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INDIANA FURNITURE SUPPLY CHAIN

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August 2006

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Indiana Furniture Supply Chain

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16. Abstract

An initial survey assessing overall supply chain issues was reviewed with twenty Indiana wood products companies. A longer follow up survey accompanied by in-person interviews, assessed more specific supply chain issues, and was reviewed with ten Dubois County wood products companies. From this, a supply chain map of major suppliers and customers located both inside and outside of Indiana was developed. The research also attempted to capture the industry trends and characteristics in a formal model, to explore the impact of INDOT projects on the competitiveness of the industry.

17. Key Words

Wood, wood products, wood supply, furniture, home furniture, furniture industry, customization, supply chain, imports, shipping, transportation, transportation cost, transportation time, rail, inter-modal, lead time, vertical integration, lumber, veneer, wood components, cabinets, sawmill, office furniture, furniture components.

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Executive Summary

The furniture industry in Indiana has a significant economic footprint. The top five counties are Dubois, Elkhart, Bartholomew, Marian, and Lagrange. The number of employees in the industry in these top five counties totals over 30,000, or 2/3 of the total 45,000 employees in the state. The average annual sales in these top five counties totals over \$7 billion, or 7/9 of the total \$9 billion in the state. Based on this information, it was determined that these five counties were significant to the state wood products industry. Given the significant presence of this industry in Dubois county, and a lack of direct transportation routes to primary hubs, such as Chicago, we focused efforts on this county.

We conducted a multi-stage survey to identify how INDOT projects impact companies in Dubois county and to identify trends that might affect the level of this impact in the future. The initial survey assessing overall supply chain issues was reviewed with twenty Indiana wood products companies. A longer follow-up survey assessed more specific supply chain issues was reviewed with 10 Dubois County wood products companies. The long surveys were accompanied by an in-person interview, which included the completion of a supply chain map of major suppliers and customers located both inside and outside of Indiana. Finally, we attempted to capture the industry trends and characteristics in a formal model, to explore the impact of INDOT projects on the competitiveness of the industry.

The following is a summary of the key findings:

(1) There does not seem to be a supply chain view in the industry, i.e., the different players do not perceive that they are competing together for the location Indiana.

1

Thus, for example, in the primary industry there is no difference (not even perceived) between selling logs to a company in Indiana or for export. The significantly lower cost for container shipments to the far East (due to substantial flows from the far East to the US) affect the economics of raw material acquisition which could affect the competitiveness of downstream producers. The amount of long distance transportation resulting from a more dispersed supply chain, increase the importance of good connections to major interstates. For southern Indiana this augments the need for a better north-south connection to gain better access to major hubs, such as Chicago.

- (2) Imports have become very important to the furniture industry. Companies are using a mix of sources for lumber (both in state and out of state) and purchase components from the far East as inputs (shipped by rail). Significant inventories are carried due to long transportation times und delivery uncertainties.
- (3) Customization of products is already a competitive advantage and the trend will likely continue, resulting in an estimated 42% of products manufactured in Dubois being customized. Substantial increases in customized product manufacturing will change the downstream traffic flows to retail with smaller, more frequent shipments to customers.
- (4) While rail is not an option for furniture distribution, due to low volumes and the risk of damage, especially larger companies see a substantial benefit of a local rail hub and better intermodal connections for inbound transportation. It is possible to integrate rail more substantially into the transport system to provide significant

- benefits, such as direct routes and reduced road congestion which lead to shorter transport times within the wood products supply chain.
- (5) There is currently little cooperation between INDOT and the furniture industry. Most companies rather contact the mayor, Legislator's office or the Governor's office to communicate their concerns and project preferences. Since this indirect communication might lead to a loss of information for INDOT, direct communication should be encouraged. In the course of this project, the local INDOT office already took the initiative and joined a meeting with the local industry.
- (6) We can derive the following conclusions from the cost model:
 - a. By taking a supply chain perspective, one can conclude that the cost savings provided by INDOT projects are substantially higher than what could be derived by looking at the furniture companies alone.
 - b. INDOT projects that will result in a lower and more predictable transportation time can lead to cost savings as well as increased revenues. If the companies make adjustments to their competitive strategy (e.g., pricing), these benefits would turn out to be even larger. If companies lower their inventory holdings appropriately, lower and more predictable transportation time can lead to cost savings. In addition, lower and more predictable transportation time can help improve the companies' competitiveness as compared to foreign low-cost producers: By lowering the lead times required for offering customized products, domestic producers will be able to capture a larger market share (capture customers, who are interested in customized products but buy

standardized ones because of long lead times) and hence increase their revenues.

While this study helped us gain insights into how INDOT projects affect the furniture supply chain in southern Indian, several questions remain to be answered. Going forward we see the following possibilities to enhance the study.

- Going into the study, we suspected to find an Indiana focused supply chain. However, discussions with members of the industry revealed that this might not be the case. A detailed study tracking individual logs would allow to identify the degree to which there is an Indiana supply chain.
- 2. The study revealed that many members are not very concerned about having a good rail link. However, the reason might well be that many companies are not aware of the transportation modes used for their inputs and look just at "the last mile". A detailed study trying to understand the rail link better would shed light on this issue, and will help to determine how important the rail link really is to reduce the cost related to inbound transportation.
- 3. The study focused on the wood supply chain in southern part of Indiana. Taking a look at another cluster in northern Indiana, for example in Elkhart, would reveal in how far these clusters are linked and would provide a better picture of the overall flows in the industry.

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I Project Overview

The purpose of the project is to develop an approach to understand how INDOT choices affect state economic development potential by focusing on one industry – the furniture industry in Indiana. The wood furniture industry features heavy, low volumes, high variety, and either high or low customization. The accompanying supply chain issues include logs of wood, fragmented supply chains, machining and assembly, and paint and finishing.



Figure 1 - Basic wood furniture supply chain

The first phase of this project was aimed at obtaining a general understanding of the industry, its supply chain structure and primary locations. This phase identified Dubois county as one of the important locations of the industry, which at the same time had the poorest connection to main state roads and was thus a good location to study the impact of INDOT projects on the industry.

The second phase of this project was a detailed analysis of the companies in the wood furniture industry, located primarily in Dubois County. The purpose was to identify how INDOT projects impact these companies and to identify trends that might affect the level of this impact in the future. A short survey (Appendix F) assessing overall supply chain issues was reviewed with twenty Indiana wood products companies (Appendix G). In addition, a long survey (Appendix H) assessing more specific supply chain issues was reviewed with 10 Dubois County wood products companies. The long surveys were accompanied by an in-person interview by research assistant, Justina Mikals. The interviews were typically less than 1-hour and included

the completion of a supply chain map of major suppliers and customers located both inside and outside of Indiana.

The third phase of the project attempted to capture the industry trends and characteristics in a formal model, to explore the impact of INDOT projects on the competitiveness of the industry.

II Data Sources

There are three primary data sources used in this project. First is a database of Indiana Wood Products Contacts provided on October 11, 2005, by Brian Burton, Vice President of Marketing and Member Services for the Indiana Manufacturers Association. Second is a table of Dubois County Companies and Employment Numbers provided on August 15, 2005, by Bob Grewe, President of Dubois County Area Development Corporation. The third primary source is a list of INDOT projects in Dubois County provided on October 13, 2005, by April Schwering at INDOT.

Secondary data sources include a variety of related projects and websites. All data sources are listed in Appendix A.

For Phase 2 of the project, specific contact names were identified as survey targets. In larger companies, these contacts had titles such as Vice President or Manager of Supply Chain, Logistics, or Traffic. In smaller companies, the contacts were typically the president of the company. The specific contacts for the long surveys are indicated in the last column of Appendix G. These contacts also completed the short survey.

III Data Analysis:

PHASE 1- Overview of the Furniture Supply Chain in Indiana

In the first phase of the project, a case was made to study the supply chains of the wood furniture industry in Indiana. The database of Indiana Wood Products Contacts included Standard Industrial Classifications (SIC). A full listing of these SIC's is included in Appendix B. For our purposes, these SIC's were grouped together into more general descriptions. These descriptions included Logging, Sawmill, Softwood Veneer, Hardwood Veneer, Mobile, Cabinets, Furniture Components, Home Furniture, and Office Furniture.

A separate "Other" category was developed for any classifications that are not directly related to the furniture industry. Examples of classifications in the "Other" category include pallets, metal furniture, miscellaneous wood products (ie. picture frames, doors, etc.), and more. A full listing of classifications included in the "Other" category is included in Appendix B.

The diagram below was developed to illustrate the supply chain of the wood furniture industry in a general sense based on these generic descriptions.

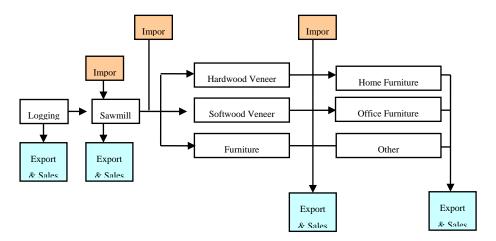


Figure 2 – Expanded wood furniture supply chain

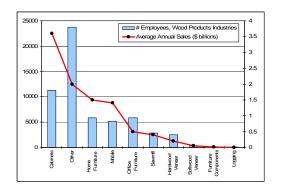
Logs cut from Indiana forests can be transported to sawmills in Indiana. They can also be sold for "Other" uses in Indiana or exported out of Indiana. Indiana sawmills can process logs from

Indiana forests as well as those imported from outside of Indiana. The processed logs can be transported from the Indiana sawmills to another location for secondary processing. The processed logs can also be sold for "Other" uses in Indiana or exported out of Indiana.

