



CENTER FOR AUTOMOTIVE RESEARCH

ENERGY, ENVIRONMENT, & TRANSPORTATION DIVISION OF ALTARUM

# Computer Assisted Collaboration in the Automotive Industry:

## What Are the Complex Problems and How Are Decisions Made?

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## SUMMARY

Market forces are driving the automotive industry toward shorter design times, shorter order fulfillment cycles, and fewer labor hours in final assembly. To cope with these changes, automotive supply chains are becoming more diverse, and their information environments more complex. Our research program has been studying how automotive supply chains are adapting to these realities. Our view is that the most robust, adaptable, and powerful information exchange systems will prove to be those which combine automated processing for activities that are routine and predictable, with transactions that are *assisted* by information technology, but which are, ultimately, human activities.

Here we summarize the beginnings of our exploration of this belief. We report on a small-scale interview project that we hope will prove valuable in its own right, but whose main purpose was to set the stage for larger, more in-depth research. The intent of this research was to identify events whose management requires both heavy doses of human interaction, *and* rich collaboration among many different functions within a company. It is our belief that these events will prove the most desirable targets for improving enterprise functioning by improving information flow and information access.

Interviews were conducted with 12 people in five companies. Respondents were asked to identify events that fit our criteria as being heavy in need for both human interaction, and cross-functional collaboration. Sixteen scenarios were identified, fourteen of which could be placed at various stages of the product development life cycle, and two of which were cross-cutting issues. Data analysis proceeded through two stages: 1) categorize patterns of information flow in each scenario, and 2) identify the nature of problems within each pattern.

Five “information flow” patterns emerged: 1) integration of diverse input into a single format, 2) transmission in different formats of information that was generated in a single format, 3) synthesis of diverse information to make a decision, 4) identification and retrieval of information from far-flung sources within a company, and 5) restricted information flow into the organization from outside sources. Once these patterns were mapped to the information scenarios, the next step explored *why* each information management scenario was problematic. Five types of problems emerged: 1) legacy systems, 2) dollar cost, 3) complexity of cross-linked problems, 4) uncontrolled input from the outside, and 5) reliance on human knowledge because data were not systematically captured.

Given our focus on computer-assisted decision-making, eleven of the information management scenarios warranted further analysis. Three conclusions emerged from this exercise. First, while most of the scenarios fell at well defined points on the product development life cycle, the attendant information flow problems were spread across the life cycle. For instance, early-stage design engineers may be unable to identify, access, or use potentially relevant information which emerged from warranty and repair activities. Second, technical, as opposed to business data, posed the greatest problems. However, this observation should be tempered by the makeup of the sample, which was comprised of people with operational, as opposed to long term strategic, perspectives. Finally, there is a lot of information flow of technical data across organizational boundaries. However problematic internal information management and collaboration processes may be, these activities are at least bound by a single organizational culture, and by whatever consistency a corporation is able to impose on its divisions and personnel. As a result, these activities are relatively amenable to automation, or at least to a combination of partial automation and a high degree of routinization. When organizational boundaries are crossed, the internal discipline of a single organization is replaced with

contractual arrangements and informal ties of trust that may or may not have developed over the years among personnel in different companies. Such cross-company transactions are among the most complex and unpredictable in the business world, and hence, are the least amenable to simple, IT-based solutions.