics firms from all over the country. The OLC is critical for training surgeons on new products as they are developed by the companies, and serves as a focal point for much of the orthopedics industry. HSR would allow better access to this facility.

Overall, there was an indication that Chicago would be continue to serve as a final destination for training and other meetings, while some of that activity could be accomplished in Warsaw if convenient HSR travel was an option.

Labor Markets

In order for the Warsaw-based orthopedics firms to remain competitive, they must be able to recruit and retain highly trained professionals. HSR would help address this problem by connecting Warsaw to cultural and business opportunities in Chicago, Ft. Wayne, and possibly an even larger HSR network in the future. It would also enable spouses and other family members to find employment and educational opportunities outside of Warsaw, where such opportunities are currently limited, in large part by distance.

Overall, the participants viewed HSR as having the ability to increase the pool of labor by accessing a larger metropolitan region, as well as making Warsaw more attractive due to increased access to amenities in Chicago and its suburbs. While an employee may not choose to live in Chicago and commute to Warsaw, the employee may perceive Warsaw differently if downtown Chicago is only 90 minutes away.

Warsaw Redevelopment

Interview participants indicated an interest in greater conferencing capabilities in Warsaw. Hotel stock in Warsaw, presently, is scattered and not necessarily the highest quality for the purposes of industry conferences. HSR could provide impetus for developing hotel, conference services and additional retail options in Warsaw.

With HSR and the associated potential growth in Warsaw of biomedical related conferences, the potential exists for entry of a major hotel-conference facility in Warsaw. Recognizing the potential that HSR provides, a conference hotel developer may be motivated to leverage that potential and could consider the development of a hotel conference center.

5. ECONOMIC IMPACTS OF HSR

This section of the report identifies and describes the economic contribution that a HSR route serving

Warsaw would make to the Orthopedics industry cluster there, and the secondary, or spin-off, regional and state benefits that would be derived from them. These impacts reflect only those that relate directly to travel delay and potential time savings, and the increased productivity of industry employees, visitors, vendors, and others. They do not include the equally -- if not more important -- impacts on the business climate and attractiveness of the region to employees and their families, or the critical role that such improved access would play in maintaining the critical role of Warsaw as the central place for development and manufacturing of orthopedics equipment in America.

This analysis starts with a broad qualitative description of economic benefits across a wide range of benefit types. This begins with a discussion of improved overall accessibility for the orthopedics firms located in Warsaw, as HSR would help address a range of industry travel requirements that are currently not well met. The discussion moves on to specific benefits such as improved recruitment and retention of orthopedics employees, increased potential for industry conferencing activities in Warsaw, downtown redevelopment, and secondary economic growth and development. Sources for these discussions include industry interviews summarized in Section 4, previous studies of HSR in the Southern Indiana corridor, and other industry stakeholder input.

Following this, quantitative benefits are estimated, focusing on one major segment of the travel market -- travel by orthopedics industry employees. These estimates represent an important, but by no means sole, travel segment. Internal travel information, provided by the firms themselves was assembled for purposes of this study. This travel segment has been selected for analysis both because data for internal travel by firms' employees are recorded internally by the OEMs and thus provide a sound basis for quantification, and because this segment comprises the major share of direct travel benefits that HSR would deliver to the industry. Based on this data, as well as assumptions about travel demand for other segments such as vendor or medical providers' travel to and from Warsaw, travel related benefits were estimated for this study.

Improved Recruitment

Recruitment and retention of professionals (sales, research, engineering and high level administrative) was an important factor for HSR according to interviews with industry executives. The major firms would like to access greater labor pools and have Warsaw become a more attractive location to move to as accessibility to the greater region increases with HSR.

- Time Savings: Up to \$44.6 million over 20 years
- Productivity Increases: Up to \$46.1 million over 20 years
- Additional Employment: Approximately 492 direct and indirect jobs in Kosciusko County
- Benefits to recruitment and retention

Downtown Redevelopment in Warsaw

The additional development around a new Warsaw train station would lead to increases in employment, household income, and property values in the immediate area. The 2006 Midwest Regional Rail Initiative Benefit Cost and Economic Analysis estimates that the Warsaw station could experience an increase from 105 to 160 jobs, \$9 to \$13 million in household income, and \$35 to \$53 million in additional property values.⁴

This would be beneficial to the orthopedics industry in two ways. First, it would potentially decrease the amount of travel that employees in the industry must undertake. Companies often choose to have meetings and conferences in other cities, like Chicago, that offer greater amenities and facilities that have greater capacity than those available in Warsaw. Secondly, the spurring of development along the HSR corridor may bring additional services to the area. The potential for added cultural amenities and high-end retailing would help make Warsaw a more attractive destination and aid in recruitment of top talent.

Quantitative Benefits of Improved Corporate Travel

Methodology

In order to capture the immediate economic benefits to orthopedics firms in Warsaw resulting from improved business travel and greatly enhanced access on the part of its employees (who comprise a major segment of the travel demand generated by orthopedics firms in Warsaw), PB and OrthoWorx administered a survey to the major orthopedics companies in Warsaw in order to quantify the number of business trips that their employees take in a given year. Five major companies participated in this survey, and PB compiled the number of trips taken that go to and from the following airport gateways: O'Hare International, Midway International (Chicago), and Ft. Wayne International.

These locations were selected because interviews stressed that access to O'Hare was a paramount reason that the companies desired HSR.

The total number of trip movements (i.e., 1 round trip equals 2 trip movements) taken annually were applied to differing travel times between the existing method of travel (automobile to the airport) versus a future HSR option. The travel times were compared and subsequently, this analysis could identify travel time savings and – from those savings – business productivity increases.

Travel time *savings* -- the reduction in travel due to the HSR connection vs. current travel times without HSR -- are valued at average wage levels, and reflect a direct savings to the companies and their employees. Business productivity increases reflect the fact that even while traveling via HSR, the time spent is productive compared with driving. Time spent in transit on modern, business-traveler-oriented HSR would be served by all necessary business accommodations, including internet availability and comfortable surroundings conducive to work or in "restorative" activities that increase worker output. By contrast, driving is not productive, and can be stressful and reduce productivity for workers later on.