Secondary processing can take place using processed logs from Indiana sawmills and those imported from sawmills outside of Indiana. Secondary processing includes hardwood veneer, softwood veneer, furniture components, home furniture, and office furniture. After this secondary processing, the products can be sold as finished goods in Indiana or exported out of Indiana.

After understanding the supply chain of the wood products industry in a general sense, using generic descriptions, we looked at the number of employees and average annual sales for each of the generic descriptions. This is illustrated below in Graph 1. With the exception of the "Other" category, cabinets, office furniture, mobile, and home furniture employ more than 5000 people each in the state and total more than 45,000 employees. When taken together, these categories also represent approximately \$9 billion in average annual sales.

Based on the number of people employed in the wood products industry in the state of Indiana and the average annual sales, it was determined that the wood products industry was significant in Indiana.



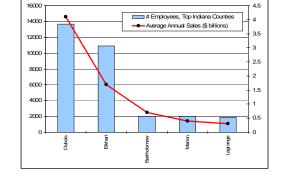


Figure 3 - Employment and sales by industry segment and county

The next step is to find out where the manufacturing centers are for each of the generic descriptions. We decided to look at the number of employees and average annual sales in the wood products industry by Indiana county. This is illustrated in Graph 2. The top five counties are Dubois, Elkhart, Bartholomew, Marian, and Lagrange. The number of employees in these top five counties totals over 30,000, or 2/3 of the total 45,000 employees in the state. The average annual sales in these top five counties totals over \$7 billion, or 7/9 of the total \$9 billion in the state. Based on this information, it was determined that these five counties were significant to the state wood products industry.

After looking at the number of employees and average annual sales in the top five counties, we looked at the major road access in those counties. In Dubois County is Interstate 64. The Interstate 80/90 Toll Road goes through both Elkhart and Lagrange counties. In Bartholomew County is Interstate 65. And in Marion County, the state hub, are Interstates 70, 65, 69, and 74. These are illustrated in the map in Appendix C.

The next step was to plot the manufacturing centers by generic description on the map to get a better sense of the flow of the Indiana wood products supply chain. This is illustrated in the map in Appendix D. An example of the supply chain is indicated, starting in an Indiana forest, then moving to an Indiana sawmill, then an Indiana veneer secondary processing facility, then a tertiary Indiana processing facility where the finished goods can be sold. In every step, products can be imported into Indiana for processing and exported out of Indiana after processing. The unfinished goods can also be sold for "Other" uses both inside and outside of Indiana.

Of the top five counties, Dubois County has the least major road accessibility, especially to a major trading hub, such as Chicago. We reviewed the relevant INDOT projects in Dubois

County. There are two major long-term INDOT projects that could be affected by our study.

These are illustrated in Appendix E.

The first is the Interstate 69 extension with an undetermined completion time. This would provide a closer direct connection of Dubois County to both Indianapolis and Evansville. Indianapolis connects with Chicago. Evansville connects with export cities southwest of Indiana. In the future, these long-distance connections are expected to become ever more important, due to an expected increase in imported furniture components for mass produced furniture.

The second project is the US 231 bypass through Dubois County and around the city of Jasper. The project completion date is set at 2015. This project would increase the road speeds and reduce truck congestion within Jasper, thus reducing the transport time within the Indiana wood products supply chain. The importance of the bypass as well as smaller road projects becomes apparent if one considers that most companies have multiple plant locations within Dubois County with regular shipments taking place between them. For example, Office Furniture Systems reports seven different plant addresses within the city of Huntingburg. Kimball estimated that intra-company shipments account for 20% of the cost of transportation, but more importantly have a large impact on the production lead-time.

The next area we looked at were the number of employees and average annual sales for the wood products industry in Dubois County, broken down by the generic descriptions. This is illustrated in Graph 3. It can be seen that cabinets generate average annual sales at over \$600 million, but employ less than 2000 people. This contrasts with office furniture with similar average annual sales at approximately \$550 million and over 5000 employees.

Graph 4 illustrates the combined results of office furniture, home furniture, and furniture components. Together, they employ over 7000 people and show close to \$1 billion in average annual sales. This combination significantly surpasses cabinets. Since the supply chain for cabinets differs from the supply chain for furniture (the first is more closely linked to housing construction) we decided to focus on the larger furniture segment.

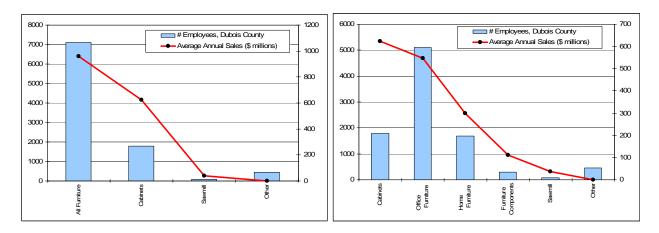


Figure 4- Employees and Sales in Dubois County

Based on discussions with industry representatives, we gained the following important insights:

- 1. There does not seem to be a supply chain view in the industry, i.e., the different players do not perceive that they are competing together for the location Indiana. Thus, for example, in the primary industry there is no difference (not even perceived) between selling logs to a company in Indiana or for export. The low cost for container shipments to the far East (due to substantial flows from the far East to the US) affect the economics of raw material acquisition which could affect the competitiveness of downstream producers.
- 2. Interplant shipments are extremely important for larger firms, which makes these companies dependent on the local road network. Due to the high fire risk (and tornados), one large plant is not a feasible alternative; with a network of plants

products can be picked up by other plants in case one plant is affected by a fire.

Currently most transportation between these plants has to use small town roads, resulting in waiting times due to many stop lights and railroad crossings disrupting the product flows.

- 3. Imports have become very important to the furniture industry. Companies are using a mix of sources for lumber (both in state and out of state) and purchase components from the far East as inputs (shipped by rail). Significant inventories are carried.
- 4. Customization of products is already a competitive advantage and the trend will likely continue. Substantial increases in customized product manufacturing will change the downstream traffic flows to retail with smaller, more frequent shipments to customers.
- 5. Consolidation will change flow, but will not likely result in large single location operations that benefit from economies of scale.
- 6. Intermodal transportation is important for larger firms. It is possible to integrate rail more substantially into the transport system to provide significant benefits, such as direct routes and reduced road congestion which lead to shorter transport times within the wood products supply chain.

Given that INDOT projects are being planned whose effects will be seen 5 to 15 years, trends in the industry will play an important role in affecting the economic benefit of potential INDOT projects.

Summary of Findings in Phase I

The wood products industry is profitable and unique to Indiana. Although different levels of wood products manufacturing exist throughout the state, a cluster of different levels exists in Dubois County.

It can be inferred from the data that the furniture industry with high employee levels contributes significant value added at various stages of production, possibly in separate locations. The furniture industry includes office furniture, home furniture, and furniture components. The distribution network for furniture is likely different from that of cabinets.

Dubois County lacks direct transportation routes to primary hubs, such as Chicago, making this industry cluster particularly interesting to study. Increased transportation rates negatively affect sales. Given long-term INDOT projects (I-65 extension and US-231 bypass), it is necessary to project industry trends at 10 and 20 years into the future.

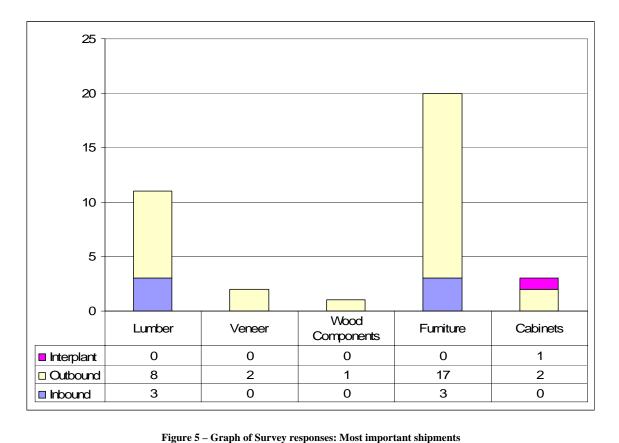
PHASE 2 - Detailed Industry Survey and Company Level Analysis in Dubois County

In the second phase of the project, surveys were collected and detailed interviews conducted with 10 companies in Dubois county.

Main Results from Short Survey

The following seven graphs summarize the most important findings of the short survey. The questions are included above the graphs and a brief summary is given below them.

Which of these three categories of shipments is the most important for your company?



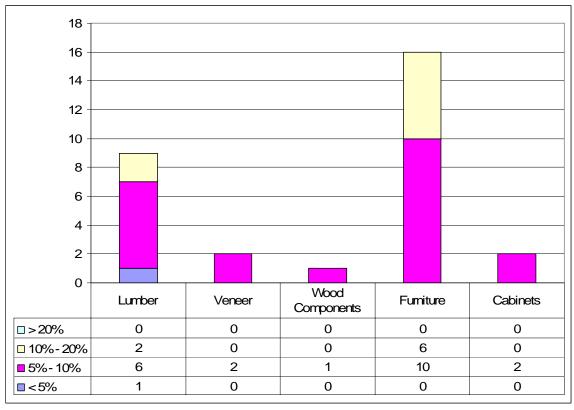
This graph shows that the majority of the respondents (80%) consider outbound shipments the most important for their company. Only one cabinet maker regarded interplant shipments more important, and six firms were most concerned about inbound

cost of outbound shipments themselves, while inbound shipments are typically included in the

shipments. One reason for the focus on outbound shipments might be that companies incur the

purchase price and hence not directly visible to the firms.

