B2B e-Commerce Adoption Across the Global Steel Industry

A GXS White Paper for the Active Business
The global steel industry has undergone significant restructuring and consolidation in recent years and this has led to many steel companies having to review their strategies for managing their B2B infrastructures. The steel industry has had to globalize their operations in order to maintain relationships with their key customers. As a result, there has been a need to adopt new B2B technologies in order to be able to communicate with customers and trading partners around the world. Until recently, B2B adoption levels across the steel industry have been relatively low when compared to other manufacturing sectors. There are three main reasons for the lower adoption of B2B:

Firstly, for most job functions within a steel company, there has been no real need for many employees to have access to the Internet. Consequently, there has been a significant under-investment in networking infrastructures when compared to other manufacturing industries.

Secondly, the availability of general ICT—(Information Communications Technology) related skills is very low within steel companies. In a survey published in the 2008 e-Business Watch study “ICT and e-Business Impact in the Steel Industry,” respondents stated that, in small European steel companies, only 24% employed specific ICT infrastructure skills. In medium-sized and large companies these numbers jumped to 38% and 61%, respectively.

Thirdly, the steel industry is perceived as being “old fashioned” and, as a result it, has had trouble attracting employees with the ICT skills needed to take the industry forward. Compounding the challenges is the fact that many existing employees are reaching retirement age. Due to these factors, many steel companies are thinking about outsourcing the management of their ICT and B2B infrastructures. According to the e-Business Watch report, almost 22% of companies interviewed stated that, in the past twelve months, they had outsourced ICT functions which were previously conducted in-house to external service providers.

The challenges driving B2B solutions and services across the steel industry are similar to those facing companies in other manufacturing sectors—lack of efficiency across the supply chain, low productivity in internal business processes, and disjointed distribution and sales channels.

Adoption of B2B e-commerce technologies in the steel industry can be categorized into two different areas:

- **Electronic Buy-Side Procurement**—The steel industry, like many other sectors, was quick to adopt buy-side procurement platforms for spend management, supplier sourcing, electronic catalogs and automated purchasing processes.

- **Electronic Sales-Side Processes**—The steel industry is largely driven by requirements from customers, therefore the sell-side interfaces are vitally important. B2B solutions should facilitate communication with customers, including negotiation, product specification, scheduling, shipping and invoicing.
**Buy-Side Processes**

**Electronic Procurement**

Typically, a steel mill will have to manage the procurement of raw materials such as iron ore, coal and coke, and energy supplies such as electrical power. Additionally, steel producers must produce and stock spare parts and maintenance for blast furnaces and rolling mills. In large steel mills, many goods are procured in huge volumes by dozens of specialized buyers who are dedicated to the procurement process.

Electronic sourcing platforms help to streamline procurement processes and reduce costs in the steel industry. One example given in the *e-Business Watch* report relates to ThyssenKrupp in Europe, who has established a multilingual online procurement platform that is open to suppliers anywhere in the world. Within one-and-a-half years of implementation, ThyssenKrupp has realized significant price reductions and process enhancements amounting to millions of dollars. In addition, procurement costs were reduced due to enhanced market transparency and improved purchasing conditions. Processes were also streamlined because buyers no longer had to print inquiries and send them to potential suppliers via post, fax or email. However, ThyssenKrupp is a rare example of automation in e-procurement. In general, buy-side e-business is not very prevalent in the European steel industry. The root cause is that most suppliers are relatively small, and the medium enterprises want to avoid expensive investments in B2B solutions.

**Electronic Invoicing**

In North America and Europe, procurement activities are generally followed by order fulfillment, shipping, receiving and financial settlement. Automating financial settlement, becomes challenging as steel companies have many different ways of describing what an e-invoice actually consists of. For example, a PDF document attached to an email is the most common way to exchange invoices within the industry. More advanced forms of e-invoicing, such as utilizing computer-to-computer integration or dedicated web sites, are relatively rare within the steel industry—providing a significant growth opportunity for B2B technology.