Assumptions

Geographic Scope

This analysis limits the economic impacts to Kosciusko County, Indiana. It assumes that the employers based in Kosciusko County will be the beneficiaries of travel time savings and productivity increases.

⁴ MWRRI. Midwest Regional Rail Initiative Benefit Cost and Economic Analysis, November 2006.

Thus, those direct benefits can be applied to that specific industry in that specific county. The overall economic impacts will be experienced in Kosciusko County and potentially spill over into the rest of Indiana.

HSR Alignments

This analysis assumes that the proposed alignment for HSR will be the “Southern Alignment” as proposed in the 2002 Northern Indiana / Northwestern Ohio Routing Study published by the Indiana Department of Transportation. This alignment is the only option that travels directly to Warsaw, connecting two terminal points at Chicago to the west and Toledo to the east, with possible other further connections to the east, including Cleveland. Furthermore, this is the selected and recommended alternative used as the basis for the most recent program submittal by the Indiana DOT to Federal Railroad Administration.⁵ The figure below, also shown in the Introduction of this report, depicts this alignment.

Figure 2. Alternative Alignment for Northern Indiana / Northwest Ohio Routing Study



Source: INDOT, Northern Indiana / Northwest Ohio Routing Study (2002).

This proposed “Southern Alignment” has a Western terminus at Chicago’s Union Station, and an Eastern terminus in Toledo, with the possibility of future service to Cleveland. The Union Station terminus has the ability for further capacity with the proposed West Loop Transportation Center in Chicago, which would join Union Station with the Ogilvie Transportation Center via an underground facility, adding through capacity for intercity passenger trains.⁶

The Southern Alignment would also provide access to Gary Regional Airport, although there is presently no commercial service at this airport. Because interviews stressed the importance of O’Hare International Airport, this analysis examines a third hypothetical alignment that extends beyond Chicago’s Union Station to O’Hare. This hypothetical alignment would take an additional 20 minutes beyond the time it takes to arrive at Chicago’s Union Station, utilizing similar speeds throughout the rest of the alignment. Simply, the Southern Alignment would provide direct service to the Chicago area, and thus a hypothetical

⁵ Indiana Department of Transportation. Track 2 Submittal, OMB No. 2130-0583. IN-Chicago-Cleveland-HSR Service, October 2010.

http://www.in.gov/indot/files/IN_CHI_CLEV_HSRService_hsiapprack2_3.pdf

⁶ <http://web1.ctaa.org/webmodules/webarticles/articlefiles/rail/rail18/Connecting-the-Loop.pdf>

extension to O'Hare serves as a prudent additional analysis. In fact, it is unlikely that the Warsaw orthopedic companies would utilize HSR to access O'Hare if Union Station was the terminus of the route; adding bus or taxi transportation to O'Hare or connecting to the O'Hare commuter rail line introduces considerable additional time and uncertainty in trip planning, negating HSR's advantages. This analysis did not consider a hypothetical alignment direct to Midway because right-of-way issues make that alignment highly unfeasible.

Thus, there are three scenarios examined: 1) Existing conditions 2) proposed HSR to Chicago's Union Station 3) hypothetical HSR with alignment through Union Station and beyond to O'Hare.

Travel Times

Certain assumptions about travel times were made given the scenario timetables from the Northern Indiana / Northwest Ohio Routing Study as seen in Figure 3 below. For the hypothetical extension to O'Hare, an additional 20 minutes was added to the travel time to Union Station.

Figure 3. Scenario Timetables for HSR

Southern Alignment

Station	Train Number		250	200	202	204	206	208	210	212	214
	Milepost	Schedule Time	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily
Chicago, IL - Union Station	0.0	0:00		6:00	8:55	9:45	11:10	13:30	15:30	18:00	20:20
Gary Airport (IN)	23.0	0:24			9:19		11:34		15:54		20:44
Plymouth, IN	84.7	1:08			10:03		12:18		16:38		21:28
Warsaw, IN	109.8	1:27			10:22		12:37		16:57		21:47
Ft. Wayne, IN	148.8	1:57		7:43	10:52	11:28	13:07	15:13	17:27	19:43	22:17
Defiance, OH	192.4	2:35			11:30		13:45		18:05		22:55
Toledo, OH	247.1	3:22	6:30	9:03	12:17	12:48	14:32	16:33	18:52	21:03	23:42
Sandusky, OH	294.1	4:03			12:58		15:13		19:33		0:23
Elyria, OH	329.1	4:30			13:25		15:40		20:00		0:50
Cleveland, OH	353.6	4:52	7:50	10:23	13:47	14:08	16:02	17:53	20:22	22:23	1:12

Station	Train Number		250	200	202	204	206	208	210	212	214
	Milepost	Schedule Time	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily
Cleveland, OH	0.0	0:00	5:17	7:09	8:38	10:39	14:03	14:49	16:19	18:39	21:08
Elyria, OH	24.5	0:20		7:29		10:59		15:09		18:59	21:28
Sandusky, OH	59.5	0:46		7:55		11:25		15:35		19:25	21:54
Toledo, OH	106.5	1:27	6:35	8:36	9:56	12:06	15:21	16:16	17:37	20:06	22:35
Defiance, OH	161.2	2:11		9:20		12:50		17:00		20:50	
Ft. Wayne, IN	204.8	2:50	7:52	9:59	11:13	13:29	16:38	17:39	18:54	21:29	
Warsaw, IN	243.8	3:20		10:29		13:59		18:09		21:39	
Plymouth, IN	268.9	3:39		10:48		14:18		18:28		22:18	
Gary Airport (IN)	330.6	4:23		11:32		15:02		19:12		23:02	
Chicago, IL - Union Station	353.6	4:51	9:39	12:00	13:00	15:30	18:25	19:40	20:41	23:30	

Consistent with the survey, this study compares five different trip scenarios: 1) Flight to/from O'Hare direct, 2) Flight to/from Midway direct; 3) Flight to/from Ft. Wayne direct; 4) Flight to/from Ft. Wayne with a connection to O'Hare; 5) Flight to/from Ft. Wayne with a connection elsewhere. The trip scenarios, with travel time assumptions, are described in Appendix C.

