

PERSPECTIVES ON THE BUSINESS CASE

The discussion of triggers and barriers suggests that a credible business case is the single most important hurdle for a new technology implementation decision. When market leaders are driven by the pursuit of competitive advantage to enhance profitability, a strong business case is a potent trigger for action. When market followers eye benefit estimates skeptically, the business case can be a barrier to action.

Benefits

The clarity and believability of benefit estimates are the heart of the business case. FHWA asked private-sector freight stakeholders which benefits were most important to them and how they set out to achieve those benefits.

In a series of discussion of trigger points, FHWA asked freight professionals to weigh the importance of four goals when considering new technology: 1) increasing efficiency, 2) improving service, 3) assuring compliance, and 4) “others.” Since this was far from a scientific survey—the numbers were small and the approach informal—one should not attribute too much importance to the results. However, there were interesting themes in what freight professionals told FHWA:

- Shippers gave equal weight to efficiency and service, rating them twice as important as compliance.
- Motor carriers weighted the choices relatively equally, with improving service ranked first.
- Marine carriers and terminal operators strongly favored efficiency over service and compliance, which was a close third.
- The rail industry respondent put safety and compliance far ahead of efficiency and service.

When the discussion turned to perceived benefits, the greatest emphasis went to cost

reductions (efficiency improvements) as the key to improved ROI. Marine and rail responses emphasized labor cost savings; terminal operators called out gate process improvements and faster turnaround time; and shippers and motor carriers emphasized other benefits, including improved reliability and theft reduction.

No respondent mentioned potential revenue or market share gains, although it seems fair to think of improved reliability as a goal related to market share. The silence on revenue-related goals may reflect the difficulty of making a case to internal skeptics about quantifiable changes in customer behavior, which is certainly more difficult than making a convincing case for cost reductions.

Costs and ROI

The credibility of a business case depends on the project costs as well as benefit estimates. Our industry collaborators mentioned no difficulties or controversies about project cost estimates, but there were many comments about ROI.

From a textbook perspective, the crucial juncture in a business case is the integration of costs and benefits in terms such as benefit/cost ratio, net present value, or return-on-investment: projects that pass a value hurdle are implemented or put on a return-based priority list. The research for this report and the experience of the FOT program, however, show that is not always the case. There is also a wide range in behavior.

One shipper in the interviews described disciplined use of quantitative analysis and modeling; over two years their ROI was 10:1 on a series of innovations, including electronic shipment tracking designed to reduce theft. The ROI panel mentioned earlier in the report emphasized the importance of 12- to 18-month payback targets for new projects. One carrier in an interview said that, despite “significant” estimated dollar benefits from new asset tracking tools, his firm decided not to implement the technology until costs come down further because the total cost ran afoul of a corpo-

rate priority to limit investments and expenditures. In contrast, an air carrier on the edge of bankruptcy elected to invest \$25 million in RFID baggage tracking technology because managers saw the potential to reduce expenses related to lost and misdirected luggage.⁷

SUMMARY OF BENEFIT ESTIMATES

The long-term trend towards successful and productive deployments of intelligent freight technologies is clear; however, it is important to recognize that private firms base implementation decisions on discrete business analyses, not long-term trend assessments. This section pulls together the concrete benefit estimates and conclusions from the FOTs and other tests, summarizing them in Table 2.

The data show that intelligent freight technologies can make dramatic contributions to operating efficiency, service quality, and shipment integrity. However, the technologies are not mature across the board and many benefit scenarios are incomplete. **Mobile long-distance communications** platforms are a potent value multiplier, as shown by their wide adoption in the truckload industries and the per-tractor benefit numbers in row 1 of Table 2. Untethered trailer and container chassis tracking, however, is not nearly as mature. The data in row 2 show meaningful benefits per chassis, but also indicate why, at today's price points, mobile chassis tracking offers a less compelling business case than tractor fleet management. Given the recent growth in untethered trailer tracking, more data on the economics will be generated by other sources.

⁷ Barnaby Feder, "Delta to Invest in Radio Tags for Luggage at Airports," *New York Times*, July 1, 2004.



