

# E-readiness of the Automotive Supply Chain:

## Just How Wired is the Supplier Sector?

**Presented By:**



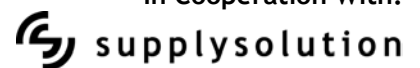
Center for Automotive Research  
Center for Electronic Commerce

Jonathan A. Morell, Ph.D. [jmorell@erim.org](mailto:jmorell@erim.org)

Bernard F. Swiecki [bswiecki@erim.org](mailto:bswiecki@erim.org)

© ERIM 2001

**In Cooperation With:**



The right information...right now.

[www.supplysolution.com](http://www.supplysolution.com)

[info@supplysolution.com](mailto:info@supplysolution.com)

## Table of Contents

Acknowledgements.....	1
Introduction.....	2
The Importance of E-Business to Automotive Supply Chains.....	3
Methodology.....	4
Findings.....	5
Conclusions.....	12

## Acknowledgements

This report was made possible by the contributions of several ERIM staff members. Sean McAlinden was instrumental in the focus group interviews, questionnaire design, and data analysis. Dave Cole, Director of CAR, provided guidance and direction throughout the project. Amelia Holmes provided data entry and statistical results. Gina Alexia provided assistance with the creation of the final report document.

Special thanks also to SupplySolution, Inc., who served as sponsor of the research project. For more information about SupplySolution, please visit [www.supplysolution.com](http://www.supplysolution.com).

## Introduction<sup>1</sup>

E-commerce plays a key role in the function of today's automotive industry. As an increasing number of transactions are carried out online and relationships among industry participants grow ever more complex, it is poised to continue to grow in significance.

The automotive industry has historically used very large supply chains. Even during the industry's earliest days, Original Equipment Manufacturers (OEMs) purchased the bulk of the parts used in their products from suppliers, rather than making them in-house. Barriers to entry were low and the market was crowded with a plethora of OEMs.

A trend towards vertical integration then swept the industry for several decades. This new business model eliminated many of the smaller OEMs who could not afford the capital investment it necessitated. Most either merged with larger firms or disappeared altogether. Automakers sought to reduce costs by making their own components and even producing their own raw materials.

Over the last few decades, OEMs have once again been relying more on suppliers for components and functions they once did on their own. Even individual parts units, such as Delphi and Visteon, have been spun off from their parent OEMs. In addition to supplying modules, suppliers are now relied on for a significant portion of the engineering of key vehicle components.

A key driver of the increasing complexity of industry relationships is the trend towards modular sourcing. Under the modular sourcing model, OEMs purchase preassembled sections of a vehicle from suppliers. The module is generally built of components supplied by several lower tier suppliers. This paradigm requires unprecedented collaboration between the OEM, the supplier providing the module, and the suppliers from which the module is sourced. A new supplier tier, referred to as the 0.5 tier suppliers, has appeared on the automotive landscape. These suppliers maintain extremely close relationships with OEMs and have final responsibility for managing suppliers of lower tiers.

As the relationships between OEMs and suppliers grow ever more complex, with increased interaction between participants of different tiers, e-commerce is emerging as a necessary tool and enabler of this new business paradigm.

This study investigates the current state of e-commerce in the auto industry and its contribution to the business function of the industry's participants.

---

<sup>1</sup> The information reported here draws from our research program, which explores the impact of e-business on the behavior and structure of supply chains. Areas covered within this research program include: interoperability needs to support integration, product data quality, autonomous agents and emergent behavior, best practices, single point management, and metrics and evaluation.

## The Importance of E-Business to Automotive Supply Chains

Outsourcing has been an established trend in the automotive industry for many years. Against this backdrop, strong business drivers are posing ever-greater demands on coordination across multiple tiers of automotive supply chains. Coordination requires data exchange.

- Requirements for shorter design time (the “12 month car”) will necessitate a greater volume of time-critical product data.
- Requirements for fewer final assembly hours (the “10 hour car”) imply that OEM’s will purchase more complex components, thus increasing the complexity of product data flow.
- Requirements for shorter order fulfillment time (the “7 day car”) mean a greater volume of inventory and production schedule data.

E-business is important because it can lower the transaction costs of all this data exchange. If appropriate e-business products and services are available, the automotive industry will use those products and services to adapt to its business drivers, thus affecting its own business climate. That climate change in turn, will create new opportunity for e-business vendors. The e-business sector, in turn, will have to adapt to its changing business climate by developing new marketing plans, new products, and new services. As these dependencies play out, the automotive industry and the e-business industry will co-evolve.

What are the present conditions that will set the direction for this co-evolution? While coordination between OEMs and First Tiers is already well developed and well supported by e-business, conventional wisdom has it otherwise with respect to lower tiers. The condition at those lower tiers is important because for the automotive industry to succeed, *enterprises*, not just *collections of individual companies*, must function well. What then, is the e-business readiness of the lower tiers of the automotive industry? This study was an attempt to find out.