Wage and Travel Time Savings Assumptions

Travel time savings in this includes in-vehicle travel time savings for auto passengers who would then divert to HSR given the reduced travel times. Travel time is considered a cost to users, and its value depends on the disutility (cost or disbenefit) that travelers attribute to time spent traveling. A reduction

in travel time would translate into more time available for work, leisure, or other activities, which traveler's value. In this case, the travelers are all business travelers so the travel time savings are assumed to be beneficial to the company in the form of additional time spent working.

Travel time savings must be converted from hours to dollars in order for benefits to be aggregated. This is traditionally performed by assuming that travel time is valued as a percentage of the average wage rate, with different percentages for different trip purposes. This analysis equates the value of time with the wage rate for the local industry.

In 2009, the average annual wage of the medical equipment and supplies manufacturing industry in Kosciusko County was \$70,418, equating to \$33.85 per hour. However, certain adjustments were made in order to better reflect the fact that the employees traveling in this study represent non-production and supervisory employees. Nationally, "non-production and supervisory" employees have wages that are 57.2 percent above the industry average for "medical supplies equipment and supplies manufacturing." When applied to Kosciusko County, this translates to an annual wage of \$111,124 per year, or \$53.24 per hour. This is the wage rate used in this study.

This analysis assumes that the value of time is 100 percent of this wage rate because the travelers are business travelers on official business. This analysis also assumes zero real wage growth in this industry as a conservative assumption – that is, wages in the industry keep pace with inflation.

Productivity Assumptions

Travel time savings can be viewed as one form of productivity increase because the time saved can be spent working instead. However, the opportunity HSR affords over automobile travel is a different productivity increase. An employee driving from Warsaw to Chicago cannot do work while driving; however, the same traveler riding a train can do work while riding the train.

This analysis assumes that the minutes spent in an automobile are zero percent productive; time spent on a train, plane or layover is 100 percent productive. That is to say, the employee will exploit the opportunity on the train to conduct more business and produce more work. In this sense, the travel time itself can become productive beyond any potential travel time savings.

Travel Growth

The surveys provided only the number of trips for one year in 2009. Because the orthopedics industry in Warsaw is a growth industry, it follows that the number of business trips would increase over time. This growth, furthermore, is likely to be tied to employment numbers. Section 3 above highlighted that the employment growth rate for this industry in Kosciusko County is projected to be 5.5 percent through 2019, and 1.3 percent thereafter.

This analysis does not assume an expected completion date, and instead uses a relative year-based analysis system (year 1, year 2, etc). Thus, this analysis uses a growth rate for travel of 2 percent, in between the two rates above.

Congestion Growth

One benefit of HSR relative to highway travel is that travel times are consistent over time due to a dedicated right of way. Highway travel, however, worsens as congestion increases in a region. This

analysis assumes that highway travel times will increase by 0.8 percent per year, consistent with Federal Highway Administration estimates of projected growth on urban freeway congestion.⁷

Induced Travel

It is possible that due to existing travel difficulties, employees in the orthopedics industry forgo certain trips. In other words, if there was a HSR option, they would begin to take trips that otherwise were not taken. These additional trips would likely add to the total travel time savings and productivity increases. However, this analysis lacks enough information to predict what the induced travel effects may be. Thus, this analysis assumes that HSR does not induce additional trips that otherwise were not taken via automobile.

Discount Rate

Because this analysis conducts an evaluation of a 20-year period, it is necessary to apply a discount rate in order to account for inflationary effects. This allows dollars to remain constant. Because this is an economic impact analysis, the discount rate is not an opportunity cost. Instead, it is used to deflate future dollars into current dollars. For this analysis, a 3-percent discount rate is used.

Benefits Not Included

South Bend Travel

The Southern Alignment would allow Warsaw-based employees to use HSR to access Fort Wayne or Chicago airports instead of traveling through South Bend Airport. These would constitute diverted trips, where travelers would choose another airport in lieu of South Bend. These diverted trips would include both travel time and productivity increases, but the number of these trips was not quantified. It should be noted that there are additional benefits from these diverted trips that are not included.

Travel to Other Cities

This analysis only quantifies the benefits of employee business travelers going to and from O'Hare, Midway, and Ft. Wayne airports. It does not consider business travel within the corridor. For example, it excludes any trips to Chicago as a final destination because the data for the number of these types of trips was not available. It follows that trips to other locations, like Toledo or Cleveland, that would be accessible via the Southern Alignment route, are not included. These travel time benefits would augment the ones calculated in this analysis.

Other HSR Routes

There are other proposed High Speed Rail routes, especially along the Midwest. Another proposed route had the potential to connect Warsaw with Indianapolis. However, such routes were not considered, and the only route which benefits were calculated remains the Southern Alignment from Chicago, through Warsaw, Ft. Wayne, and to Toledo and Cleveland.

Direct Travel Expenses/Non-time Travel Costs

This analysis does not include the non-time costs of traveling. That is to say, costs such as the train fare, gasoline for the car, depreciation, maintenance, oil, parking, and similar costs were not included. While it is possible that driving and traveling by train may incur different direct out of pocket costs to the traveler, it is not clear which one would be greater. This analysis assumes that the cost of driving and parking would be more or less equivalent to the cost of the HSR fare.

⁷ http://ops.fhwa.dot.gov/congestion_report_04/chapter3.htm, Figure 3.6.

Travel Time Variability

The highway travel times reported in this analysis consider typical travel times that drivers may face when on the road. They do not incorporate the concept of travel time variability, the value of the unpredictable travel time, or the additional time that users may add to their trip to compensate for this variability.

