

# THE FABRICATED STRUCTURAL METAL MANUFACTURING INDUSTRY: TRENDS AND CHARACTERISTICS

## A Report of the Center for Competitive Analysis May 2000

This report, prepared by the Center for Competitive Analysis of the University of Missouri Outreach and Extension (UO/E), provides an overview of some important aspects of the Fabricated Structural Metal Manufacturing industry (“FSM industry”), Standard Industrial Classification (SIC) code 3441.<sup>1</sup> Its primary intended audiences are UO/E, which may consider educational programming designed to assist business owners and workers in the industry, and economic development policy makers, who can use the information contained herein to learn more about the industry and develop programs designed to attract or retain businesses in this industry. It is by no means intended to be an exhaustive survey of all aspects of the industry. The final section of the report identifies issues that will have to be studied in greater depth before educational or developmental programming can be designed. The sources of information for this report include government publications and a variety of trade journal articles.

### 1. General Industry Information

The FSM industry includes, according to U.S. Census information, “establishments primarily engaged in fabricated (*sic*) iron and steel or other metal for structural purposes, such as bridges, buildings, and sections for ships, boats, and barges.” In 1997, the latest year for which U.S. Economic Census data are available, this industry had 2,888 establishments<sup>2</sup> nationally. There were 83,783 employees in total (\$2.64 billion payroll), including 60,969 production workers (\$1.62 billion payroll). Average hourly wages in this industry are slightly below the national average. The total employment figure is down from approximately 110,000 in 1970. National total value of shipments was \$13.96 billion, of which \$6.40 billion represented value added. Fabricated structural metal for buildings made up slightly over half of the total value of shipments, structural metal for bridges accounted for 6.2%, and “other” amounted to about 25%.

**Fabricated Structural Metal  
Manufacturing Industry,  
1997 U.S. Economic Census Statistics**  
SIC Code 3441; NAICS Code 332312 (pt)

	Missouri	U.S.
No. of Establishments	63	2,888
Value of Shipments	\$386 million	\$13.96 billion
No. of Employees	2,094	83,783
Payroll	\$68.4 million	\$2.64 billion

<sup>1</sup>This largely corresponds to the new North American Industry Classification System (NAICS) code 332312. NAICS 332312 also includes portions of SIC 3499 (Miscellaneous Structural Metal Work—fabricated bar joists and concrete reinforcing bars), which accounts for approximately 15% of NAICS 332312. SIC is the old system, which is being replaced by NAICS.

<sup>2</sup>The number of companies is slightly lower; some companies operate multiple establishments.

Census data also indicate that Missouri's share of value of shipments in 1997 was approximately \$386 million (\$166 million value added). There were 63 establishments in Missouri, according to the U.S. Census Bureau, 24 of which had 20 or more employees. The industry employed a total of 2,094 persons in Missouri (\$68.4 million payroll), of which 1,493 were production workers (\$37.4 million payroll).

**Fabricated Structural Metal  
Manufacturing Industry,  
1999 Harris Selectory Statistics  
SIC Code 3441**

	Missouri
No. of Establishments	117
No. of Employees	4,708

Another source of industry data is the *Harris Selectory*, which collects information on manufacturers in a different way and therefore produces different results. According to 1999 Harris data, the number of firms in Missouri whose primary line of business is in SIC code 3441 is 117, the total employment in the firms is 4,708, and the 12 largest (by number of employees) Missouri firms account

for 51% of the state's total employment in this industry. These data reveal much other interesting information about the Missouri FSM industry. The industry is spread throughout the state, with firms located in 39 of Missouri's 112 counties, and the 12 largest firms are spread over 9 different counties. Furthermore, while many of the larger firms are located in urban centers around Kansas City, St. Louis, and Springfield, there are several large firms in rural areas.

