# Globalizing HSFO Marketing

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*Abstract*. The process of building a system dynamics simulation model helped a firm competing in the HSFO (high-sulfur fuel oil) market add US$120,000 per day to its revenue, yielding a sustainable increase in profit of 62 percent. These benefits resulted from globalizing its HSFO marketing strategy while building a new internal competency, namely using system dynamics models to support strategy design (Fig. 1).

Recent changes in the HSFO industry created a trend by its users to turn global (i.e., buy fuel for their ships on a coordinated basis for decentralized use), and projections of a declining growth in the demand for high-sulfur fuel oil. Typically, declining growth in industry demand intensifies rivalry among existing competitors. Internally, players in the supply chain upgraded their refineries and thereby reduced the availability of equity HSFO, in some cases from 75 to 25 percent, causing marketing desks to restructure in order to incorporate trading activities for outsourcing fuel. Together, these internal and external changes increased uncertainty about strategy design and adequacy of organizational objectives. Before this intervention, for example, the operational focus of profit centers—each trying to maximize its own revenue and profit independently—provided a poor fit between the business environment and the strategy of firms competing in the HSFO market.

Fig. 1
Using system dynamics to support strategy design

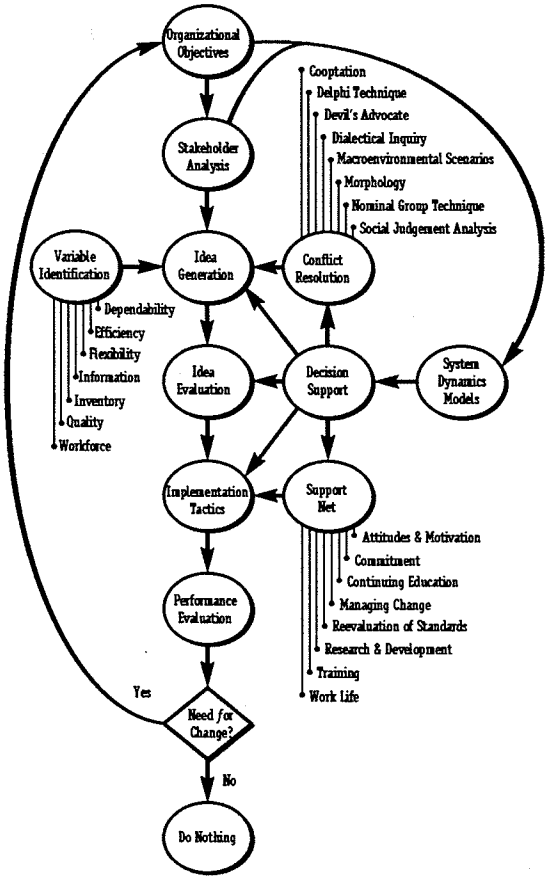



Fig. 2
Globalization framework with potential benefits
(Adapted from Yip, 1995, pp. 4-17)