TABLE 2 • QUANTITATIVE BENEFIT ESTIMATES

Source	Dollar Range	Unit of Measure
1. Asset tracking, mobile communications (reference 6.B)	\$7,866 to \$15,222	Annual savings per tractor
2. Asset tracking, chassis tracking (reference 5)	\$210.35	Annual savings per chassis
3. Asset tracking, containers with RFID (references 7.A and 7.B)	\$400	Benefits to shippers per container load
4. Freight status information, ESCM and biometric ID* (reference 1.B)	\$16.20	Time and labor savings per air freight shipment
5. Gateway facilitation among ports, highways, and border crossings (reference 2)	\$12.8 to \$24.8 million	Annual savings
6. Network status information, FIRST-like capabilities (reference 3)	\$21.36 to \$247.57	Savings per terminal trip

**Estimates developed from FOT test measurements; all other estimates developed from models and simulations.*

RFID asset tracking shows clear promise as reflected in row 3. The \$400 per container benefit estimate rests on small samples, but if further tests confirm that estimate for shippers, then the total benefits will be much larger. If shippers can reap those benefits, then it stands to reason that carriers and terminal operators would also be capturing efficiency benefits.

The per shipment benefit estimate in the ESCM FOT is one of the most positive results to come out of the FOT program (row 4). Combining biometrics, smart-

cards, and electronic manifests, the FOT showed that a mix of security- and efficiency-related technologies could yield benefits on both fronts. Those results helped generate the enthusiasm of our industry supply chain partners in the new EFM FOT.

Established gateway facilitation applications are clear winners, as shown by the wide acceptance of CVISN transponder programs and electronic toll payment. The estimates in row 5, while they examined benefits across ports, highways, and a border crossing, are of more value to public officials than to private firms. The estimates in row 6, however, should be more useful to draymen, terminal operators, and others. Those estimates show substantial per trip savings from the application of network status information in a port gateway facilitation system.

LESSONS LEARNED FROM THE FOT PROGRAM

The feedback FHWA received on the FOT program indicates that it delivers value, that much of the program is well-founded, and that there are things that can be done to improve it. The feedback is consistent with FHWA's self-assessment, and FHWA is working to reinforce program strengths and improve areas that need improving.

The *purpose* of the FOT program is to accelerate the introduction of effective new intelligent freight technologies. Its *approach* is shared-cost testing of highly promising applications in operating environments and making useful independent test assessments available for deployment decision processes of market leaders. Input from industry largely endorses the purpose and the approach. In effect, FOTs help build the business case for successful applications. They demonstrate whether an innovation can be implemented and performs as advertised; they provide cost confirmation; and they deliver a benefit analysis, all vetted by an independent evaluator. FHWA's trigger analysis indicates these are all important ingredients.

Industry told FHWA that the FOTs help potential users assess new intelligent freight



technologies. Most of FHWA's interviews reinforced the message, particularly those with motor carriers and port operators. FHWA was pleased to see that potential users found the government-sponsored test results to be more useful than did the technology providers.

The FOTs succeed more in identifying and calibrating potential benefits than in generating hard data from the tests themselves. Table 2 illustrates both points. The evaluation models and simulations combined with test data show the significance of possible benefits, but the small test sets limit the statistical value of the results. FHWA and JPO are working to design new FOTs, such as EFM, to produce larger data sets.

Several FOTs brought home the lesson that, to the extent possible, FHWA and its partners should design projects so that test process data flows are integrated into operational systems. When the test process is simply added on as a parallel path, it distorts the assessment of costs and benefits.

FHWA certainly received positive feedback on the independent evaluation program. Most potential technology users consider data from outside sources in their decision process, but they consider the source in weighting the value of the information—and independent evaluation ranks high. FHWA expects to enhance the value of the independent assessments by asking evaluators to design tests that yield more comparable cross-project results.

No firm should decide to deploy new technology or processes simply because of results reported from an FOT. Each firm is responsible for its own due diligence in such decisions, but FHWA is confident that the FOT program offers useful and valued input to many deployment decision processes.

PUTTING THE RESULTS IN THE LARGER CONTEXT

Intelligent freight technologies are, as we have seen, continuing expressions of the communications and IT revolution in the domain of freight transportation. The technology trends are in the right direction, but there are barriers that work against implementation. The challenge is to accelerate progress—not rush, but accelerate—and thus increase the present value of intelligent freight benefits for firms and for the economy.

This report and the FOTs have shown there are benefits for firms to harvest from intelligent freight technologies. As more firms deploy such solutions, the first-order network effects will kick in, driving down deployment costs, increasing participation, and enlarging the total flow of benefits. And as the benefit flows grow, supply and demand curves should begin to shift for industries that depend on freight transportation. To the degree these technologies are used to expand the effective capacity of our transportation system, and to the degree firms succeed in using the technologies to capture efficiencies, improve reliability, and enhance shipment integrity, then it is reasonable to expect second-order freight network benefits to kick in, boosting national productivity and prosperity.