Results

Total Impacts

HSR under the proposed Southern Alignment would save the orthopedics industry \$28.0 million dollars worth (real 2009\$) of travel time over a 20-year period, for an average of \$1.4 million per year in such savings. That is to say, business travelers in this industry would experience faster travel times, valued at \$18.0 million in total over 20 years. Valuation of these time savings reflects industry wage rates for technical and skilled industry employees.

Additionally, the industry would experience added productivity increases as travelers could be productive on a train when they otherwise could not work in a car. The added productivity is estimated to be \$33.9 million over a 20 year period, or an average of \$1.7 million in added productivity for the industry per year. In total, this HSR alignment would produce \$61.9 million in direct benefits for the orthopedics industry in Warsaw, Indiana over a 20 year period, or \$3.1 million per year.

If one considers a hypothetical alignment with direct access to O’Hare International Airport, the numbers are greater. In this scenario, there are \$39.5 million in travel time savings over 20 years, and \$40.1 million in added productivity over the same period (in real 2009 \$). In total, this yields \$79.6 million in benefits over 20 years, or \$4.0 million per year.

Table 4. Direct Economic Impacts of HSR on Orthopedics Industry in Warsaw, IN

	Discounted 20-Year Value (2009 \$)	Value Per-Year (2009 \$)
Alignment to Union Station		
Travel Time Savings	\$28,033,831	\$1,401,692
Productivity Increase	\$33,883,388	\$1,694,169
Total	\$61,917,219	\$3,095,861
Alignment to O'Hare		
Travel Time Savings	\$39,505,383	\$1,975,269
Productivity Increase	\$40,147,487	\$2,007,374
Total	\$79,652,869	\$3,982,643

Source: Parsons Brinckerhoff analysis.

Indirect and Induced Impacts

Earlier, this report indicated that the orthopedics industry in Warsaw creates spin-off benefits to the rest of the local and state economy. These spin-offs, or multiplier benefits, occur when final demand (as measured by sales) increases within the industry in question. In this analysis, it is assumed that the productivity and travel time benefits are ultimately reflected in increased industry (not just worker) productivity - as well as an expansion of output as labor cost savings are incurred and industry productivity increases.

A regional input-output model was conducted in order to identify impacts to the rest of the state, as well as identify those impacts that are incidental to the direct travel time and productivity benefits. The PB Regional Input Output Scenario Model methodology was used, in addition to data in IMPLAN, in order to estimate these impacts. When doing so, the impacts were applied to the “surgical appliance and supplies manufacturing” industry as a proxy for the orthopedics industry.

There are two types of impacts beyond the direct travel time and productivity benefits: indirect impacts, and induced impacts. Indirect effects include business-to-business effects on industries required to satisfy additional spending by the directly affected industry. Induced effects are the impacts produced by the people working in the direct and indirect industries.

Impacts for HSR Alignment to Union Station

Table 5 below outlines the overall economic impacts of HSR with an alignment to Union Station in Chicago. The overall output represents the total economic effect in Kosciusko County as well as the rest of Indiana.

Table 5. Direct, Indirect and Induced Economic Impacts of HSR with Alignment to Union Station, Chicago (2009 \$)

Impact Type	Employment (Person-Years)	Employment (Supported Per Year)	Wages	Value Added (GRP)	Output
Direct Effect					
Kosciusko County	264	13	\$17,276,777	\$37,275,059	\$61,917,220
Rest of State	0	0	\$0	\$0	\$0
Total	264	13	\$17,276,777	\$37,275,059	\$61,917,220
Indirect & Induced Effects					
Kosciusko County	155	8	\$5,984,870	\$17,629,221	\$34,824,067
Rest of State	152	8	\$6,189,556	\$10,942,246	\$20,400,401
Total	307	15	\$12,174,426	\$28,571,467	\$55,224,467
Total Effect					
Kosciusko County	419	21	\$23,261,648	\$54,904,280	\$96,741,287
Rest of State	152	8	\$6,189,556	\$10,942,246	\$20,400,401
Total	571	29	\$29,451,203	\$65,846,526	\$117,141,687

In the proposed alignment to Union Station in Chicago, the direct effects are felt in Kosciusko County, and total \$61.9 million, representing the 20-year total of travel time savings and productivity increases. When multiplied throughout the economy, there are an additional \$55.2 million in indirect and induced effects over the 20 year time period. In total, the overall economic impact of HSR with an alignment to Union Station in Chicago is approximately \$117.1 million over 20 years.

These impacts lead to job creation as well, as additional economic benefits translate to additional jobs. The \$61.9 million in direct impacts to the “surgical appliance and supplies manufacturing industry” would translate to 264 additional person-years of employment in the orthopedics industry over 20 years. This means the additional demand support about 13 jobs, per year on average.

Additionally, the indirect and induced effects lead to 307 person-years of over other industries in same time period. This additional demand in other sectors supports support about 15 jobs, per year on

average. Thus, the total job creation effects of this HSR alignment to Union Station would be 571 person-years of employment jobs over 20 years, or about 29 jobs per year on average.

Note that these are impacts only from only from the savings and additional demand for the orthopedics industry business travelers in Warsaw, Indiana. They do not reflect the total impacts of HSR on the entire region and across every industry. Instead, they only reflect the impacts from business travelers in one industry and geography, who experience travel time savings and productivity increase

Impacts for HSR Alignment to Chicago O’Hare International Airport

Table 6 below outlines the overall economic impacts of HSR with a hypothetical alignment that extends beyond Union Station in Chicago and terminates at O’Hare International Airport. The overall output represents the total economic effect in Kosciusko County as well as the rest of Indiana.