Your approximate average logistics cost, as a percentage of total costs, is:



Average: 8.6% 7.5% 7.5% 10.3% 7.5% Figure 6 – Approximate average logistics cost

This graph shows that the majority (70%) consider a 5% - 10% range for the approximate average logistics costs, as a percentage of total costs. The average is somewhat higher for furniture companies, probably due to many small outbound shipments and more bulky / less compact products. Overall, only one company reported less than 5%, and eight reported a range of 10% - 20%. No company reported average logistics costs exceeding 20%. The actual cost might in fact be higher, since the companies do not seem to consider (or even know) the inbound transportation costs, which are typically included in the material purchasing cost.

Of these five types of road projects, which one should INDOT focus on in your county that will most affect your company?

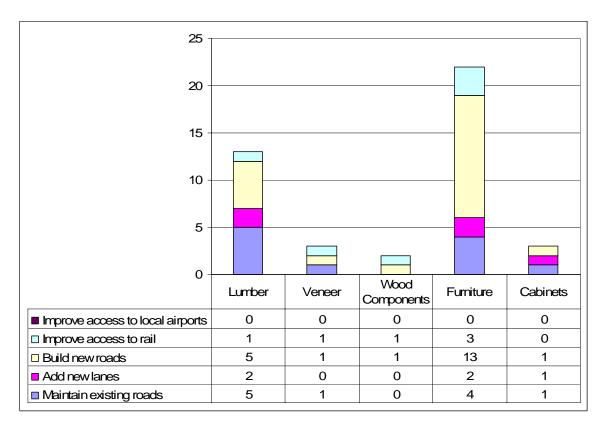


Figure 7 – INDOT project focus

In this graph, the majority of respondents (50%) favored building new roads. The next largest category is maintaining existing roads (25%). There was some limited interest in improving access to rail and adding new lanes, but no interest in improving airport access.

When asked to identify specific projects, the I-69 extension and the US-231 bypass dominated the comments. (The importance of these two projects was rated in the long survey.) Other specific projects mentioned were the following:

- US 24 state road extension (Hoosier Heartland Highway, Logansport)
- US 27 expansion (addition of lanes, Randolph County)
- US 31 project bypass
- Improvement of US 56
- General maintenance

- Dubois County intermodal facility
- Dubois County rail access
- Better connection to Indianapolis and Evansville

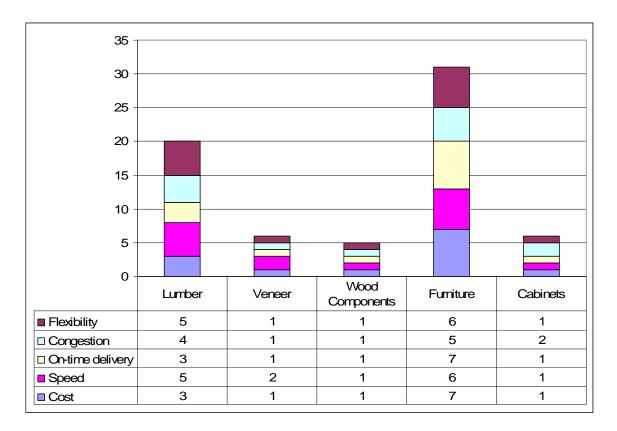


Figure 8 – Category Breakdown

This graph shows that each of the five options was selected across all categories, with no clear dominating options. In many cases, companies selected more than one option. This shows that companies value each of the options at relatively the same amount. One interpretation of these results is that many of these factors are linked. For example, an improvement in speed and on-time delivery will also reduce costs due to the reductions in inventory holding made possible by these improvements.

Do you currently offer customized products? What would you guess is the proportion (by value) of your customized products (versus your standard products)?

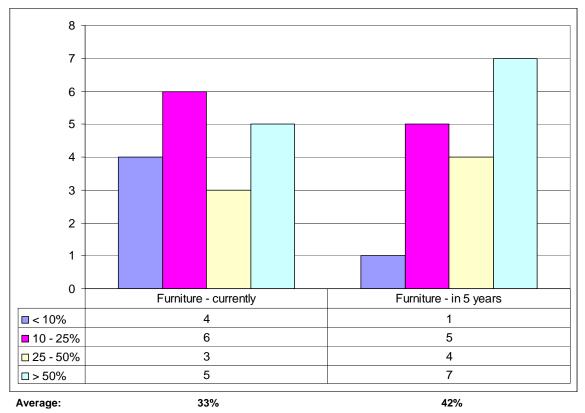


Figure 9 – Product mix

This graph shows that many of the wood furniture companies are already offering a significant percentage of customized products (33%). This trend towards customization is expected to continue in the next 5 years, resulting in an increase of customized products as a percentage of overall sales to 42%. (This question was relevant for furniture and cabinet companies only. Furthermore, one respondent provided only a current estimate and no forecast,) This trend might well increase the total number of shipments and with it the importance of speed and costs, as the results from the long survey suggest.

Where are your primary suppliers/customers of wood products located?

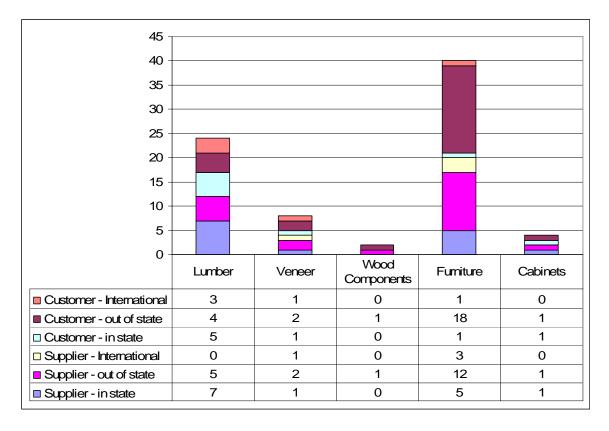


Figure 10 – Location of primary suppliers/customers

This graph shows that most customers (65%) are located out of state. While a significant number of customers is also located in the state, hardly any customers are international.

Similarly, most suppliers (55%) are located out of state. 35% are located in the state, with the remaining being international suppliers.

Given the large percentage of out of state customers and suppliers long distance transportation and hence a good connection to interstates are particularly important for the industry.

Who selects the transportation mode for inbound/outbound shipments?

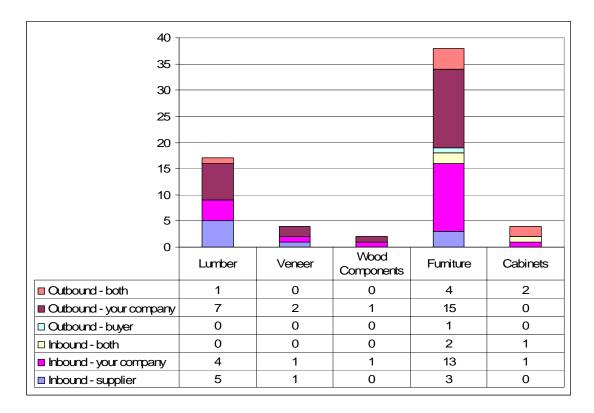


Figure 11 – Transportation mode for inbound/outbound shipments

In this graph, most companies (75%) select the transportation mode for outbound shipments. For some companies, the company or the buyer (customer) will select the transportation mode. In only one case did the buyer primarily specify the transportation mode.

For inbound shipments, most companies (60%) select their own transportation mode. However, some suppliers will select the transportation mode. Only two companies indicated both their company or a supplier will select the transportation mode.

While many companies are involved in the inbound mode decision, the costs are typically carried by the supplier and included in the price quotes.

Main Results from Long Survey

The long survey is shown in Appendix H. The people who answered the long surveys also answered the short surveys. All contacts who were willing to be identified are listed in Appendix G, with the last column indicating those who took the long surveys.

The main results from the long survey are as follows:

- About half of the long survey respondents indicated that lumber, veneer, and furniture components are purchased regionally, within 240 miles.
- For those who had multiple plants, a significant proportion of interplant transportation takes place locally, within 60 miles.
- The majority of long survey respondents indicated the west coast is where the ports of entry
 are located for both overseas shipments from suppliers and international shipments to
 customers. The east coast is also used, but to a lesser degree.
- In selecting the most important criteria to choose a port of entry, cost and on-time delivery
 were the most important overall, followed by port congestion, flexibility, and speed. Services
 provided were not indicated as that important.
- For rail shipments, the most likely terminals used, and at equally probability, are St. Louis,
 MO; Louisville, KY; and Chicago, IL. Only 1 person indicated Indianapolis at 15%.
- In selecting the most important criteria to choose a terminal, cost and on-time delivery were again the most important overall, followed by speed and terminal congestion. Services provided and flexibility were not indicated as that important.
- Half of the long survey respondents indicated that they expect no change in the number of production facilities running in 2020, while the other half expected an increase.