According to the *e-Business Watch* report, only 36% of European steel firms reported sending invoices electronically, while 12% still manually sent invoices directly from their computer systems to their customers. Fiscal dematerialization, or the conversion of paper-based invoices to digital invoices, is starting to gain traction across many industry sectors in Europe. However, the process is complicated by the fact that, for the digital invoice to be recognized as a legal document, it must contain a digital signature. The use of digital signatures is relatively low across the industry, with only 7% of companies using them on a regular basis. There are 27 different countries in the European Union, and therefore 27 different tax laws to account for. These country-specific regulations are a key reason why e-invoicing has seen slower adoption levels in Europe when compared to the rest of the world. In North America, for example, almost half of the steel firms surveyed sent invoices as PDF documents, 40% sent directly from computer systems to their customers, and 13% accessed invoices via a web-based solution.
Sales-Side Processes

In general, sales-side business processes involve activities such as order management and the subsequent customer support. In Europe, steel firms sell to both national and international markets, with 41% of companies selling primarily to domestic customers. Steel is typically sold in three different ways:

1. By the steel-producing company itself
2. Through a third-party enterprise such as steel “service centers”
3. Via an exchange market such as the London Metal Exchange

Baosteel, the largest steel producer in China, stated that their key driver for implementing and extending e-business applications was the need to align processes towards customer-centric operations. Baosteel successfully improved workflow operational efficiency by 60%, reduced order cycle time by 20%, and drove down process costs.

One of the key areas where e-commerce has been used to support sales-side processes has been to help with the development of e-marketplaces. e-marketplaces have been in use across many different industry sectors for nearly 10 years. At the height of the dot.com boom in 2000, it was estimated that there were nearly 211 e-marketplaces in use within the steel industry alone. These marketplaces were established at specific points across the steel value chain to service both individual groups of companies as well as the entire value chain. The primary benefit of e-marketplaces was that they provided a very simple way to exchange electronic documents with trading partners using only a web browser.

In North America, one of the key e-marketplace to survive, steelpartner.com, was established in 2001 by the American Iron and Steel Institute (AISI) who commissioned Northrop Grumman to re-invent the way in which metals inventory was managed. The marketplace, which was effectively sponsored by a consortium of steel producers, has since grown into an electronic supply chain community allowing mills, processors, warehouses and customers to communicate and track material across multiple locations. The subscription-based environment supports setup of product and processes, shipment of materials and associated receipts, reapplication of coils to new orders, inventory reconciliation between processes and mills, and output of a variety of standard reports. As Northrop Grumman handles all of the system maintenance and upgrades, none of the steelpartner.com users have to worry about maintaining their own systems—undoubtedly, a key factor in the success of this e-marketplace.

In Europe, however, no e-marketplaces have survived despite numerous efforts by the steel producers to establish these exchanges. The last active European steel e-marketplace, Steel24-7, closed in 2007. Steel24-7 was established in 2001 by the three largest steel producers in Europe—ThyssenKrupp, ArcelorMittal and Corus. The marketplace was tasked with creating a virtual communications hub in order to facilitate collaboration between buyers and sellers across the steel industry. The hub offered two key processes: transaction management and follow-up services. Transaction services included modules for forecasts, selling, auctions and order entries. Follow-up services included material call-off, document

“The GXS B2B platform had an immediate impact on our supply chain operating efficiency. We were able to quickly establish a successful business relationship with Ford Europe and many large downstream automotive enterprises in China. We were able to reduce inventory management with a key automotive customer to two hours, whereas it had originally taken two days. We can achieve this because we can integrate every segment of the supply chain through the B2B platform.”

—JOHN CHANG,
PRESIDENT,
BSTEEL ONLINE CO., LTD.
(IT BUSINESS UNIT OF BAOSTEEL)
management, and order progress. Associated integration services offered the ability for customers to integrate the Steel24-7 portal into their own back-office business systems.

In addition to implementing EDI solutions, some steel enterprises use online sales platforms to sell smaller volumes to specific customers. For example, in 2007 ThyssenKrupp North America purchased the Seattle-based firm Onlinemets.com, which functioned as an online retailer of hot-rolled, cold-rolled, and stainless steel-based products. Online metals will act as a counterpart to the company’s high-volume distribution segment. With the acquisition, ThyssenKrupp was seeking to widen its customer base to include low-volume commercial customers as well. Another customer interface, e-Arbed.com, attempted to establish an electronic sales platform for all suppliers and customers of Arbed’s distribution branch. Arbed was one of Europe’s largest steel manufacturers before it was taken over by the ArcelorMittal group. However, in 2003 the system was shut down due to a number of problems.

In retrospect, there were a number of reasons why e-marketplaces failed to gain traction within the European steel industry:

- **Steel Product Specifics**—Steel products tend to have numerous specifications related to product types, qualities, lengths and measures, mass tolerances, types of distribution, and accompanying certificates. Such specifications are difficult to translate into electronic processes.

- **Personalized Nature of the Steel Business**—Personalized customer care remains important for selling steel in a market environment that is largely driven by powerful buyers.

- **Price Reductions Sought by Customers**—Customers used electronic marketplaces mainly, or solely, to lower prices. They were reluctant to pay adequately for portal services.