Table 6. Direct, Indirect and Induced Economic Impacts of HSR with Alignment to O’Hare International Airport (2009 \$)

Impact Type	Employment (Person-Years)	Employment (Supported Per Year)	Wages	Value Added (GRP)	Output
Direct Effect					
Kosciusko County	310	15	\$20,262,090	\$43,715,945	\$79,652,872
Rest of State	0	0	\$0	\$0	\$0
Total	310	15	\$20,262,090	\$43,715,945	\$79,652,872
Indirect & Induced Effects					
Kosciusko County	182	9	\$7,019,017	\$20,675,435	\$33,804,675
Rest of State	196	10	\$7,962,499	\$14,076,555	\$26,243,913
Total	377	19	\$14,981,517	\$34,751,990	\$60,048,588
Total Effect					
Kosciusko County	491	25	\$27,281,108	\$64,391,379	\$113,457,547
Rest of State	196	10	\$7,962,499	\$14,076,555	\$26,243,913
Total	687	34	\$35,243,607	\$78,467,935	\$139,701,460

In the proposed alignment to Union Station in Chicago, the direct effects are felt in Kosciusko County, and total \$79.7 million, representing the 20-year total of travel time savings and productivity increases. When multiplied throughout the economy, there are an additional \$60.0 million in indirect and induced effects over the 20 year time period. In total, the overall economic impact of HSR with an alignment to Union Station in Chicago is approximately \$139.7 million over 20 years.

These impacts lead to job creation as well, as additional economic benefits translate to additional jobs. The \$79.7 million in direct impacts to the “surgical appliance and supplies manufacturing industry” would translate to 310 additional person-years of employment in the orthopedics industry over 20 years. This means the additional demand support about 15 jobs, per year on average.

Additionally, the indirect and induced effects lead to 377 person-years of other industries in same time period. This additional demand in other sectors supports support about 19 jobs, per year on average. Thus, the total job creation effects of this HSR alignment to Union Station would be 687 person-years of employment jobs over 20 years, or about 34 jobs per year on average.

Again, these are impacts only from only from the savings and additional demand for the orthopedics industry business travelers in Warsaw, Indiana. They do not reflect the total impacts of HSR on the entire region and across every industry. Instead, they only reflect the impacts from business travelers in one industry and geography, who experience travel time savings and productivity increases.

Improved Client Business Travel

As access to regional hubs, including Chicago, improves through HSR service, client business travel becomes better for those visiting orthopedics businesses in Warsaw. In particular, their travel time decreases and they stand to be more productive as they can work on trains where they otherwise would not be able to work while driving a car. Additionally, visitors to Warsaw, especially those from international destinations who do not have U.S. driver’s licenses, could arrive at the OEM facilities without requiring expensive and time-consuming private drivers or shuttles.

According to OrthoWorx estimates, for every 100 orthopedics industry travelers (as calculated above), there are approximately 5 medical professionals and 5 business partners (e.g., key product vendors) who travel. This conservative estimate allows for the calculation of additional travel benefits. It is assumed that the share of routes (from O’Hare to Warsaw, from Ft. Wayne to Warsaw, etc) are split the same among these travelers as they are for the orthopedics industry travelers. Furthermore, it is assumed that the additional demand generated from their travel time and productivity savings will multiply through the economy at the same multiplier effect as the orthopedics industry travelers (for example, the same level of job creation per \$1 million of additional demand).

Medical professionals have a higher wage rate than orthopedics industry business travelers. According to the Bureau of Labor Statistics, surgeons had a mean annual wage of \$219,770 in 2009, or an hourly wage of \$105.69 per hour, which is used in this analysis. It is assumed that other business partners have the same wage rate as orthopedics industry business travelers, which was calculated at \$53.24 per hour. All other assumptions about productivity and travel in the analysis above remained the same.

Results

The Southern Alignment under the hypothetical Union Station alignment would produce \$4.2 million in travel time savings, and an additional \$5.1 million in productivity increases for a total of \$9.2 million in additional benefits over 20 years. When considering the O’Hare alignment, there would be \$5.9 million in travel time savings and \$6.0 million in productivity savings to medical professionals and business partners, or \$11.9 million over a 20-year period. This amounts to a total of \$462,000 to \$594,000 in benefits per year, depending on the alignment.

Table 7. Direct Economic Impacts of HSR on Clients and Partners of the Orthopedics Industry

	Discounted 20-Year Value (2009 \$)	Value Per-Year (2009 \$)
Alignment to Union Station		
Travel Time Savings	\$4,183,486	\$209,174
Productivity Increase	\$5,056,415	\$252,821
Total	\$9,239,901	\$461,995
Alignment to O’Hare		
Travel Time Savings	\$5,895,384	\$294,769

Productivity Increase	\$5,991,206	\$299,560
Total	\$11,886,590	\$594,329

Table 8 below outlines the overall economic impacts of HSR that result from benefits to clients and business partners traveling to and from Warsaw. These effects are not confined to any given geography because these travelers come from various parts of the country.

Table 8. Direct, Indirect and Induced Economic Impacts of HSR from Benefits to Clients and Partners

Impact Type	Employment (Person-Years)	Employment (Supported Per Year)	Wages	Value Added (GRP)	Output
Alignment to Union Station					
Direct Effect	36	2	\$2,350,445	\$5,071,142	\$8,423,622
Indirect & Induced Effects	42	2	\$1,656,288	\$3,887,048	\$7,513,096
Total	78	4	\$4,006,733	\$8,958,190	\$15,936,718
Alignment to O'Hare					
Direct Effect	46	2	\$3,023,710	\$6,523,726	\$11,886,590
Indirect & Induced Effects	56	3	\$2,235,690	\$5,186,036	\$8,961,045
Total	103	5	\$5,259,400	\$11,709,762	\$20,847,635

In the proposed alignment to Union Station in Chicago, the direct effects are felt wherever the individual travelers spend their benefits, and total \$8.4 million representing the 20-year total of travel time savings and productivity increases. When multiplied throughout the economy, there is an additional \$7.5 million in indirect and induced effects over the 20 year time period. In total, the overall economic impact of HSR with an alignment to Union Station in Chicago is approximately \$15.9 million over 20 years for these travelers.