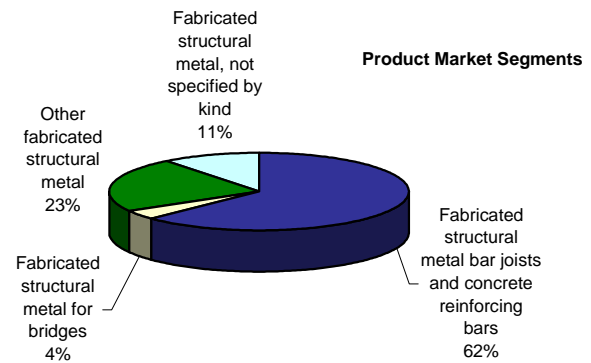
Census data from 1992 regarding overall concentration for SIC code 3441 reveal that control of the industry was relatively diffuse. The four largest firms controlled just 10% of total industry value of shipments, the top 20 firms controlled 22%, and the largest 50 firms had 35%. In comparison, the top 50 firms regardless of industry controlled 24% of the U.S. total value added for manufacturing, making this industry slightly more concentrated than the overall economy. Our initial research could not confirm the extent to which markets in this industry are regional or local, but we suspect that the cost of transporting the industry's output implies that most purchasers obtain these products in relatively localized markets. To the extent markets are indeed less than national in scope, national concentration numbers would tend to understate concentration in the meaningful regional/local markets, particularly in sparsely populated areas. The fact that Missouri's FSM firms are spread geographically around the state would tend to support the notion of regional markets. Furthermore, product submarkets or market segments tend to be more concentrated than the overall industry. For example, Nucor has 45% of the U.S. steel joist market.

On the other hand, increasing production costs in the U.S., caused in part by more stringent environmental regulation, led to increasing imports in the 1980s. Import competition remains strong in segments such as wide-flange beams, in which U.S. firms cut prices in late 1998 by about 20% to the \$360 per ton range in order to compete with imports from Asia, Russia, and Europe, which are priced in the \$300 range. In 1998, approximately half of U.S. purchases in this submarket were made from foreign sources. Census concentration data does not include foreign sources, and therefore the reported numbers may overstate the degree of industry concentration. In any event, it seems safe to say that the industry is relatively unconcentrated, and therefore fairly competitive, with

the possible exception of localized markets in remote areas, which may only be served by one or two FSM firms.

## 2. The Product Market: Segments and Competitive Conditions

According to 1997 Economic Census data, which are published using the NAICS classifications based largely on the *destination* (type of usage) of the products, there are four main product categories. These are fabricated structural metal bar joists and concrete reinforcing bars (\$8.8 billion value of 1997 shipments); fabricated structural metal for bridges (\$548 million); other fabricated structural metal (\$3.2 billion); and fabricated structural metal, not specified by kind (\$1.5 billion). Within each of these categories there are subcategories where certain types of steel *products*, which is the classification approach emphasized under the SIC system, find their way into multiple applications, or NAICS subcategories. In this section we will first discuss developments in some NAICS product market subcategories, and then describe some competitive aspects of markets for one particular product: wide-flange beams.



Steel companies are trying to expand the use of steel in bridges, highways, fuel-storage tanks, utility poles, and water-storage tanks. There are numerous opportunities for steel fabricators in these areas, both to replace items previously made of steel and to substitute steel for other materials. Depending on the product, competition for steel will come from wood, concrete, fiberglass, and polymers.

According to the U.S. Department of Transportation, the maintenance budget for U.S. bridges, highways, and transit facilities will be \$57 billion a year, and upgrading costs will be \$80 billion annually. There are 125 million utility poles in the U.S., of which between 4 million and 7 million must be replaced annually; the American Iron and Steel Institute (AISI) hopes that steel will be able to capture 10% of this replacement market. New Environmental Protection Agency rules require that approximately 1.2 million fuel-storage tanks be upgraded. Steel is especially attractive for use in above-ground storage tanks, which are often used to replace underground tanks.

The use of cold-formed galvanized steel is increasing at 3% to 6% annually in residential and light construction markets. AISI has budgeted \$2.35 million for promoting steel residential construction in 1998, up from \$1.6 million in 1996. An August 1999 report issued by the Steel Recycling Institute predicts that by as early as 2002, one-quarter of new homes in the U.S. will be built with steel framing. The major problem for steel in these applications is increased labor costs in construction, which must be offset by savings in material costs. Such savings become more important when lumber prices

escalate. Another steel product used in residential applications is bantam or junior beams, which are increasing their share in the manufactured housing market.