In other regions of the world, such as China, e-marketplaces continue to act as one of the main methods for conducting business electronically across the steel industry value chain. However, due to the impending industry consolidation, it is expected that many of these marketplaces will disappear over the next few years. Additionally, Chinese manufacturers may follow the example set by the European steel producers and establish their own sell-side infrastructures for conducting business electronically with customers.

**B2B e-Commerce Standards**

The steel industry began conducting e-commerce with customers in the 1970s via EDI and, later, email. Today, most steel companies use customer-facing EDI to exchange only a few messages electronically, such as delivery instructions, dispatch advices, and invoices. Electronic invoicing, however, is critically important as it can facilitate and speed up payment processing across the steel industry. The steel industry was one of the first to adopt EDI, primarily driven by customer requirements for electronic business exchange. However, according to the *e-Business Watch* report, in Europe only 31% of steel companies acknowledged processing orders and related messages electronically; 26% claimed...
paper-based processing; and 43% utilized both methods (see Figure 1). The major differences were found in small firms (10-49 employees) and medium-sized companies (50-249 employees) at which most were using paper as the main form of business communication. In North America, the use of automated business document exchange is slightly higher, whereas in Asia, paper-based transactions are still primarily used.

![Share of Orders and Related Messages Processed Electronically in the EU Steel Industry (2007)](image)

The survey was conducted in seven EU Member States (Germany, France, Italy, Spain, Poland, Sweden, United Kingdom) and in the US. Base (100%) = companies with at least 10 employees and using computers, except answers of “don’t know”, N (Steel, EU-7 and US) = 433.

Weighting: Figures for sector totals and countries are weighted by employment (“firms representing x% of employment in the sector/country”), figures for size-bands in % of firms.

Source: e-Business Survey 2007 by the SeBW

**Figure 1 – Form of Business Communications Across Europe**

In addition to the more traditional EDI standards, such as ANSI X12 and EDIFACT, a number of other standards have appeared in recent years. The two most significant standards to emerge are COMPORD and ESIDEL.

The COMPORD (Computer Order) EDI standard, based on ANSI X12, was initially developed by AISI in the 1980s to support EDI communications in the North American steel industry. COMPORD and ANSI X12 EDI standards remain central to many business processes within the steel industry today. One such business process devised by AISI, the Evaluated Receipts Settlement process (ERS), is a payment method designed to remove paper-based invoices from transactions conducted between steel producers and processors (see Figure 2 below). The benefits of ERS include a reduction in clerical personnel and associated errors, elimination of duplicate and lost orders, decrease in mailing costs, and improved cash flow. This business flow, derived from a similar model developed by the Automotive Industry Action Group, has been widely adopted as a standard across the entire North American steel industry—once again demonstrating how the steel industry follows the lead set by key customers in the area of innovation.
ESIDEL (the European Steel Industry Data Exchange Language) was originally created in 2000 by a committee formed by the European Federation of Iron and Steel. The new committee called EDIFER (which was comprised of nine major European steel companies) was tasked with deriving the new ESIDEL standard in support of the growing interest in using the Internet to send electronic business documents. The ESIDEL standard supports the ordering, scheduling, shipping, invoicing and payment business processes across the European steel industry. In total, 32 different business documents/messages were identified for XML schemes development (see Figure 3 below).

<table>
<thead>
<tr>
<th>Business Process</th>
<th>Business Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic</td>
<td>Party information; sales catalog, including product specification</td>
</tr>
<tr>
<td>Ordering</td>
<td>Request for quote; orders; order change; order response; sales list; sales list - capacity selling; sales list bid; sales list bid response; order status request; order status report</td>
</tr>
<tr>
<td>Scheduling</td>
<td>Delivery schedule; just-in-time delivery</td>
</tr>
<tr>
<td>Shipping</td>
<td>Dispatch advice; packing list; receiving advice; inventory request; inventory balance; inventory movement; inventory switch; instruction to dispatch; goods ready for dispatch request; goods ready for dispatch balance; goods ready for dispatch movement; certificate request; certificate; return of goods notice; return of goods instruction</td>
</tr>
<tr>
<td>Invoicing</td>
<td>Invoice</td>
</tr>
<tr>
<td>Payment</td>
<td>Remittance advice</td>
</tr>
</tbody>
</table>

**Figure 2 – Evaluated Receipts Settlement Process**

**Figure 3 – Typical Message Types Used Across the Steel Industry**
Based on change requests from steel companies in Europe and Australia, an upgraded version of ESIDEL (1.1) was published at the end of 2005. Unfortunately, while the goal was to continue development of ESIDEL, it was ultimately abandoned since the original founding companies could not commit to resources. ESIDEL was the right approach in developing an Internet-based standard for the steel industry. However, although actively sought, a single standard requires international collaboration in order to move it forward towards global adoption. At this time, many of the aforementioned steel companies have reverted back to using more traditional EDI standards, such as ANSI X12 and EDIFACT.