When considering an alignment to O'Hare, the direct effects are \$11.9 million, and the indirect and induced effects are \$9.0 million, totaling \$20.8 million in overall economic impact from benefits to clients and business partners from HSR.

These impacts lead to job creation as well, as additional economic benefits translate to additional jobs. The additional demand created from travel time and productivity increases would lead to approximately 78 total person-years of additional employment under the Union Station alignment, and 103 person-years of employment under the O'Hare alignment.

Additional Benefits

While the travel time and productivity benefits and impacts appear modest, they are conservative estimates and do not reflect the overall importance of added connectivity that HSR provides to the orthopedics industry. A large benefit to the clients and partners is their ability to access the orthopedics industry's products and services in Warsaw. This is a mutually beneficial arrangement where the clients and partners achieve a competitive advantage by having easier and more fluid access to the firms that supply their products. They are able to receive information on the latest developments in the industry, tap the expertise of industry specialists located in Warsaw, attend meetings and conferences that would be easier located near the orthopedics hub in Warsaw, and better maintain important relationships with OEMs and suppliers. The orthopedics industry in turn achieves a competitive advantage by being able to develop products and market them easier to a broader range of clients, as well as maintaining these important business relationships.

6. CONCLUSIONS

This analysis assessed the economic impacts of a proposed high speed rail (HSR) service from Chicago to Toledo, with a stop in Warsaw, Indiana. The results include potential travel time savings of nearly \$44.6 million over 20 years, productivity savings of \$46.1 million over the same period, and a number of ancillary benefits. These ancillary benefits include higher property values for the community and easier access to quality-of-life amenities in the Chicago region.

Why would HSR provide such great benefits? Orthopedic employees are classic "road warriors." The industry requires convenient access to Chicago and the large hub airport of O'Hare International. Furthermore, the industry requires broad regional connectivity to labor pools, and the overall ability to connect globally through global hubs. Because the orthopedics industry relies heavily on business travel, this type of service would be beneficial in decreasing travel times to Chicago. Moreover, HSR would allow the orthopedics industry in Warsaw to access greater markets, spur further development in the town, and make it more convenient for business visitors to arrive.

There were three main impacts that are significant as a result of potential HSR through this region:

1) First is the expansion of the skilled labor pool for the orthopedics industry, as it could potentially hire employees from a broader region. Through interviews with industry representatives, the ability to attract and retain employees was an important reason for added transportation investment to this region. As case studies in this report demonstrate, additional transportation investments can have a significantly positive impact for employers seeking a broader labor pool as well as employees seeking jobs. By reducing travel times and making Warsaw accessible, the potential HSR line could allow for more successful recruitment and retention of employees.

2) Secondly, the local region could benefit from added development along a HSR train station and new businesses and hospitality activity. Case studies in Albany and Orlando demonstrate that HSR lines are viewed to have significant impacts on local development and industry activity. Furthermore, according to the 2006 Midwest Regional Rail Initiative Benefit Cost and Economic Analysis estimates that the Warsaw station could experience an increase from 105 to 160 jobs, \$9 to \$13 million in household income, and \$35 to \$53 million in additional property values.⁸ These benefits come from the additional

⁸ MWRRI. Midwest Regional Rail Initiative Benefit Cost and Economic Analysis, November 2006.

economic activity generated by greater travel and subsequent development. The orthopedics industry benefits from this development as the local capacity for meetings and conferencing would expand with greater hospitality-related businesses. Also, the additional development has positive effects on recruitment and retention, as mentioned above.

3) Finally, based on travel surveys, HSR would save between estimated 770,000 and 1.1 million person-hours of travel time over 20 years, depending on whether the alignment extends to O'Hare. This translates to between \$32.2 million and \$44.6 million in travel time savings (real 2009 dollars) for orthopedics industry business travelers, clients, and business partners over the same period.

- a. The same survey and analysis estimates additional productivity of between 932,000 and 1.1 million person-hours over 20 years, depending on alignment. This represents additional work that travelers are able to do while riding HSR that they otherwise would not do while driving. When monetized, this translates to between \$39.0 million and \$46.1 million in productivity benefits (real 2009 dollars) over the same period.
- b. The benefits extend to the rest of the economy as well, producing indirect and induced impacts. These impacts range between \$62.7 million and \$69.0 million in induced and indirect impacts on the county and state economy over 20 years. The same input-output analysis estimates a jobs impact between 649 and 790 person-years of employment over 20 years, or the equivalent of supporting 33 to 39 additional jobs per year, on average.
- c. The total economic impact on the orthopedics industry, as well as induced and indirect effects, is estimated to be between \$133.0 and \$160.5 million over 20 years, depending on the HSR's final destination in Chicago (Union Station or O'Hare).

Further Study Recommendations

These impacts are limited to the travel time savings of business travelers in the orthopedics industry with only estimates of clients and business partners. Additional surveys that estimate the actual annual number of non-employee business travelers would indicate further economic impacts. Furthermore, estimates of non-airport business travel that could utilize HSR could be added to this analysis as well.

Finally, this analysis does not constitute a complete regional impact analysis of HSR; nor does it constitute a benefit-cost analysis. Additional research may be conducted to identify the overall economic impacts of HSR, including the construction impacts, on the greater Chicago-Northern Indiana region. Such a regional study could include travel time savings for all of society, beyond one industry.