Another area of expected rapid growth for steel is associated with increases in the usage of cellular and other wireless communications. New and existing operators of digital TV, radio, paging, cellular, and personal communications systems (PCS) need more towers to mount radio antennae for information transmission. The number of the existing towers is about 20,000 to 30,000, and, according to the Personal Communications Industry Association, 100,000 additional towers will be required over the next 10 years. Thus, the boom in wireless communications has led Wall Street to become very interested in makers of steel towers, and the number of leveraged buyouts in the industry has increased in the past 2 years.

Structural steel fabricators are also looking for ways to increase the value of their products by providing additional services to customers. One trend in this area is for fabricators to paint their products rather than shipping bare steel. Structural steel fabricators throughout the U.S. are adding in-plant painting service by creating advanced finishing lines in their facilities. There are numerous advantages for customers of turning the job of painting steel beams, columns, and trusses over to fabricators, including better compliance with environmental, safety, and coating performance requirements.

An interesting combination of events has recently occurred in the market for wide-flange beams. On one hand, producers have filed trade complaints accusing foreign producers of dumping steel beams on the U.S. market at below-cost prices. Yet at the same time there appears to be a (possibly short-lived) shortage of U.S. production capacity for these products. For example, one of the two largest U.S. producers of wide-flange beams is limiting orders for these products, imposing a sort of quota on buyers. The other of the largest two producers recently told customers it was shifting production among its mills in Arkansas and South Carolina in an attempt to free up more rolling time

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for the mid-range of beams, which are in the tightest supply. The Milwaukee, Wisconsin, area's booming commercial construction business is causing delays in shipments of structural steel, a basic material in most projects. As the lead time becomes shorter, Williams Steel, a local supplier, has turned down business

because it would be unable to procure steel quickly enough for prospective customers. Industry analysts project that domestic wide-flange beam capacity in 2000 will total 4 million tons while market demands will be in the range of 4.1 million to 4.3 million tons. In 2001, U.S. production capacity will increase to 4.55 million tons with an unchanged demand, which is expected to bring domestic demand and supply into balance and reducing or eliminating the potential market for imported beams. Indeed, some analysts are predicting that the current plant-building "binge" will lead to a domestic surplus of capacity by 2002.

There is no doubt that U.S. producers are expanding capacity in this and other segments of the steel fabrication industry. Chicago Metal Rolled Products Co. has opened a new 120,000-square-foot facility and acquired the world's largest beam roller, which

allows the firm to make cold-curved structural beams. With the roller, the company can, for example, curve a 36-inch-wide, 120-foot-long beam into a 75-foot radius. Nucor-Yamato Steel plans to spend \$50 million to build a new structural steel plant to produce joists, girders, and steel decking. SMI Joist, the second largest manufacturer of steel joists in the U.S., will expand its existing plant in Hope, Arkansas, by 50% and build a new facility there specialized in manufacturing castellated and cellular beams, the first plant in the U.S. for such beams. Castellated and cellular beams, already used in Europe, accommodate greater design flexibility in steel construction. Diez Group plans to add about 35,000 sq. ft. to its metal parts fabricating plant in Lapeer, Michigan, to help it meet demand for steel stampings and subassemblies in the auto industry.

But increased use of steel in many applications should not lead steel firms to believe that there are no threats in the marketplace from fabricators of other structural metals. For example, wide temperature swings (-31° F to 95° F) cause high maintenance costs for steel and concrete bridges. Aluminum is being used in many bridge installations in Europe, especially in Scandinavia. This alternative to steel/concrete bridges is gaining favor in colder climates because of its better resistance to salt and other corrosive materials.