- Six out of 10 long survey respondents indicated an increase in the number or size of warehouses running in 2020, while the remainder expected a decrease or no change.
- Half of the long survey respondents indicated that they expect an increase in the total number of separate shipments by 2020.
- About half of the furniture companies indicated that customization will increase the importance of transportation cost, speed, on-time delivery, and road congestions.
- The majority of the respondents indicated that the communicate project preferences to the mayor, Legislator's office or the Governor's office, rather than communicating directly with the INDOT District Office or Central Office. This indirect information might lead to a loss of information for INDOT, and more direct communication should be encouraged. In the course of this project, the local INDOT office already took the initiative and joined a meeting with the local industry.
- The US-231 bypass project is indicated as very critical by the long survey respondents, while there is a mixed view for the I-69 extension. The distribution is indicated in Graph 12.

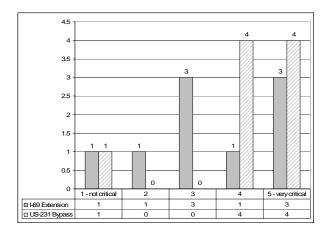
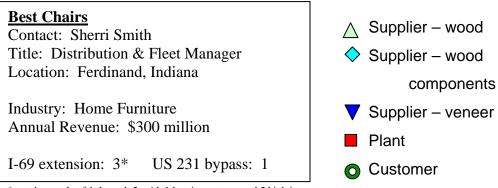


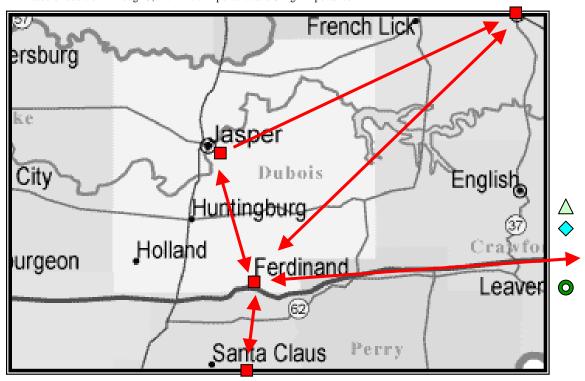
Figure 12 – Importance of US – 231 bypass

Results from Individual Interviews

In addition to completing the short and long surveys, each of the ten contacts then completed a map to indicate significant suppliers and customers both inside and outside of Indiana. The maps for each are included in the next pages accompanied by brief notes.



* rated on scale of 1 through 5, with 1 low importance and 5 high importance



Supply Chain:

- 1. Receive wood (GA +) & wood components (US +) via rail through Louisville.
- 2. Truck to Ferdinand on I-64, often by OFS.

- 3. Wood drying in Jasper.
- 4. Sewing in Paoli.
- 5. Assembly in Ferdinand & IN satellite plant.
- 6. Truck to Louisville on I-64, often by OFS, direct to furniture stores (US +).
- 7. Overseas customers arrange shipping broker.

Notes on Best Chairs:

- Best Chairs is a private company, which has doubled in size in the past 10 years due to US customers.
- Several years ago, their largest customer was in Norway. Now, the largest customer is in Florida. This change is mostly due to a change in exchange rate.
- Suppliers usually ship to the west coast and then send via rail or truck to Ferdinand.
- Finished products for customers are usually shipped to the east coast.
- Every shipment is custom ordered, including color of wood and fabric as well as chair style.
 Customer orders are built in seven days. Best Chairs builds to order, not to stock, and inventory is turned in less than three days.
- There are 3800 trucks that ship in and out per day.
- Carriers are selected based on service, price, delivery, and quality.
- Best Chairs is located just north of I-64 in Ferdinand. Most shipments coming in and going
 out are transported on I-64. This road is very good. Due to reliance on I-64, Best Chairs does
 not have much interest in the completion of the US-231 bypass.
- However, Best Chairs does have interest in the completion of the I-69 extension. They would like to encourage more suppliers to locate in southern Indiana.

DMI Furniture

Contact: Rick Rossbottom

Title: VP Manufacturing & Distribution

Location: Huntingburg, Indiana

Industry: Home Furniture Annual Revenue: \$100 million

I-69 extension: 2 US 231 bypass: 5

∧ Supplier – wood

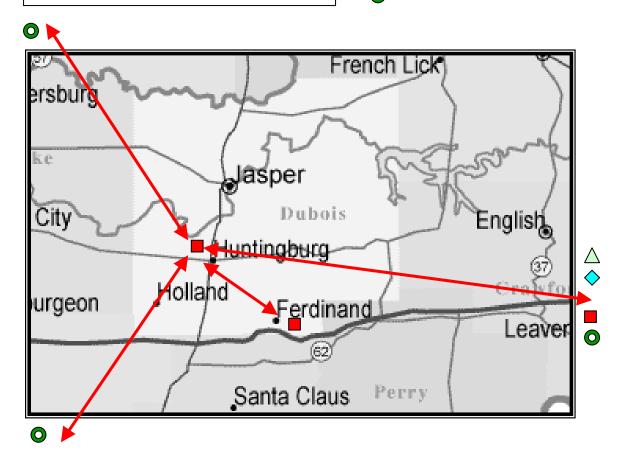
♦ Supplier – wood

components

▼ Supplier – veneer

Plant

Customer



Supply Chain:

- 1. Receive imported furniture from Long Beach via rail to Chicago or St. Louis.
- 2. Receive wood components from Mississippi via rail to Louisville.
- 3. Wood is dimensioned in Ferdinand.
- 4. Truck to/from Huntingburg via US 231 or I − 64.
- 5. Some mfg & assembly done in Huntingburg.
- 6. Truck to primary customers in FL, MN, WI, and AL via US 231 or I 64.

Notes on DMI:

- DMI is headquartered in Louisville, KY, and is currently owned by Flexsteel. DMI used to stand for Dolly Madison Incorporated, which was a previous owner.
- DMI imports 80% of product from overseas. These products typically have a 120 day lead-time. Products are shipped to Long Beach, CA, then sent by rail to St. Louis, MO or Chicago, IL. Finally, products are trucked to Indiana.
- Other furniture is produced and shipped from Indiana. There is limited warehouse space in Indiana.
- There are three major product lines, including commercial office, home retail, and lifestyle lines. The commercial office line is sold through wholesalers and dealers. The home retail line is sold through basic home furniture stores, such as Kittle's in Indianapolis. And, the lifestyle line is sold to Target, the Air Force, and through catalogs.
- There are 120 independent sales representatives over the three product lines. They are mostly located in Mexico, California, and Puerto Rico.
- Most customers are located in the Southwest US.
- DMI receives 15 20 containers per day in Huntingburg. Drivers complain about the congestion on US 231. The US 231 bypass is very critical for DMI.

Indiana Furniture

Contact: Stan Vollmer Title: Traffic Manager Location: Jasper, Indiana

Industry: Home Furniture Annual Revenue: \$63 million

I-69 extension: 3 US 231 bypass: 5

∧ Supplier – wood

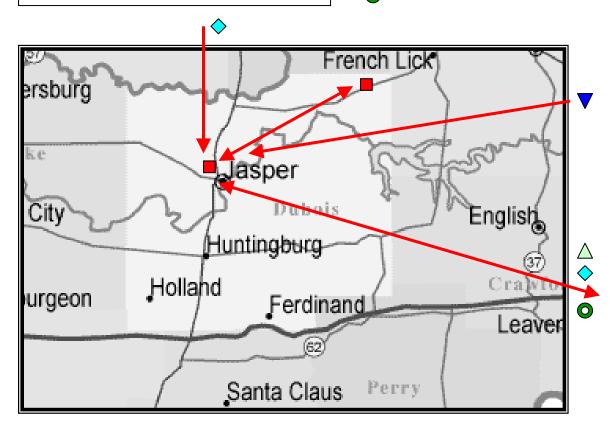
♦ Supplier – wood

components

▼ Supplier – veneer

Plant

Customer



Supply Chain:

- 1. Purchase wood based on \$.
- 2. Receive wood components from Mississippi, Michigan, North Carolina, and South Carolina.
- 3. Receive veneer from Jeffersonville, IN.
- 4. Manufacturing and assembly completed in 4 plants in Jasper / 1 plant in Dubois.
- 5. Sell mostly to mid-Atlantic and Southeastern states. Ship out of state via I 64.

Notes on Indiana Furniture:

- Indiana Furniture is a private company that got its start in school desks. They celebrated their 100th anniversary in 2005.
- Indiana Furniture uses Poplar and Aspen wood for their products.
- There are 125 outbound shipments and 20 inbound shipments per week.
- They sell through 25 independent sales representatives.
- In the past, Indiana Furniture used more rail because dealers carried more inventory and therefore lead time was not as time sensitive as it is today.
- Sometimes the products were damaged in rail shipment. These products were typically written off because the railroad companies would not reimburse.
- Desk Express was created due to customer demand. Relatively standard products are shipped today to arrive at the customer in 1 – 2 weeks.
- Today, Indiana Furniture prefers to use Nancy Baer for specialized outbound trucking. There
 is less than 1% damage compared to regular truck at 15% damage.
- The streets in the historical "Furniture District" of Jasper are too congested. Several major furniture manufacturers are located within several blocks, often with competitors right across the street from each other. Warehouses should be built away from this area. There is a critical need for the US 231 bypass due to this congestion.