APPENDIX A – TOTAL YEARLY TRIPS FOR ORTHOPEDICS

INDUSTRY EMPLOYEES

Trip Description	Total Trips (Departing + Returning)
Warsaw-Based Employees	
O'Hare direct	10,128
Midway direct	644
Fort Wayne direct	7,362
Fort Wayne connect ORD	8,494
Fort Wayne connect other	12,094
Non-Warsaw Based Employees	
O'Hare drive to Warsaw	542
Midway drive to Warsaw	60
Fort Wayne drive to Warsaw	430
O'Hare to Ft. Wayne, drive to Warsaw	168

APPENDIX B--EXAMPLES FROM OTHER HSR STUDIES AND MAJOR TRANSPORTATION CORRIDORS

As part of this analysis the study sought to identify other major transportation corridor investment projects to determine how large investments might alter the economics of various specific industries, particularly high value added industry clusters. This analysis considered large transportation infrastructure projects that were primarily inter-city in nature. It considered both passenger rail projects as well as large highway projects. Of particular interest were projects in cities and region where a smaller city gained greater access to a large metropolitan area, similar to Warsaw's potentially improved connectivity to Chicago.

Four projects emerged as comparisons to similar experiences. These projects were selected by the characteristics above, as well as their motivation. Often, the developments of a certain industry or a manufacturing base's access to mobility were cited as prime reasons for the investments. Furthermore, for smaller cities, a benefit was often increased access to labor markets in a larger region. The four projects included two HSR projects that are in the study and early development phases, and two highway corridor projects that were built. These are: future high speed rail from New York City to Albany; future High Speed Rail to Orlando, Florida; the Maryland Interstate 68 expansion; and Corridor D (U.S. Highway 50) in West Virginia.

High Speed Rail to Albany, NY - Proposed

Albany, NY faces a similar geographical dilemma that Warsaw faces: difficult access to the larger economic activity in New York City, especially access to convenient airports. While Albany has an airport of its own, many residents and business travelers are forced to travel 142 miles to New York City region airports (JFK, La Guardia, and Newark) for more convenient destinations. Albany, NY is also more comparable to Warsaw in that it is a medium-sized region, with 94,000 residents in the City of Albany and 850,000 in the Capital District Region. Finally, this city is also dominated by one specific industry, government, with 21 percent of the area's employees working for the state government.

The proposed high-speed rail train would operate at speeds up to 110 miles per hour. In doing so, one goal of this HSR project is to expand labor markets and business travel opportunities as the region supports growth of office activities and services that support state government, emerging nanotechnology businesses, clean energy, and computer chip-related industries. A national center for nanotechnology has been developed in this region and economic developers see a strong opportunity for HSR to support regional connections to medical institutions, research institutions in New York City and Boston, and access to capital.

Additionally, a study by the Council of Mayors indicates that the HSR project is anticipated to spur visitor spending and station area development. These include tourism-related jobs as well as technology and service jobs in support of added economic activity. The proposed service will provide productivity benefits in terms of economies of scale from broader tourism markets and linkages to partner firms.

Overall, by 2035, a 110 mile per hour HSR service is anticipated to spur 4,703 jobs in the region, with \$534.4 million in additional output per year.

High Speed Rail to Orlando, FL

The Orlando HSR project was selected because local plans indicate that it is expected to spur development of a new "Medical City" technology park next to the airport and HSR station. Thus, infrastructure is viewed as a means to support a business cluster and spur development of a certain industry.

Orlando, as a medium-sized city, is home to an international airport with various destinations. As a result, access to larger cities and regional airports are not as necessary in this case. However, the view is that HSR service can expand visitor markets, enabling visitors from other areas to arrive at Orlando via HSR and enjoy its theme parks and tourist-related amenities, who on average spend \$162 per night in tourism dollars. In this sense, HSR broadens regional economic connectivity.

Like many major infrastructure projects another view is that HSR service can broaden regional labor markets. Expanding the distances people can travel in a two to three hour trip provides businesses with access to more workers with specialized skills. This furthers the development of technology clusters in this area. Research and development centers would be linked with university research centers and production facilities through efficient HSR service. As the Orlando area attempts to foster the development of diverse industry in medical services, the region views HSR as a means to link centers of economic activity.

By 2035, HSR to Orlando is expected to produce 19,935 jobs assuming a 168/186 mile per hour service. This translates to \$2.1 billion in additional output impacts for the region.

Interstate 68

The Interstate 68 projects consisted of an 82 mile interstate highway connecting Western Maryland to the broader regions of Washington, DC and Baltimore. The project, lasting from 1968 to 1991, was built along an economically distressed area through Alleghany and Garret counties, connecting Hancock, Maryland with Morgantown, West Virginia. In 2008 dollars, the project totaled \$2.2 billion for the expansion of the highway from two to four lanes.

By allowing greater connectivity and East-West access, especially to the Washington, DC region, this highway project allowed for greater economic development in the region. After losing much of its manufacturing base, this area was able to attract more manufacturing and distribution businesses that benefited from greater access to markets. Other service-related businesses indicated the highway project as a major region to move to the area, including Blue Cross/Blue Shield accounts, PharmaCare, and InfoSpherix, a telecommunications customer service center.

The impacts of greater transportation infrastructure access were significant for this region. Personal income in the impacted counties grew by 60 percent from pre-project to post-project. Property values also increased by 143 percent. This was because further real estate and commercial development was possible along a corridor with greater transportation access. Higher income employees could also move to the region as businesses benefit from access to greater labor pools.

Overall, the \$2.2 billion investment is estimated to have produced \$149 million in economic output impacts, and 1,600 jobs.

Corridor D Highway

The Corridor D (U.S. Highway 50) project was a 70-mile highway project in West Virginia estimated to have cost \$1.6 billion in 2008 dollars to construct. This highway expansion began in 1966 and ended in 1977. It was built along an economically distressed area in West Virginia that connected the northeast part of the state to economic centers in Cincinnati, Ohio. Overall the goal was to decrease the geographic isolation of this mountain region by linking it to Midwest cities.

Real income grew in the impacted counties by 73 percent from pre to post-project time periods. There was an additional job increase of 43 percent in the region as well. As the region shifted to a more diversified economy, the highway afforded businesses better access to labor markets not once available with the inconvenient two-lane highway.

Overall, this project was estimated to have produced \$198 million in economic output impacts, and 1,500 jobs.