### 3. Labor, Skills, and Labor Market Conditions

The labor force employed by the fabricated structural metals industry in Missouri is not generally characterized by high skill levels, but a reasonably significant percentage of employees are in occupations requiring specific trade skills (e.g., welders, drafters, and sheet metal workers). The following table contains the occupational titles and the 1997 average annual wages of workers employed in the three-digit SIC code 344: Fabricated Structural Metal Manufacturing. Note that this 3-digit category is broader, despite its name, than the 4-digit industry that has the same title; the percentages of employees in each occupation in SIC code 3441 will therefore likely vary from those shown here. The table contains information for the six most heavily employed occupations.

TABLE 1. FSM Industry Occupations		
Job Title	Percent	1997 Annual Average Wages
Assemblers, Fabricator (All Other)	5.9	\$16,848 – \$37,669
Structural Metal Fabricators	5.8	\$15,059 – \$23,379
Welders and Cutters	5.7	\$18,574 – \$28,330
First Line Supervisors, Production	4.2	\$24,461 – \$43,846
Helper, Laborer, Mover, All Other	3.8	\$13,208 – \$24,419
Sheet Metal Workers	3.7	\$25,480 – \$47,840

The annual wage data are for all workers in Missouri in that occupational category, not just those in SIC code 344.<sup>3</sup> The “Percent” column states the percentage of the industry workforce classified in a particular occupation. The source of the information is the Missouri Occupational Information System (MOIS). Because most of these jobs do not require extensive skills, training would typically be done on the job, and there are no technical school programs designed to prepare workers for such occupations. Welders and sheet metal workers possess higher skills, and welding programs are in place in most vocational-technical schools in Missouri. Other important occupations in this industry, not shown in Table 1, include combination machine tool operators, cost estimators, and welding machine operators.

Table 1 is based on overall industry employment in Missouri, which means that the occupational proportions are heavily weighted toward the largest employers in the state. These data may not therefore be appropriate for the smaller firms in the industry. Each

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establishment, no matter how small, requires a minimum number—perhaps only one—of certain types of employees. As commerce moves more into the electronic realm, it will probably be necessary for even the smallest producers to have an employee who has relatively sophisticated computer skills that go beyond, for example, proficiency with a single word processing package. In order for a local area to attract and retain even small firms, it is therefore important for the nearby secondary and vocational schools to provide the kind of computer skill training required by such small businesses.<sup>4</sup> Even if the attitude, work ethic, and basic skills of the local workforce are sufficient in every other way, firms may be reluctant to locate in rural areas if workers with the requisite specific skills are unavailable.

An important reason why the educational system rather than the firms themselves will be the critical source for training in electronic commerce computer skills lies in the nature of the training. Economists distinguish between general training, which can be put to use by a worker in any of a number of firms or industries, and specific training, which is applicable only in individual or small groups of firms. Firms are more willing to provide specific training because the workers receiving it cannot easily (if at all) apply the knowledge gained to a job at another firm. The employer therefore need not be concerned with the possibility of investing what can be considerable sums in training only to see the employee leave for a more lucrative position with another firm. The sorts of electronic commerce computer skills at issue here are more general skills that are largely transferable from one employer to another. These principles apply to a greater extent in small businesses, for which training costs would be a larger proportion of total costs and which cannot offer their employees as many opportunities for intrafirm advancement.

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<sup>3</sup>Nationally, average wages in this industry were slightly below the overall national average manufacturing wage.

<sup>4</sup>This principle applies to a wide variety of industries.

Because labor market conditions vary considerably across Missouri, no blanket statements about labor availability in the state can be made, except to state generally that outstate labor markets are not as tight as those in urban areas. A good source of information on local (county) labor markets and a variety of other labor-related information for Missouri is the “Missouri Works” Web site at

<http://www.works.state.mo.us/index.htm>.<sup>5</sup>

A more general labor-related problem facing smaller businesses is the ability to maintain a competitive package of benefits, especially medical insurance. In today’s tight labor market (especially with respect to workers with high skill levels), the ability to provide a strong benefits package may be the most critical factor in recruiting and retaining employees. In rural areas, the presence of one major employer with attractive benefits packages can leave smaller businesses in the area the choice between losing employees and incurring high benefits expenses.