## Methodology

The research for this project was conducted in two steps. The first was a series of focus group interviews. Top executives in charge of purchasing and supplier e-commerce from three large system integrators were interviewed on their firms' supply chains. Topics covered included the extent to which e-commerce is used in the supplier's supply chain, what kind of transactions were taking place, and the means used to measure the amount of supply chain activity.

The knowledge gained from the focus group interviews was used to assemble a questionnaire focusing on the extent to which system integrator level suppliers use e-commerce with their suppliers. Particular focus was applied to how capable 2<sup>nd</sup> and lower tier suppliers are to implement e-commerce initiatives and apply them within their business practices. The questionnaire was then reviewed by several focus group participants and their recommendations were implemented.

The questionnaire was then used to survey a sample of the 46 First Tier suppliers with the highest North American automotive sales. The firms were chosen based on their ranking in the *Automotive News Market Data Book 2000's* Top 150 North American Suppliers list. In order to gain knowledge on the responding firms' supply chains, the questionnaire was addressed to the head of purchasing at each sample firm.

Responses were obtained from sixteen firms. The respondents represent a significant portion of North American automotive supplier sales. Total 2000 North American automotive sales for the respondents were \$70.2 billion. The average respondent had 2000 automotive sales of \$4.4 billion. On average, each respondent managed a supply chain consisting of 1,303 suppliers.

## Findings

Within 12 months, 77% percent of the respondents will decrease the number of their suppliers by an average of 21%. As this consolidation takes place, First Tier suppliers will place an ever-greater emphasis on e-business. The extent of the growing importance of e-business is shown in Table 1, which summarizes responses to two questions: “How important is it that you do e-business with your production parts suppliers?” and “Do you select any production parts suppliers on the basis of their ability to do e-business with *their* suppliers?”. On a four-point scale, the average increase in e-business importance increased from 2.6 “today”, to 2.4 “in 2 – 3 years”. The direction of change is consistent for all three activities we presented to respondents – demand planning and management, engineering design, and procurement. Further, there is strong reason to believe that First Tier suppliers will cause e-business to permeate their supply chains. Today, only 15% of respondents insist that their suppliers do e-business with *their* suppliers. That figure will rise to 77% within 2 – 3 years.

**Table 1 - Importance of E-Business**

How important is it that you do e-business with your production parts suppliers? *	Today	In 2-3 years
Demand planning and management	2.4	3.4
Engineering design	2.5	3.2
Procurement	2.9	3.5
Average	2.6	3.4
*4 point scale 4= required for success		
Do you select any production parts suppliers on the basis of their ability to do e-business with <i>their</i> suppliers?	15%	77%

First Tier suppliers are prepared to invest heavily to support their increased reliance on e-business. Respondents' best guess as to the share of their companies' overall capital spending devoted to implementing e-business will increase from an average of 3% today to 13% within 2-3 years. As Table 2 shows, respondents expect quite a lot from their investment. Averaged across engineering, procurement, and quality assurance, the expectation is for a change in the "cost reduction impact of electronic business" to rise from 4.7% today, to 17.7% in 2 – 3 years.

**Table 2- Expected Cost Reduction Impact Due to E-Business**

What is your best guess as to the cost reduction impact of doing e-business with your production suppliers?	Today	When e-biz plans are implemented
Engineering, product design	4%	18%
Procurement	7%	16%
Quality assurance	3%	19%
Average	4.7%	17.7%



Precisely how will that cost reduction actually come about? We investigated this question for specific business activities grouped under three broad categories: “procurement of production parts”, “collaborative engineering”, and “demand planning and management”. For each, we determined the percentage of suppliers with whom respondents do e-business now, and with whom they plan to do e-business within 2 - 3 years. On average, reported changes were: Procurement of production parts 10% → 49%, collaborative engineering 16% → 67%, and demand planning 20% → 65%. These data, with specific activities in each category, are summarized in Tables 3, 4, and 5.

**Table 3: Specific E-business Activities With Suppliers:  
Procurement of Production Parts**

<b>Procurement of production parts: What % of your suppliers will you do e-business with?</b>	<b>Today</b>	<b>2 years</b>	<b>Difference</b>
Request for bids/proposals	25%	76%	51%
Catalogues - search suppliers general catalogue	9%	45%	36%
Catalogues - search based on specially negotiated prices	3%	41%	38%
Reverse auctions	4%	34%	30%
Mean	10%	49%	39%

**Table 4: Specific E-business Activities With Suppliers:  
Collaborative Engineering**

<b>Collaborative Engineering: What % of your suppliers will you do e-business with?</b>	<b>Today</b>	<b>2 years</b>	<b>Δ</b>
Send, receive interoperable CAD files	25%	73%	48%
ECNs - transmit, version control, tracking	18%	72%	54%
Joint product design	12%	63%	51%
Maintain a common database	7%	58%	51%
Mean	16%	67%	51%