Inwood Office Furniture

Contact: Glen Sturm Title: President

Location: Jasper, Indiana

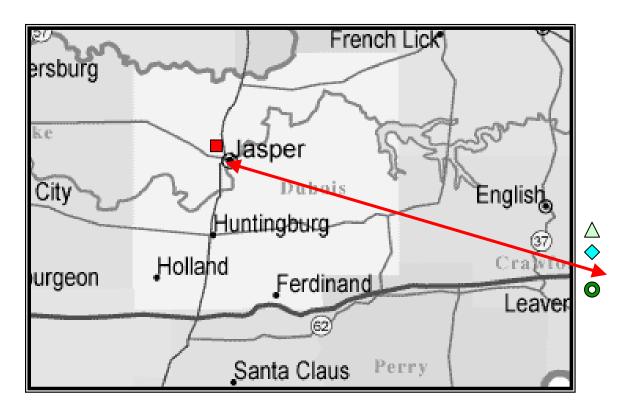
Industry: Office Furniture Annual Revenue: \$20 million

I-69 extension: 5 US 231 bypass: 5

- ∧ Supplier wood
- ♦ Supplier wood

components

- ▼ Supplier veneer
- Plant
- Customer



Supply Chain:

- 1. Purchase wood based on \$.
- 2. Receive wood components from KY, NC, and AL via rail to Louisville.
- 3. Truck to Jasper via I 64 & US 231.
- 4. Manufacturing and assembly completed in 1 plant in Jasper.
- 5. Ship out of state via US 231 & I 64.
- 6. Truck to mid-Atlantic and Southeastern states.

Notes on Inwood Office Furniture:

- Inwood is a private company with one manufacturing location.
- Most of their customers are located on eastern daylight savings time and they are resisting the change of their area to central daylight savings time.
- Suppliers ship dimensioned wood, particle board, and solid wood. Products are made from
 walnut, cherry, maple, gum, and birch trees. Some of this wood comes from Indiana. Wood is
 purchased based on price.
- There is a prefer to select inbound shipments, but some suppliers do not give that flexibility.
- Rail is preferred, but it is too expensive with deregulation. With the increase in the cost of fuel, there may be an increasing trend to go back to rail.
- Shipping to the East and West are ok, however better access is needed to the North. Both the US-231 bypass and the I-69 extension are very critical to Inwood Office Furniture.

Jasper Desk

Contact: Phillip Gramelspacher

Title: General Manager Location: Jasper, Indiana

Industry: Office Furniture Annual Revenue: \$20 million

I-69 extension: 4 US 231 bypass: 4

∧ Supplier – wood

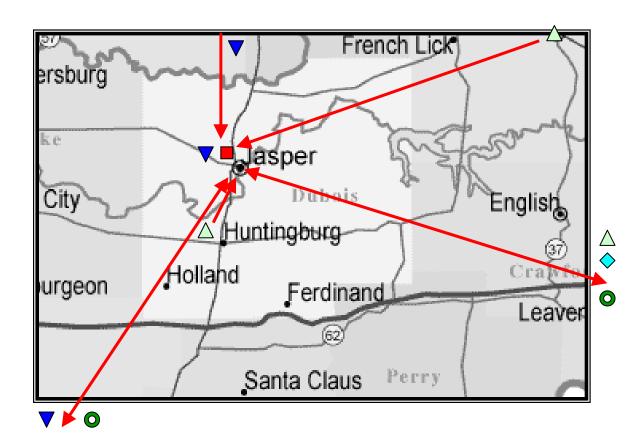
♦ Supplier – wood

components

▼ Supplier – veneer

Plant

Customer



Supply Chain:

- 1. Wood mostly from Paoli, IN & Huntingburg. Also KY.
- 2. Receive veneer from Indy, Jasper, and Iowa.
- 3. Receive wood components from Virginia.
- 4. Truck to Jasper via I 64, US 231, & SR 52.
- 5. Manufacturing & assembly completed in Jasper plant.
- 6. Ship out of state via US 231 & I 64.
- 7. Truck to New England, GA, VA, MD, TX, OK, MO, CO, & IL.

Notes on Jasper Desk:

- Jasper Desk is a privately owned company and is the oldest wood office furniture manufacturer in the US at 130 years old.
- Jasper Desk was selected to manufacture rush orders of bulk furniture for the Pentagon after 9/11.
- Fuel charges are increasingly affecting logistics costs.
- Inventory costs have been raised with the cost of insurance.
- Furniture is heavy to move around and easy to damage. Most shipping is done through Nancy
 Baer.
- Shipping by rail is too slow. Customers are demanding shorter lead times and more customized products. Now ship in 8 weeks or less or 10 day quick ship.
- Jasper Desk does not want to grow more in customization. Currently, they are approaching 50% customization.
- Approximately 90% of wood comes from Indiana, including Hard Maple, Beech, Walnut,
 Cherry, Poplar, and White Oak. The rest of the wood comes from Kentucky.
- Currently, Jasper Desk does not have many international customers, but would like to see this
 increase in the future.
- A single inbound truck of wood components is received every week.
- There is an average of 30 orders per week.
- There is a concern for increased passing lanes on US-231 from Jasper to West Lafayette.
 Also, the US-231 bypass in considered critical by Jasper Desk.

Kimball / flexcel

Contact: Mark Merder, Logistics Operations Contact: Mark Canapa, Logistics Processes

Location: Jasper, Indiana

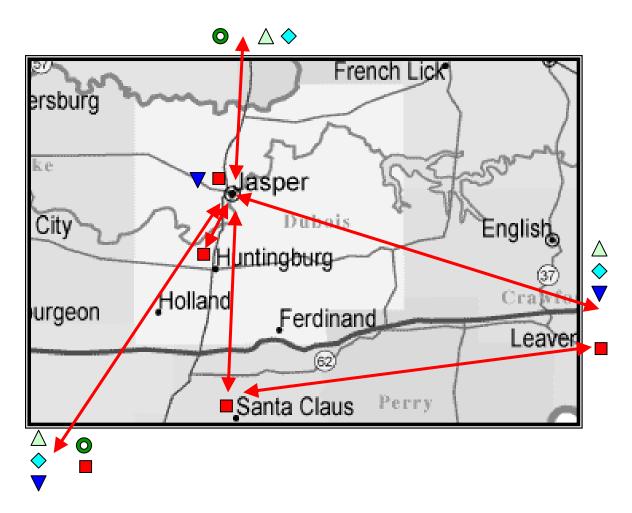
Industry: Office Furniture Annual Revenue: \$1.2 billion

I-69 extension: 3 US 231 bypass: 4

- ∧ Supplier wood
- ♦ Supplier wood

components

- ▼ Supplier veneer
- Plant
- Customer



Supply Chain:

- 1. Wood purchased based on \$. Receive wood, veneer, & wood components mostly from southeast US.
- 2. All rail shipments go through St. Louis.
- 3. Truck to Jasper via I 64 & US 231.
- 4. Sell through dealers.

Notes on Kimball:

- Kimball is an international company publicly traded on the NASDAQ (Common Stock) –
 KBALB. Flexcel Logistics is part of Kimball. There are 34 plants in the US.
- Kimball used to be fully integrated, but it is hard to justify the lower prices found elsewhere.
 They recently sold a forest and are trying to standardize more and become "right sized."
 Currently, there are over 1 million SKU's.
- Imports usually come from L.A. to St. Louis by rail. Kimball is interested in a local intermodal hub for Asian shipments.
- There are daily inbound and outbound shipments to and from Kimball.
- Speed to market is critical and better transportation is needed, especially to improve the northern and eastern routes. Often, trucks go to I-65 to get to Indianapolis.

OFS / Styline

Contact: Ryan Menke Title: VP Supply Logistics Location: Huntingburg, Indiana

Industry: Office Furniture Annual Revenue: \$220 million

I-69 extension: 5 US 231 bypass: 5

∧ Supplier – wood

Supplier – wood

components

▼ Supplier – veneer

Plant

Customer



Supply Chain:

- 1. Receive wood & wood components from KY, IN, OH, WI, MN, PA, & Canada
- 2. Receive veneer from New Albany, IN & Arkansas.
- 3. Most imports from west, with rail via St. Louis.
- 4. Truck to Huntingburg via I 64 & US 231.
- 5. Dry & dimension in their Leitchfield, KY plant.
- 6. Manufacturing & assembly in Huntingburg plant.
- 7. Ship out of state via US 231 & I 64 to 135 US dealers.

Notes on OFS:

- OFS stands for Office Furniture Systems, formerly Styline, and is a private global company.
- OFS in actively increasing vertical integration and is looking to purchase more forests. They
 currently use White Maple, Poplar, Hickory, and Oaks.
- Products are sold through representatives to dealers.
- There is a preference to ship their products themselves to avoid any padded transportation costs, estimated as 10 – 20% global logistics costs. For this reason, OFS has its own truck line.
- Although there are about 25 trains running through Huntingburg per day, rail is just not quick enough. There is a need for improvement.
- OFS wants to increase intermodal opportunities and is starting up communication through a shippers advocacy committee.
- Both the US 231 bypass and the I 69 extension are a must. There is a need to improve
 project communication, including railroad CEO's. For example, the I 64 project was too
 large and caused unnecessary congestion. OFS wants a better open-door policy with INDOT.