#### **4. Physical Infrastructure Requirements**

Our research did not uncover specific information about infrastructure requirements peculiar to this industry. In the absence of evidence to the contrary, we believe it is fair to assume that the requirements of this industry are not significantly different from most manufacturing industries. Necessary utility services are an adequate supply of electricity, probably including 3-phase service, telecommunications facilities sufficient to permit data as well as voice services, and good supplies of water and sewer services. In addition, since this industry’s primary input is the “raw” steel or other metals to be processed, a good road system is needed so that large trucks carrying the input materials can reach the plant. Similarly, good roads are needed in order to get the output from the plant to customers’ construction sites. The availability of nearby rail or water transportation may be of use, particularly if the plant creates large items that do not easily fit on standard semi trucks. Given the geographic dispersion of FSM firms in Missouri (noted in the “General Industry Information” section above), we suspect that access to roads or other modes of transportation is adequate for the state’s metals fabricators.

#### **5. Support Industries**

An obviously important cost faced by fabricated structural metals firms is that of the “raw” metals—primarily steel—used to make finished structural items such as joists and beams. Manufacturers of fabricated structural metals experienced a direct manufacturing cost decline of 6.2% between June 1998 and June 1999 thanks to the falling cost of steel. This trend may not be expected to continue, however, even though steelmakers are expanding their capacity. Many buyers have complained that prices have risen sharply

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<sup>5</sup>Note that Web addresses and the contents of Web pages change from time to time. The Web addresses provided in this report were correct at the time of writing.

and availability has declined since unfair-trade complaints against foreign producers were filed in the first half of 1999.

Several steelmakers are building or recently opened new facilities used for the production of structural steels. These new plants are located in the eastern half of the U.S., in Georgia, Illinois, Indiana, Kentucky, New Jersey, and Virginia. Despite the fact that many of these plants are being built as replacements for older facilities, there will be a net decrease in domestic structural steelmaking over the next 2 years or so. Imports can help relieve the pressure, and Mexico is adding to its steelmaking capacity. While lower capacity may tend to push prices up, the newer facilities are more efficient, which tends to put downward pressure on prices. There appears to be no consensus among analysts regarding the near-future course of steel prices. Wide swings in the quantities of imports also add to the uncertainties.

Many steel fabricators use galvanized or zinc coated sheets or plates to produce their products, including galvanized steel framing and roofing for commercial and residential buildings. Galvanizing applications account for roughly half of the zinc consumption in the world. Metal fabrication activities therefore have a significant impact on zinc prices and in turn on the price of galvanized products. Zinc producers are improving their efficiency and are forming partnerships with their customers to find ways to produce zinc-using products more efficiently.

The steelmaking industry is also proving to be a good partner in marketing efforts, both on its own and in alliance with fabricators. A group of steel companies, including Bethlehem, US Steel, and LTV, came together in early 2000 to start a \$100 million advertising campaign to promote the use of steel in housing construction. And a Chicago not-for-profit firm, AISC Marketing, is receiving funding from both steelmakers and fabricators to increase the visibility of steel among decision makers in the building industry, including architects and contractors. AISC is a 12-year-old firm funded primarily through the American Institute of Steel Construction, a trade group.

## **6. Regulatory Requirements**

Although there appear to be no industry-specific regulatory issues affecting metals fabricators, such firms must be aware of broader labor, occupational, and environmental regulations. Large companies typically have employees or entire departments devoted to following new regulatory developments and devising compliance procedures. In many small businesses, however, such responsibilities cannot be assigned to special experts. A good place to begin gaining a familiarity with federal (primarily employment) regulations is the U.S. Department of Labor's *Small Business Handbook: Laws, Regulations, and Technical Assistance Services* (November, 1997), available on the Internet at

<http://www.dol.gov/dol/asp/public/programs/handbook/ofccp.htm>.

Also of assistance to small businesses is the Department of Labor's Office of Small Business Programs. One of that agency's initiatives is the Regulatory Compliance Assistance program, available on the Internet at

<http://www.dol.gov/dol/osbp/public/sbrefa/main.htm>

or by toll-free telephone at 1-888-972-7332 (1-888-9SBREFA).