**Table 5: Specific E-business Activities With Suppliers**

Demand Planning and Management /or Inventory Management: What % of your suppliers will you do e-business with?	Today	2 years	Δ
Computer to computer communication between you and your supplier	41%	85%	44%
Send orders and releases	33%	81%	48%
Receive advance ship notices	30%	77%	47%
Track shipments in transit	27%	76%	49%
Checking parts availability	0	66%	62%
Just in time	23%	63%	40%
Vendor managed inventory	12%	59%	47%
Computer to human communication - automated on your end	27%	51%	24%
Observe your suppliers' inventory or production schedules	0%	49%	49%
Observe your suppliers' suppliers' inventory or production schedules	2%	40%	38%
Mean	20%	65%	45%

First Tier suppliers are investing a lot in e-business and expecting a large ROI to manifest itself across a very broad range of business activity. What does this expectation translate to in terms of the percentage the supply base that can, and will have to, do e-business? At present, depending on the business activity, between 14% and 49% of the supplier base is capable of e-business. Within 2-3 years, the range will have to shift from a minimum of 54% and a maximum of 78%. These numbers include questions about generic electronic capability, e.g. “computer to computer communication”. When the question is narrowed to focus on specific business activities, (e.g. “finished goods inventory”), the range for “today” becomes 15% - 28%, while the range for expectations “within 2 – 3 years” shifts to a minimum of 63% and a maximum of 70%. (See Table 6 for details.)

**Table 6: Amount of E-Business**

Approximately what percent of suppliers do you do e-business with?	Today	2 - 3 years	Δ
<b>Generic E-business capabilities</b>			
Computer to computer communication - automated on both ends	49%	78%	29%
Computer to human communication - automated on your end	29%	56%	27%
<b>Specific business activities</b>			
CAD interoperability or similar CAD systems	28%	63%	35%
Production planning	23%	70%	47%
Logistics / order tracking	18%	66%	48%
Integration between data sent to suppliers and their internal systems	15%	59%	44%
Catalogue pricing	15%	54%	39%
Finished goods inventory	14%	63%	49%

Will the industry be capable of meeting these demands for e-business? Two questions provide insight on the answer. The first asked respondents to assess the hurdles to e-business that their suppliers face. The second asked for respondent's own concerns about the industry's pending reliance on a common industry portal. The data are summarized in tables 7 and 8. As for hurdles faced by suppliers, no single problem emerges as a showstopper. On a four-point scale, most items range between 2 and 3, no single item scores higher than 3, and the average rating is 2.4. (Recall, however, that this data represents the opinions of buyers about the capabilities of their suppliers. A second study is being planned to check on the reality from the point of view of the sellers.) As for portals and security concerns, respondents do worry. With regard to these issues, on a three-point scale of concern, ratings average 2.4.

**Table 7: Hurdles to E-business Among Suppliers**

What are the hurdles to e-business among your suppliers?	
	Impact*
<b>Conflicting e-business demands</b>	
Companies within auto	2.5
Companies outside of auto	2.1
<b>Human resources</b>	
Staff skills	2.5
Outside help	1.6
Leadership	2.3
<b>Technology</b>	
Supporting applications	2.5
Supporting hardware	2.2
<b>Cost</b>	3.0
<b>Hesitation before the unknown</b>	2.7
<b>Average</b>	2.4
<i>*4 point scale, 4 = most important</i>	

**Table 8: Concerns About Portals**

Concerns about putting proprietary information on a site not under your direct control	Level of Concern*
Security of posted information	2.7
Assurance of site longevity	2.5
Cost	2.5
Technical issues in maintaining interfaces	2.5
Average	2.4
* 3 point scale, 3 = most important.	

## Conclusions

The overall trend in the automotive industry will be for a fewer number of direct suppliers to the First Tier, and for e-business to play an increasingly important role in the business that is done among the remaining companies. First Tier firms will invest a lot of money in electronic business, and will expect a lot in return. They expect that e-business will provide benefit over a very wide range of activities, and that, as a result, coordination will be improved not just between adjacent tiers, but also, across multiple tiers of suppliers.

To meet these demands, a large number of companies will have to become e-business capable across a broad variety of business processes. It is an open question as to how easy that transition will be. First tier suppliers do not see any single factor as being an overwhelming impediment to their suppliers' ability to do e-business. (Although they are personally concerned about the vulnerabilities attendant to reliance on a common industry portal.) Understanding the reality from the suppliers' point of view, however, must await a survey that is now being planned, and which will query those Second Tier suppliers directly. From their point of view, a number of mid-level difficulties may aggregate to major implementation problems. Also, suppliers may see what seems like a minor problem to a customer as a major difficulty.

Overall, e-business is destined to define standard practice in the automotive industry. To date, the automotive and e-business sectors have made a good start in supporting each other's business needs. We are confident that powerful e-business processes will continue to develop at the OEM/First Tier level. The industry is poised to repeat that development at lower tiers. This deployment will be critical if e-business is to fulfill its potential as a tool for *automotive enterprises* as opposed to a method of helping isolated groups of trading partners.