MasterBrand Cabinets

Contact: Chris Cuda, Sr. Director Logistics Contact: Lee Huther, Director Sourcing

Location: Jasper, Indiana

Industry: Cabinets

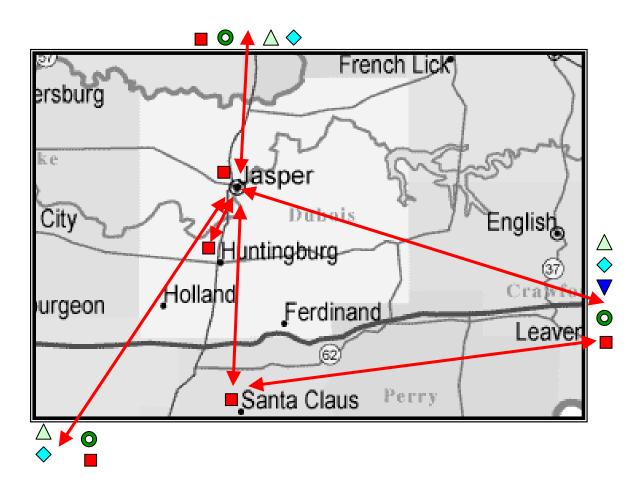
Annual Revenue: \$2 billion

I-69 extension: 5 US 231 bypass: 4

- ∧ Supplier wood
- ♦ Supplier wood

components

- ▼ Supplier veneer
- Plant
- Customer



Supply Chain:

- 1. Receive wood from Terre Haute & globally, for low \$.
- 2. Receive wood components from PA, MS, TN, AL, ME, LA, NC, MI, IN, IL & KY.
- 3. Receive veneer: KY & IN.
- 4. Most rail shipments go through Chicago.
- 5. Truck to Jasper via I 64 & US 231.
- 6. Manufacturing & assembly in 21 US plants.
- 7. Sell to US dealers, strong in Midwest and New England, 5 truckloads/day to Chicago.

Notes on MasterBrand:

- Increase access north to Indianapolis. Swing I 69 extension towards Jasper. Not enough
 trucks Fed-Ex. More rail to decrease time & cost in long haul, whole country is better off.
 Owned by Fortune Brands.
- Cabinets were all oak, stocked, & sold wholesale. Door styles 5 in 1970's, 120 today.
- Now, 4 channels: wholesale, independent dealers, builder (Pulte), & retail (Home Depot off the shelf).
- Designer drives business. 40,000 cabinets per day.
- Time is critical make to order / ship in 7 8 days.
- Use maple, cherry, oak, hickory, & alder.
- 60 full trucks inbound & 20 outbound per day.
- Buy from brokers/distributors.

Meyer Custom Woodworking

Contact: Mel Meyer Title: President

Location: Dubois, Indiana

Industry: Cabinets

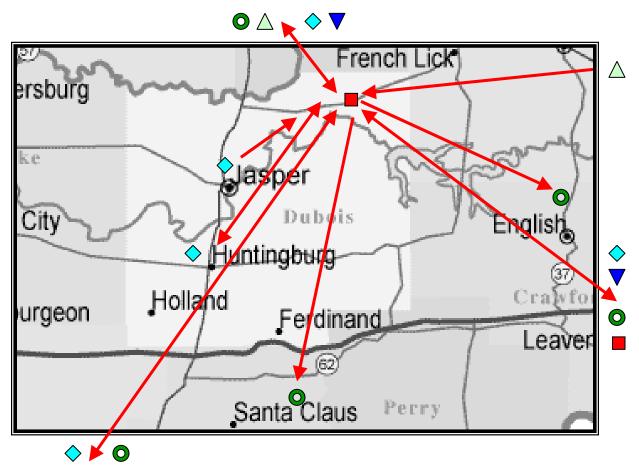
Annual Revenue: \$1 million

I-69 extension: 3 US 231 bypass: 4

- ∆ Supplier wood
- ♦ Supplier wood

components

- ▼ Supplier veneer
- Plant
- Customer



Supply Chain:

- 1. Receive wood from MI & IN
- 2. Receive veneer & wood components from KY & Indianapolis, sometimes Evansville (higher \$).
- 3. Truck to Dubois via I 64 & US 231, no rail.
- 4. Manufacturing & assembly in Dubois plant.
- 5. Truck to customer via SR 56, US 231, & I 64, no rail

Notes on Meyer Custom Woodworking:

- Most concerned about SR 56 to French Lick. There are a lot of current projects on the INDOT list & the new casino will increase the maintenance required. Possible expansion? Improve connection to Indy & Evansville.
- Private company used to own a sawmill, now purchase from OFS. Also do sub-contract
 work for OFS. Has done some offices for INDOT. Round trip to Huntingburg is 2 hours too
 much congestion on US 231.
- Use maple (MI), & local red oak, birch, & poplar from IN.
- Customers are MI to FL east of Mississippi River. No sales force. Last year was busy, no time for marketing. Now, too slow. 12 employees.

Mobel

Contact: Jeff Schipp Title: Human Resources Location: Ferdinand, Indiana

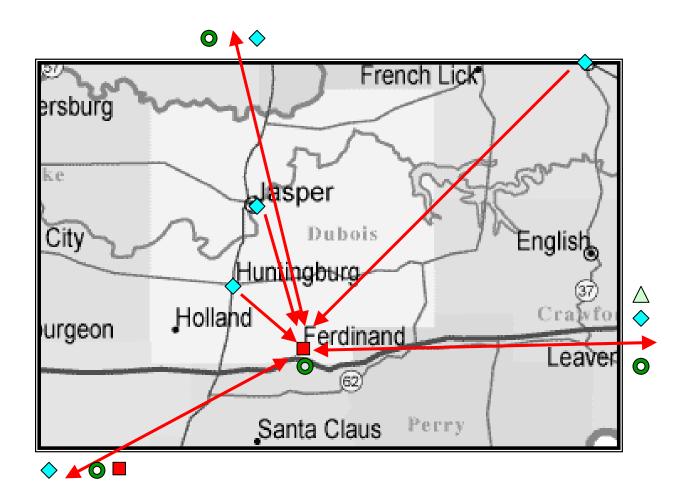
Industry: Office Furniture Annual Revenue: \$25 million

I-69 extension: 1 US 231 bypass: 1

- ∧ Supplier wood
- ♦ Supplier wood

components

- ▼ Supplier veneer
- Plant
- Customer



Supply Chain:

- 1. Receive wood: WA & IN
- 2. Receive wood components from IN, WA, OH, & MI.
- 3. Most imports from west, with rail via Louisville.
- 4. Truck via I 64 to Ferdinand.
- 5. Manufacturing & assembly in Ferdinand plant.
- 6. Truck to customers in IN, OH, & East Coast.

Notes on Mobel:

- Receive wood: WA & IN
- Receive wood components from IN, WA, OH, & MI.
- Most imports from west, with rail via Louisville.
- Truck via I 64 to Ferdinand.
- Manufacturing & assembly in Ferdinand plant.
- Truck to customers in IN, OH, & East Coast.

Summary of Findings in Phase II

The detailed surveys have revealed that the furniture supply chain is not very Indiana focused. The industry has rather extensive connections outside the state at every level of the supply chain. Logs and lumber are sold both to Indiana manufacturers and outside the state, and Indiana manufacturers also buy their inputs both locally and US wide. Similarly, the customers of most furniture manufacturers are located nation wide. More recently, imports of furniture components have become more important, and a mix of imports and domestic manufacturing is in fact being seen as critical for the competitiveness of the industry. The result is that long distance transportation and good connections to major interstates is becoming increasingly important. Given the current situation in Dubois county, this is reflected by the opinion that building new roads to improve the north-south connection would be the most beneficial.

In addition, the industry is increasing the customization of its products. Currently an estimated

In addition, the industry is increasing the customization of its products. Currently an estimated 1/3 of the furniture sold is already customized, and this number is expected to increasing in the next 5 years to 42%. The prediction is that this will result in an increase in the number of shipments and the importance of transportation.

So far rail is not being used for furniture distribution, for reasons of slow speed, low volumes and higher risk of damage. However, several of the larger companies could benefit from a local rail hub for their inbound shipments, both to increase the speed of delivery and to reduce cost. As for cooperation with INDOT, little of this exists currently. Most companies rather contact the mayor, Legislator's office or the Governor's office to communicate their concerns and project preferences. Since this indirect communication might lead to a loss of information for INDOT, direct communication should be encouraged. In the course of this project, the local INDOT office already took the initiative and joined a meeting with the local industry.

IV Modeling the Supply Chain Impact of Logistics Improvements

As we have discussed earlier in the report, the Indiana Furniture Supply Chain often involves several stages in the supply chain traversing the same set of road networks. We now consider various models that capture the impact of improvements to the road networks on the supply chain costs.

Improvements in transport costs at one commonly traversed road

One of the key findings of the survey data is that most companies describe outbound transport as the key driver of their transportation cost, setting this as 10 % of total cost on average. Since the Wood furniture supply chain in most cases consist of specialist companies at each stage of the supply chain, most companies with outbound flows also have an inbound transportation stage.