The U.S. Environmental Protection Agency (EPA) is a good source of information on how that agency's regulations affect small business and ways in which small businesses can satisfy EPA regulations at the lowest possible cost. See

<http://www.epa.gov/smallbusiness/>

for more information. One recent trend in the industry, the offering of in-plant painting services, will require attention to an additional set of regulations that were not applicable before such services were provided.

Generally speaking, a key factor in successfully and efficiently complying with state and federal regulations governing the environment and employee compensation and safety issues is familiarity with such regulations on the part of business owners and managers. While gaining such familiarity can be quite time consuming for small business owners, already serving their firms in many capacities, it is imperative that sufficient time be devoted to keeping up to date with regulatory enforcement practices. The information cited here can help begin that process.

## 7. General Strategic Issues

The profitability of a business depends upon both the overall degree of competition in an industry and the position of the business relative to its rivals. A business has little control over the general degree of competition in its industry but can take strategic actions to position itself favorably relative to its rivals and thereby influence its profitability. Businesses that earn profits above the industry average typically do so because they find a sustainable competitive advantage. This advantage allows such firms to position themselves relative to their rivals in ways that emphasize their relative strengths; and this in turn allows them to better cope with the various forces of competition.

It is common to distinguish between two broad strategies to achieve competitive advantage. The first is cost leadership, and the second is product differentiation. Each of these strategies represents a different route to sustainable competitive advantage and above-average profitability. Moreover, no matter which of these approaches is adopted, a firm also needs to determine whether it will compete for all buyers in a particular market or focus on just a target segment of the market. Successful firms will choose a strategy and target segment based upon their own individual strengths and weaknesses.

**Cost leadership** is a strategy of attempting to become the low-cost supplier in the industry. Sources of cost leadership are varied but would include such things as pursuit of scale economies, use of proprietary technology, preferential access to raw materials and other inputs, and specific knowledge of customer needs. Firms pursuing this strategy must seek out all sources of cost advantage while at the same time produce a product that is perceived as comparable to that of rival firms.

In a **differentiation strategy** a business attempts to make itself and its products unique along dimensions that are considered valuable by buyers. The business needs to find attributes that buyers perceive as important and position itself to meet those needs. The attributes along which differentiation may be achieved are extremely broad including the product or service itself, the delivery system used, the marketing approach adopted, and so forth. To be successful in a differentiation strategy, a business must choose attributes to emphasize which will allow it to be perceived as distinct from its rivals. Differentiation is often a more promising strategy for products sold to consumers rather than to firms processing them for later sale.

No matter whether cost leadership or product differentiation is pursued, a firm must also decide how broadly over the market it should compete. Most markets contain segments. Segments are distinct customer groups who possess a common set of characteristics or special needs. In consumer goods industries, for example, buyers may be segmented by income levels, frequency of purchase, knowledge of the product, and so forth. Industrial goods buyers may be segmented by size of buyer, willingness to trade price for quality, location, or special product needs. A firm needs to determine whether it will attempt to serve all of the market segments or focus upon target segments.

When a firm focuses it aims to better serve a single or small number of buyer segments in an industry. For some segments this will require a firm to be a low-cost producer. In other segments a firm may compete by offering a differentiated product. Firms that become very narrowly focused (specializing perhaps in as little as one segment with a single product) are often said to be following a “niche strategy.”

**Whether a strategy of low cost or product differentiation is appropriate depends upon the nature of the buyers in the segments being pursued and the positions of rival firms competing for those same buyers.**

By their very nature, small businesses typically must focus on only one or a few segments of an industry. Whether a strategy of low cost or product differentiation is appropriate depends upon the nature of the buyers in the segments being pursued and the positions of rival firms competing for those same buyers. Consider for example the following sets of questions in reference to a particular buyer segment:

1. Are other firms competing in this segment currently utilizing large-scale, low-cost production technologies? The existence of such firms may make it difficult to attract or maintain customers.
2. Are the products or services produced for this segment virtually standardized? Purchases of standardized goods and services are generally made on the basis of price alone.
3. Can the attributes of the product or service and its quality be ascertained by the buyer prior to purchase? Such products can be judged as to acceptability by buyers, and for a given quality a supplier must also offer the lowest price.