Steel industries in other regions of the world, such as Japan, have developed a number of homegrown EDI standards, once again primarily driven by their customer requirements. XML has seen some significant traction in China. However, a recent report compiled by the automotive industry’s ODETTE organization concluded that automotive companies in China would continue to use both EDIFACT and XML-based standards until such time that XML matured to support all business processes within that particular industry. In the future, it is expected that the Chinese steel industry will follow suit and adopt both EDIFACT and XML as their preferred standards.

Of the European steel industry survey participants currently utilizing electronic standards, the majority (34%) continue to use EDI (see Figure 4 below). However, with e-business more widely used in North America, the electronic standards deployed by steel companies appear to be evenly split, with EDI at 32%, proprietary standards at 36%, and XML at 20%.

![Figure 4 – EDI Standards Used Across the Steel Industry](image-url)
Automating Efficiency Through B2B Adoption

Although B2B adoption across the global steel industry has been relatively slow compared with other industry sectors, progress is being made in many areas. North America remains the most advanced user of B2B solutions, followed by Europe and Asia Pacific. However, with the impending industry consolidation process in China, business process improvement must be made in order to secure the country’s position as the world’s top steel-producing nation.

Across all regions, there are numerous deployment opportunities where B2B automation could drive significant efficiencies throughout the steel value chain:

- **B2B Network Consolidation**—As a result of extensive mergers and acquisition activity, there is a continuing demand for consolidating ICT infrastructures. Consolidating B2B networks and moving to a single B2B provider can help to improve supply chain efficiencies. Introducing common standards for sending electronic documents and connecting to trading partner communities. Global connectivity via a single B2B platform is especially important for those steel producers operating in different regions of the world.

- **Back-Office Integration**—Many manufacturers are connecting external B2B integration platforms directly into back-office ERP systems, such as Oracle and SAP. This level of integration helps to improve the visibility of enterprise-wide information and ensures that all users across the extended enterprise have a single view of business-related transactions.

- **SME Enablement**—B2B adoption, especially across small- to medium-sized companies, is relatively low within the steel industry. Many employees who work within the sector are relatively low-skilled regarding IT solutions and, therefore, will need access to simple and basic B2B solutions. Simple B2B applications for small businesses are especially important in emerging markets such as the Chinese steel industry.

- **Improved Visibility of Steel Shipments**—The move towards providing steel products as part of a just-in-time process has led to a need for improved supply chain visibility into steel shipments and stock levels held at storage and service centers. Improved visibility into steel shipments and stock levels ensures high levels of product availability and minimizes the likelihood of production stoppages.

- **Aging Workforce Across the Steel Industry**—Due to extensive restructuring in the 1980s and a limited focus on recruiting younger engineers and ICT professionals, the steel industry will face an unprecedented shortage of skilled engineers over the next few years. With many steel industry employees nearing retirement age, steel companies will have to find alternative ways to manage their ICT and B2B infrastructure projects. Outsourcing the management of B2B infrastructures could be one way of addressing this problem.
**Industry Trend Towards Green Operations**—The steel industry is under extreme pressure to develop green and sustainable steel production and business processes. Replacing paper with electronic business invoices and developing green B2B infrastructures will certainly help companies improve their green sustainability credentials.

Due to the highly-fragmented nature of the global steel industry, many companies will continue to see immense levels of restructuring over the next few years. During this period of transition, it is important for companies to maintain continuity of supplier relationships across their trading community.

With further industry consolidation on the way, it will be more important than ever for steel companies to ensure that they have the correct B2B infrastructure in place. For those companies wishing to focus on their core competency, namely, steel production or processing, outsourcing the management of a B2B infrastructure to a vendor such as GXS can greatly help to lower costs and improve operational efficiencies across their supply chains.

**About GXS**

GXS is a leading global provider of B2B e-commerce solutions that simplify and enhance business process integration and collaboration among trading partners. Organizations worldwide, including more than 70 percent of the Fortune 500, leverage the on-demand services on GXS Trading Grid® to extend supply chain networks, optimize product launches, automate warehouse receiving, manage electronic payments and gain supply chain visibility. GXS Managed Services, GXS’ B2B outsourcing solution, empowers customers with the expertise, technical infrastructure and program support to conduct B2B e-commerce with trading partners globally.

Based in Gaithersburg, Md., GXS has an extensive global network and has local offices in the Americas, Europe and Asia-Pacific regions. GXS can be found on the Web at www.gxs.com.
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