Assume that the costs added at each stage are set as c_i for stage i with i=1 representing the inflows of tree logs that are converted to lumber. Let γ represent the outbound transport cost c_t as a fraction of total costs at this stage. Thus we have, for stage k

$$\frac{c_t}{\Sigma_{i=1}^k(c_i+c_t)} = \gamma$$
 Suppose c_t decreases by a factor α , the decrease in cost at a stage is thus
$$\sum_{i=1}^k (c_i+c_t) - \sum_{i=1}^k (c_i+c_t\alpha) = k(1-\alpha)c_t$$
 Thus, the reduction in cost at a stage k is
$$= \frac{k(1-\alpha)c_t}{\Sigma_{i=1}^k(c_i+c_t)} = k(1-\alpha)\gamma$$

Note that this analysis captures the fact that if, for example, $\alpha = 0.9$, k = 5 and $\gamma = 0.1$ then, if there are five stages, then the cost reduction for the fifth stage is 5 % of total cost rather than 1 % that a single stage analysis would suggest.

The takeaway is that a supply chain view may well suggest a far greater benefit than a single stage, thus suggesting the benefit to using this view to justify the impact of INDOT investments in improving road networks on individual supply chain systems.

The benefit of lowering lead time

We now focus on another aspect of improving the transport networks i.e., that of lowering lead times for movement of goods at a stage. Suppose the current lead time at a stage is L and the transport cost, as in the previous section c_t . Then the safety stock related to this lead time is expressed as $\beta\sqrt{L}$. The transport cost at a stage is thus expressed as

$$\frac{c_t}{\sum_{i=1}^k (c_i + \beta\sqrt{L} + c_t)} = \gamma$$

Suppose c_t decreases to αc_t and L decreases to $\delta^2 L$ (where $\delta \leq 1$.

Then, we see that the change in costs would be

$$\sum_{i=1}^{k} (c_i + \beta \sqrt{L} + c_t) - \sum_{i=1}^{k} (c_i + \beta \delta \sqrt{L} + c_t \alpha)$$

$$= k\beta\sqrt{L}(1-\delta) + kc_t(1-\alpha)$$

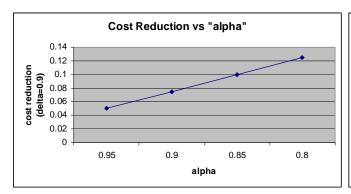
$$= k\beta\sqrt{L(1-\delta)} + kc_t(1-\alpha)$$

$$= kc_t(\frac{\beta}{c_t}\sqrt{L(1-\delta)} + (1-\alpha))$$

Clearly, when considering also the lead time effects the overall benefit as a fraction of original costs increases even further and become

$$= k\gamma (\frac{\beta}{c_t}\sqrt{L}(1-\delta) + (1-\alpha))$$

With parameters $k=5, \gamma=0.1$ and $\frac{\beta}{c_t}\sqrt{L}=0.5$, we have the following results for the change in total cost for a reduction in transportation cost (alpha) and lead time (delta):



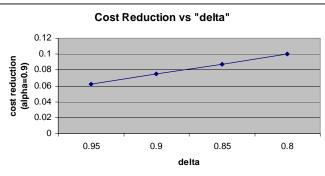


Figure 13 - Cost Reduction Graphs

Impact on competitiveness

Now consider a company that sells product to two market segments. Segment 2 focuses on price and has a long associated lead time L_2 and price p_2 . Segment 1 focuses on shorter lead time deliveries but at a higher price. Given these parameters, the demand rates faced by the two companies are as follows:

$$\lambda_1 = a - \beta_p p_1 + \theta_p (p_2 - p_1) - \beta_L L_1 + \theta_L (L_2 - L_1)$$

$$\lambda_2 = a - \beta_p p_2 + \theta_p (p_1 - p_2) - \beta_L L_2 + \theta_L (L_1 - L_2)$$

Now consider the cost associated with delivering this demand within the lead time L. Given an exponential service time, the lead time distribution for company j is exponential with a rate $\mu_j - \lambda_j$, thus the service rate μ_j required to guarantee a lead time L_j can be expressed as $\lambda_j - \frac{\ln(1-S)}{L_j}$, where S is the desired service level within lead time L_j .

Finally we can write down the expected profit for each company as $(p_1) - m \lambda_1 + (p_2 - m)\lambda_2 - A_1\mu_1 - A_2\mu_2$.

For details regarding the optimal prices that will be charged by each company given lead times as well as the optimal lead times that maximize company joint profits, please see the paper by Boyaci and Ray.

We present the results using the following example. With parameters $\theta_L = 25$, $\beta_L = 25$, $\theta_p = 10$, $\beta_p = 50$, S = 0.99, m = 3, a = 1000, $L_2 = 3$, $A_2 = 1.5$, we have the following results for prices, lead time, market size, fraction of the market focused on low lead time and profits as a function of the cost of capacity to satisfy the faster delivery.

The main question we discuss is the impact of a decrease in the cost to offer a lower lead time (i.e., if A_1 decreases), on prices, lead times and profit. If the companies do not adjust their decisions (prices, lead times etc.) the decrease of A_1 already leads to a large percentage increase in profits.

If the companies adjust their decisions, with a lower A_1 it is optimal for company 1 to offer a lower lead time and a lower price to increase demand if market size demands on price but switch-overs are governed more by lead times. The response for company 2 is to lower his price to maintain demand. However the overall impact is to increase the market share for company 1 and to increase company 1's profits even further than without adjusting the decisions.

Graph 14

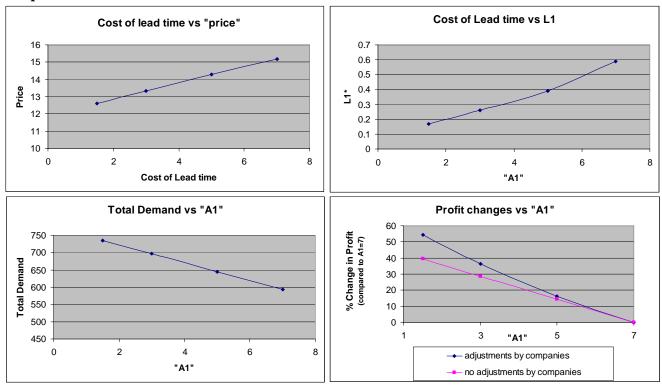


Figure 14 – Effects of Lead time on Demand, Profit and Costs

V Proposal for Next Steps

While this study helped us gain insights into how INDOT projects affect the furniture supply chain in southern Indian, several questions remain to be answered. Going into the study, we suspected to find an Indiana focused supply chain. However, discussions with members of the industry revealed that this might not be the case. First of all, neither upstream nor downstream members seem to have a supply chain perspective. They buy their inputs and sell their products without necessarily knowing where the inputs originated from or where their products end customers are located. Therefore, it remains unclear, how much of the supply chain is really located within Indiana. One possibility would be do a detailed study tracking individual logs to identify the Indiana supply chain.

Furthermore, the study revealed that many members are not very concerned about having a good rail link. However, the reason might well be that many inputs are first shipped by rail and the last lag, for example, from a local distributor, they are shipped by truck. These companies might simply not be aware of where the inputs originated from and which modes of transportation were used, since the transportation cost has been figured into the purchase price. A detailed study trying to understand the rail link better would shed light on this issue, and will help to determine how important the rail link really is to reduce the cost related to inbound transportation.

Finally, we suggest to repeat the study for the RV industry in Elkhart. Taking a look at a northern Indiana cluster and at the links between the two clusters (via upstream suppliers) will allow to get a better picture of the overall flows in the industry and understand how the transportation needs differ depending on the location.

VI Appendix A - References

Contacts:

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- 11. Indiana Maps http://www.indiana-map.org/
- 12. Indiana Geological Survey http://igs.indiana.edu/arcims/southwest/index.html

VII Appendix B: Standard Industrial Classifications (SIC's) for Wood Industry

Primary SIC code	Primary SIC description	Generic Description
2411	Logging	Logging
2421	Sawmills and planing mills, general	Sawmills
2426	Hardwood dimension and flooring mills	Other
2431	Millwork	Other
2434	Kitchen cabinets_wood	Cabinets
2435	Hardwood veneer and plywood	Hardwood Veneer
2436	Softwood veneer and plywood	Software Veneer
2439	Structural wood members	Other
2441	Nailed wood boxes and shook	Other
2448	Pallets and skids_wood	Other
2449	Containers_wood	Other
2451	Mobile homes	Mobile
2452	Prefabricated wood buildings	Other
2491	Wood preserving	Other
2493	Wood products_reconstituted	Other
2499	Wood products	Other
2511	Furniture_wood household	Home Furniture
2512	Furniture_upholstered household	Other
2514	Furniture_metal household	Other
2515	Mattresses and bedsprings	Other
2517	TV and radio cabinets_wood	Other
2519	Furniture_household	Other
2521	Office furniture_wood	Office Furniture
2522	Office furniture, except wood	Other
2531	Furniture_public building and related	Other
2541	Partitions and fixtures_wood	Other
2542	Partitions and fixtures, except wood	Other
2591	Drapery hardware and blinds and shades	Other
2599	Furniture and fixtures	Other