4. Are the buyers extremely price sensitive and unwilling to pay much of a premium for enhanced quality or image? In some cases nothing matters other than price. As a result, only firms able to offer the lowest prices are able to survive.
5. Is little post-sale service required for this product? Competition in segments in which post-sale service has little or no significance often will turn on price alone.

If each of these questions is answered affirmatively, then for this particular segment cost leadership is likely to be a dominant strategy. Segments displaying these characteristics offer little scope for creating value to buyers through differentiation efforts. Successful firms will be those who manage to achieve minimum cost in serving this type of target segment.

Product differentiation becomes a more viable strategy in segments where the conditions given in questions (2.) through (5.) above do not prevail. Under these circumstances, firms have the opportunity to offer differentiated products or services with attributes that are especially desired by buyers. Firms successful in product differentiation benefit through the ability to obtain price premiums for their products.

What type of strategy should a firm in the FSM industry adopt? There is obviously no single answer appropriate for all firms, and it is possible that any of the strategies described above, if properly executed, can be successful. For some products cost leadership and therefore price competition would work, especially if there are already several firms making an essentially identical product. Indeed, competition for many jobs would consist of a bidding process that emphasizes price, given that set of minimum standards can be met by the bidder. Differentiation, characterized (for example) by the ability of a firm to fill an order quickly or to make limited runs of an item at a reasonable price, is also feasible. Most firms in this industry will have a variety of feasible strategies from which to choose. This variety of choices is both a blessing—it allows a firm to move in one or more of several directions—and a curse—a larger number of choices means that it may be difficult to determine the best course of action.

## **8. Challenges**

Challenges to the firms in an industry or to the industry as a whole can take the form of either opportunities or threats, and sometimes a threat is also an opportunity (or vice versa). Some threats can lead to opportunities as the firms in an industry, who are forced to face issues that they have not previously considered, discover new perspectives on their core business. The challenges we see here are similar to those confronting many other industries and in that sense are not unique to this industry but simply take a slightly different form. Three important challenges face the FSM industry: imports, competition with other structural materials, and making the transition to a business model that relies on electronic commerce to a much greater extent. This section considers each of these in turn.

## **Imports**

Imports became a major challenge to the U.S. FSM industry in the early 1980s. The initial influx was caused by increasingly restrictive U.S. environmental and safety regulations and by a general increase in labor costs that accompanied the high rates of inflation during that period. These developments caused domestic metals fabricators to increase prices to a level that made foreign products quite attractive. Once the foreign producers were able to gain a foothold in the U.S., they were able to expand their market shares and increase their production capacity. By the beginning of the 1990s, U.S. worker productivity was beginning to increase and many companies streamlined operations through corporate reorganizations. Nevertheless, imports remained high and in the late 1990s several complaints were filed by U.S. steelmakers and fabricators alleging that foreign firms had engaged in unfair trade practices. Of course, trade can flow both ways. To the extent that increased imports result from lowered trade barriers (e.g., NAFTA), U.S. producers have an increased opportunity to sell into foreign markets.

Thus, the challenge posed by imports can ultimately be more opportunity than threat. If increased competition from imports forces domestic firms to become more efficient, and if increasing globalization of the FSM market also gives U.S. firms greater opportunities to make foreign sales, the domestic FSM industry will be strengthened.

## **Competition from Other Structural Materials**

We might just as correctly call this subsection “Competition *for* Other Structural Materials,” because it appears that structural metals are mounting a challenge in markets traditionally served by other materials such as wood and plastics. This challenge is truly an opportunity. Assuming the FSM industry is even moderately successful in its attempts to convince decision makers in the construction and utility industries to use more metals for residential and commercial buildings and for utility poles, new markets that will exist well into the future will have been opened. Although the jury is still out on the ultimate results of the current (primarily marketing) efforts, increases in the use of metals in the aforementioned applications indicate that further successes are quite possible. Firms in the FSM industry should continue to push the idea that their products can be as good as, and may be superior to, traditionally used materials. Along these same lines, FSM firms should, both individually and through cooperative research and marketing efforts, continue to explore other applications for their products. They should refuse to assume that applications using other materials will do so forever. To use a phrase that has become a bit overworked, the FSM industry should force itself to “think outside the box” in terms of the potential markets for its products.