Summary

Throughout the various cases certain trends emerge. First, HSR is viewed by comparable cities as a boost to the local economy. Both cities in this comparison view HSR as a means to revitalize a particular industry or cluster of industries. Through increased access and further development, Orlando and Albany intend to broaden their economic base and foster growth industries in their region. When compared to major infrastructure projects, the trend is that changes in access to once-remote regions can have significant impacts on the local economy. These areas are able to benefit from employment opportunities in a broader region, and businesses gain a larger pool of human capital at their disposal. As the diversity of the local economic base expands, both businesses and residents benefited from the added access to a broader region that resulted from major transportation infrastructure investment.

APPENDIX C—TRAVEL TIME ASSUMPTIONS FOR VARIOUS SCENARIOS

Flight To/From O’Hare

- **Driving.** (240 minutes total travel time). Traveler drives to O’Hare International Airport parking area (210 minutes); parks, waits for airport parking shuttle, and arrives at O’Hare terminal (30 minutes).
- **HSR Alignment to Union Station.** (170 minutes total travel time). Traveler takes HSR from downtown Warsaw to Union Station (120 minutes); finds a taxi and travels via taxi directly to O’Hare terminal (50 minutes).
- **HSR Alignment to O’Hare.** (150 minutes total travel time). Traveler takes HSR from downtown Warsaw to O’Hare (140 minutes); takes additional time to get from rail hub to O’Hare terminal (10 minutes). These travelers benefit from direct service to O’Hare, saving 20 minutes in travel time per trip movement compared with a Union Station only service.

Flight To/From Midway

- **Driving.** (210 minutes total travel time). Traveler drives to Midway International Airport parking area (180 minutes); parks, waits for airport parking shuttle, and arrives at terminal (30 minutes).
- **HSR Alignment to Union Station.** (155 minutes total travel time). Traveler takes HSR from downtown Warsaw to Union Station (120 minutes); finds a taxi and travels via taxi directly to Midway terminal (35minutes). These travelers continue to fly out of Midway. This analysis did not assume any travel diversion for these travelers as a consequence of HSR. An alignment to Union Station or to O’Hare makes no difference because these travelers will, in either case, travel to Union Station and take a taxi to Midway.
- **HSR Alignment to O’Hare Station.** (155 minutes total travel time). Traveler still takes HSR from downtown Warsaw to Union Station (120 minutes); finds a taxi and travels via taxi directly to Midway terminal (35minutes). These travelers continue to fly out of Midway despite a direct train to O’Hare. This analysis did not assume any travel diversion for these travelers as a consequence of HSR. An alignment to Union Station or to O’Hare makes no difference because these travelers will, in either case, travel to Union Station and take a taxi to Midway.

Flight To/From Ft. Wayne Direct

- **Driving.** (95 minutes total travel time). Traveler drives to Ft. Wayne International Airport parking area (80 minutes); parks and arrives at terminal (15 minutes).
- **HSR Alignment to Union Station.** (60 minutes total travel time). Traveler takes HSR from downtown Warsaw to downtown Ft. Wayne (30 minutes); finds a taxi and travels via taxi directly to terminal (30). These travelers going to Ft. Wayne airport benefit from HSR service to

downtown Ft. Wayne. The alignment going to either Union Station or O'Hare makes no difference for these travelers.

- **HSR Alignment to O'Hare Station.** (60 minutes total travel time). Traveler takes HSR from downtown Warsaw to downtown Ft. Wayne (30 minutes); finds a taxi and travels via taxi directly to terminal (30). These travelers going to Ft. Wayne airport benefit from HSR service to downtown Ft. Wayne. The alignment going to either Union Station or O'Hare makes no difference for these travelers.

Flight To/From Ft. Wayne – Connect at O'Hare

- **Driving.** (200 minutes total travel time). Traveler drives to Ft. Wayne International Airport parking area (80 minutes); parks and arrives at terminal (15 minutes); flies connector flight from Ft. Wayne to O'Hare (60 minutes); experiences layover time in process (45 minutes).
- **HSR Alignment to Union Station.** (170 minutes total travel time). Traveler takes HSR from downtown Warsaw to Union Station (120 minutes); finds a taxi and travels via taxi directly to terminal (50 minutes). These trips represents travelers that otherwise would have begun their trip at Ft. Wayne and connected to O'Hare, but due to a new HSR option, travel to Union Station and on to O'Hare instead.
- **HSR Alignment to O'Hare.** (150 minutes total travel time). Traveler takes HSR from downtown Warsaw to O'Hare (140 minutes); takes additional time to get from rail hub to airport terminal (10 minutes). These trips represents travelers that otherwise would have begun their trip at Ft. Wayne and connected to O'Hare, but due to a new HSR option, travel directly to O'Hare instead.

Flight To/From Ft. Wayne – Connect elsewhere

- **Driving.** (230 minutes total travel time). Traveler drives to Ft. Wayne International Airport parking area (80 minutes); parks and arrives at terminal (15 minutes); flies connector flight from Ft. Wayne to other airport (90 minutes); experiences layover time in process (45 minutes).
- **HSR Alignment to Union Station.** (195 minutes total travel time). Traveler takes HSR from downtown Warsaw to downtown Ft. Wayne (30 minutes); finds a taxi and travels via taxi directly to terminal (30); flies connector flight from Ft. Wayne to other airport (90 minutes); experiences layover time in process (45 minutes). These travelers going to Ft. Wayne airport benefit from HSR service to downtown Ft. Wayne. The alignment going to either Union Station or O'Hare makes no difference for these travelers.
- **HSR Alignment to O'Hare.** (195 minutes total travel time). Traveler takes HSR from downtown Warsaw to downtown Ft. Wayne (30 minutes); finds a taxi and travels via taxi directly to terminal (30); flies connector flight from Ft. Wayne to other airport (90 minutes); experiences layover time in process (45 minutes). These travelers going to Ft. Wayne airport benefit from HSR service to downtown Ft. Wayne. The alignment going to either Union Station or O'Hare makes no difference for these travelers.