VIII Appendix C: Top Five Indiana Counties for the Wood Products Industry

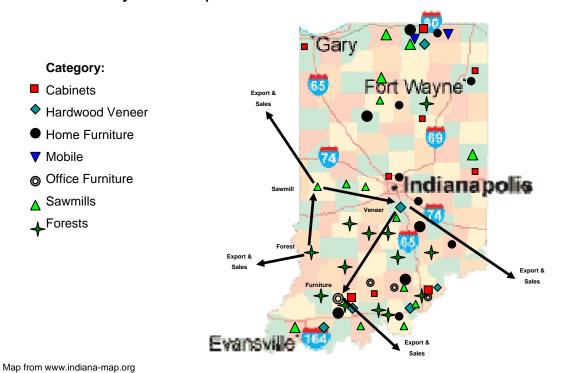
Data Analysis - Top Indiana Counties



Map from www.indiana-map.org

IX Appendix D: Example of Wood Products Industry Supply Chain in Indiana

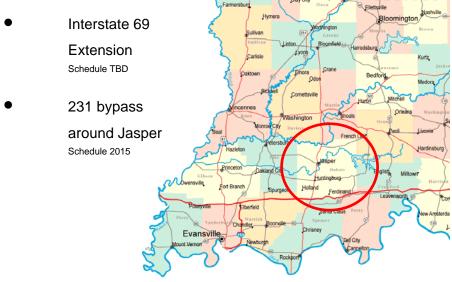
Data Analysis - Top Indiana Counties



X Appendix E: Relevant INDOT Projects to Dubois County

Data Analysis - Dubois County

Relevant INDOT Projects to Dubois County:



Map from www.indiana-map.org

XI Appendix F: Short Survey

Purdue Woo	d Supply C	hain Quick	Survey		
1. What prima	ry business is y	our company i	nvolved in ?		
Logging	Lumber	Veneer	Wood components	Furniture	Cabinets
				-	
2. What types	of wood mater	ials does your o	company mostl	y purchase fro	m suppliers:
Raw wood logs	Lumber	Veneer	Wood components		
-		uppliers of wood	d products loca	ted	
Within the state	Outside the state	International			
4. Where are a	significant pro	oportion of you	r customers loc	cated?	
Within the state	Outside the state	International			
state	state	100			
5. Which of the Inbound	Outbound	gories of shipmo Interplant	ents is the mos	t important foi	your company
6. Who selects	the transport	ation mode for:			
	Supplier Buyer		Both		
Inbound shipme		Company	100		
Outbound shipr	ments				
7. Your approx	cimate average	logistics cost,	as a percentag	e of total costs	, is:
< 5%	5% - 10% 1	.0% - 20%	> 20%	?	
8. Provide the	approximate %	% of shipments	-	wing transport	modes
		truck	rail		
today					
in 10 years	can for this t	42			
wnat is the rea	son for this tren	ar			

9. Of these six types of road projects, which one should INDOT focus on in your county that will most affect your company?					
Maintain existing roads	Add new lanes	Build new roads	Improve access to rail	Improve access to local airports	
10. For the typ		ected in questi	ion 9, the prim	ary benefit to yo	ur company
Cost	Speed	On-time delivery	Congestion	Flexibility	
11. Could you company the r		cific projects (with locations) which would he	elp your
12. (Furniture of	/Cabinets only):	Please check	if you are invo	olved in a signific	ant proportion
logging	green lumber	drying lumber	veneer	production of furniture	retailing
	production		production	components	
13. Do you exp	pect increased o	wnership inte			
Upstream Oper	ations (logs, lumb	er etc)			
Downstream O	perations (retail)				
	rently offer cust our customized			ıld you guess is t lard products)	the proportion
	< 10% 10-25	% 25-50%	>50%		
currently?	5	100	M2		
in 5 years?					
_	d information -	-			
	Your Name and Tit	'			
сотрапу мате	and Location (Cit Phone				
	2				

XII Appendix G: List of all companies with contacts for surveys

	Name	Title	Company Name	City, IN	Industry	Survey
1	Chris Cuda	Sr. Director of Transportation	Master Brand Cabinets	Jasper	Cabinets	yes
2	Mel Meyer	President	Meyer Custom Woodworking	Dubois	Cabinets	yes
3	Sherri Smith	Distribution and Fleet Manager	Best Chairs Transit	Ferdinand	Home Furniture	yes
4	Rick Rosbottom	VP Manufacturing / Distribution	DMI Furniture	Huntingburg	Home Furniture	yes
5	Jeff A. Schipp	Human Resources Manager	Mobel	Ferdinand	Home Furniture	yes
6	Mark Canapa	Logistics Process Engineer	Flexcel Logistics	Jasper	Office Furniture	yes
7	Stan Giesler		Flexcel Logistics	Jasper	Office Furniture	
8	Lynn Ermas		Indiana Chair Frame	Middlebury	Office Furniture	
9	Stanley J. Vollmer	Traffic Manager	Indiana Furniture	Jasper	Office Furniture	yes
10	Glen Sturm	President	Inwood Office Environments	Jasper	Office Furniture	yes
11	Philip Gramelspachen	General Manager	Jasper Desk	Jasper	Office Furniture	yes
12	Connie Stemle	Continuous Improvement	Kimball	Jasper	Office Furniture	
13	Glenn Messner	Transportation Manager	Kimball	Jasper	Office Furniture	
14	Jan Dodd		Kimball	Jasper	Office Furniture	
15	Tim Gleason	General Manager	Kimball	Jasper	Office Furniture	
16	Ryan Menke	VP of Supply Logisitics	OFS	Huntingburg	Office Furniture	yes
17	BIll Cheney		Chishelm Lumber	Indianapolis	Sawmill	
18	Dave Brumlage		Cole Hardwood	Logansport	Sawmill	
19	Guy Guthrie		Frank Miller	Union City	Sawmill	
20	Rachel Welp	family owned	Knies Sawmill	Dubois	Sawmill	
21	Jack Eldridge		Kokomo Lumber	Kokomo	Sawmill	
22	Mike Powers		Maley & Wertz	Evansville	Sawmill	
23	John Weida		Pike Lumber Co.	Akron	Sawmill	
24	Mary Werner	wife of owner	Virgil Werner Sawmill	Huntingburg	Sawmill	
25	Mike DiGiurgo	Veneer Clerk	Flexible Matierals	Jeffersonville	Veneer	

XIII Appendix H: Long Survey

ollow-up Survey					
Detailed Supply Cha	in Informat	tion			
1. Company Information	(for match w	ith first su	rvev)		
Company Name	•				
Contact Name					
Where do you purchase	Local (60 miles)	Regional (240 miles)	National	International	N/A
Logs - currently	100			100	
Logs - in 5 years	-				
Lumber - currently	100	100	100	100	100
Lumber - in 5 years	400	100	100		100
Veneer - currently	100		100	100	100
Veneer - in 5 years	100				
Furniture components - currently	100		100	100	
Furniture components - in years	5				

3. Do you have multiple plant locations? If no, please check N/A. If yes, where does a significant proportion of your interplant transportation take place?

	No interplant shipments	Local (60 miles)	Regional (240 miles)	National	International	N/A
Currently:						
In 5 years:						

4. If you receive shipment from overseas or deliver internationally, what ports of entry do you use? Please provide estimates of the percentage of total shipments:

East Coast	
West Coast	

5. When choosing among different ports of entry which of the following criteria are very important to you. (1= completely unimportant, 2- somewhat unimportant, 3=neither nor, 4 somewhat important, 5 = very important).

	1	2	3	4	5	N/A
Cost						
Speed						
On-time delivery						
Port congestion						
Flexibility (e.g., many / few access roads)						
Services provided (e.g.,						

6. If you use rail shipments, what terminals do you use? Please provide estimates of the percentage of total rail shipments.

St. Louis, MO	
Evansville, IN:	
Cincinnati, OH:	
Memphis, TN:	
Louisville, KY:	
ndianapolis, IN:	
Chicago, IL:	
Other, namely	

7. When choosing among different terminals which of the following criteria is very important to you. (1= completely unimportant, 2- somewhat unimportant, 3=neither nor, 4 somewhat important, 5 = very important)

	1	2	3	4	5	N/A
Cost						
Speed						
On-time delivery						
Terminal congestion						
Flexibility (e.g., many / few access roads)						
Services provided (e.g.,						

8. Out of your top five product groups, how many have interchangeable parts that facilitate different configurations of the products?												
0	1	2	3	4	5							
9. How do you expect customization to affect												
	Increases drastically	Increases somewhat	No change	Decreases somewhat	Decreases drastically	N/A						
(a) the number of production facilities you are running by 2020?												
(b) the number / size of warehouses you are running / using by 2020?	9			0								
(c) the total number of separate shipments by 2020?												
10. How do you expect customization to affect the overall importance of the following criteria for transportation by 2020? (1= drastically increase; 5 drastically decrease)												
	1	2	3	4 5	5 N/A							
Cost												
Speed												
On-Time Delivery												
Congestions												
Flexibility												
11. To which gover (and possibly value and 5 = least likely preferences. Mayor's Office INDOT District office (Indianapolis)	e estimates y that you w)? Please in	dicate fro	m 1 to 5 wh	nere 1 = mos	t likely						
Legislator's office												
Governor's office												

12. Name a few things that you expect INDOT could potentially do that would most help the competitiveness of your industry and briefly describe how it would help your industry (e.g., specific projects, improve response rate to complaints, communication of road maintenance,...).

13. Would you like a copy of the findings? No company names will be mentioned in

If so please include an email address in the company we can mail the information