## **E-commerce**

The FSM industry shares the challenge associated with electronic commerce (“e-commerce”) with most other industries. Although much of the publicity concerning e-commerce concerns transactions between retailers and consumers, business-to-business e-commerce is much more voluminous—roughly 10 times larger.<sup>6</sup> It will be virtually

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<sup>6</sup>It should be noted that this ratio is not unique to e-commerce. Even before the Internet was created, the total value of transactions between businesses was roughly 10 times greater than retail sales.

impossible for any firm in almost any industry to survive, let alone grow, if it does not adopt an e-commerce model. For FSM firms this means that the Internet will be an important, and perhaps the sole, channel for procuring its material inputs as well as for communicating with its customers. Internet-based project Web sites can communicate project information in a fast, cost-effective, and efficient manner. Some Web sites act as the homepage for a specific project, where project participants can put drawing files, specifications, and cut sheets and perform certain project-specific tasks such as requests for information or shop drawing logs. The transition to e-commerce in the FSM industry is well underway, as the following examples suggest.

A number of electronic marketplaces have been launched in a variety of industries over the past 12 to 18 months. SupplierOne.com, which inaugurated its Web site in early April of this year, is likely to become an important e-marketplace for FSM firms. It will facilitate electronic transactions for structural and sheet metal fabrications as well as for a number of other materials products, including castings, stampings, and forgings. It will provide a marketplace for all sorts of materials, including metals, rubber, and plastics. The potential benefits of this Internet company (and many others) include reducing costs, substantially cutting the purchasing cycle, and substantially improving productivity.

The biggest beneficiaries on the seller side of the digital exchanges seem to be small and medium-size suppliers. Kevin Campbell, president of Master Design and Manufacturing Inc., a \$5-million custom metal fabrication company in Noblesville, Indiana, has found new business on [www.suppliermarket.com](http://www.suppliermarket.com), which has helped keep his 80,000-sq.-ft. plant running at full capacity. He has also nearly halved his sales commission costs by paying a 4% fee to the exchange vs. a 7.5% commission to traditional salespeople.

The rapid growth of e-commerce is both an opportunity and a threat. It offers the potential for FSM firms to bid on a variety of projects that they may never have learned about otherwise, and will allow better and more timely communications with suppliers. In this fashion e-commerce opens more opportunities for increasing profits by expanding sales and cutting costs. But it clearly represents a threat as well. Firms that fail to make a sufficiently rapid transition to e-commerce will find it difficult to survive, because there can be no doubt that many of their competitors will be there soon. A major challenge in the transition to e-commerce will be finding personnel sufficiently knowledgeable about the technologies and techniques involved in a successful e-commerce plan. This is especially true because the present expansion of e-commerce is so rapid that such personnel are in short supply.

## **9. Topics for Further Research**

Our initial research on the FSM industry has given us an overview of the industry on a national level. Except for a few statistics, however, we have not learned much detail about the Missouri firms in the industry. In order for economic developers to be able to attract and retain such businesses and for University programs aimed at helping the industry to be developed, more information on Missouri FSM firms should be compiled. A potential source of this information is a survey of or set of discussions with Missouri FSM firms.

Two other issues appear in this report without firm conclusions. One is the scope of the market for a given firm. Is this market relatively localized because of transportation costs, or is it truly a global market? Or is the market global in some segments or sets of circumstances but local in others? The other issue arises because of some apparent disagreement between industry analysts. Is there now or will there be a shortage of fabricated metals products (primarily steel), or will the combination of new plants and potentially increased imports lead to a glut of metals fabricating capacity? The first of these issues can be probed with additional research, perhaps as a part of a discussion with Missouri FSM firms as suggested above. The second issue, since it involves differing predictions about the industry's near-future course, will only be resolved with the passage of time, until we can see what actually does develop in the industry.