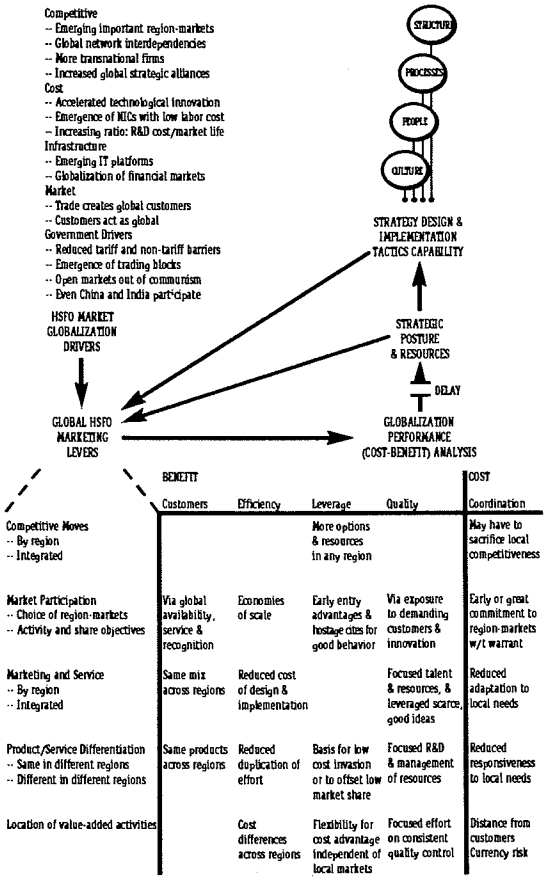
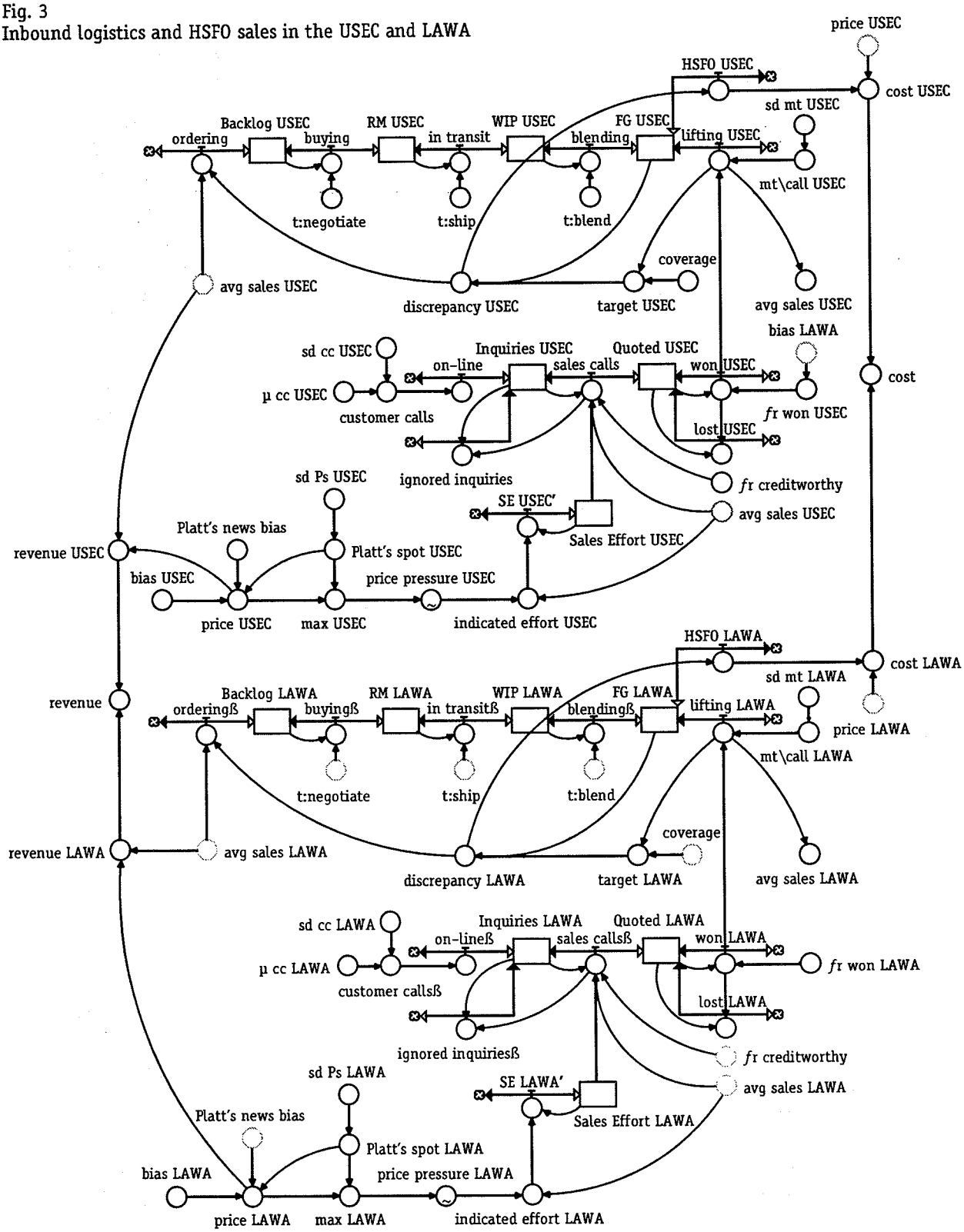


Fig. 3
Inbound logistics and HSFO sales in the USEC and LAWA



The process of building a system dynamics simulation model helped develop a profitable solution to this problem. In marketing HSFO to customers with a global spread of activity and fuel needs, a sustainable advantage stems from the integration of activities shared among global regions. If ship owners looking for fuel worldwide must coordinate their HSFO liftings away from home, then this is precisely what HSFO marketers can help them do, and in so doing turn their core business around into an exceptionally profitable one. The solution requires understanding the process of globalizing the strategy of HSFO marketing.

Existing strategy frameworks (see Fig. 2 for an example) initially helped to elicit management knowledge about HSFO marketing and to structure team discussion. These conceptual frameworks, however, much like off-the-shelf computer models, tend to be too general and vague. Custom-built system dynamics models, on the other hand, force clear thinking about the specific decisions that lead to strategy and business process redesign. The process of building the system dynamics model of Fig. 3 helped our team of HSFO marketers understand the relationship between an articulated global strategy and their firm's capacity to implement that strategy. Sustainable improvements followed in revenue and profit.

The model Fig. 3 as well as its influence diagram of Fig. 4 enhanced management dialogue. Custom-built with the help of managers, the model tracks changes in pricing tactics that exploit the firm's competitive advantage in the LAWA region. One possible scenario computed with the model shows that a 2.63 percent quantity discount given to global customers in LAWA (i.e., Panama) can rapidly increase the inquiries won in the USEC (Fig. 5.a). Within thirty days from its implementation, this single change causes revenue both in the USEC and the LAWA regions to rise by US$120,000 per day, leading to a sustainable increase in profit of 62 percent (Fig. 5.b).

Fig. 4
Causal-loop structure underlying HSFO marketing in the USEC and LAWA regions

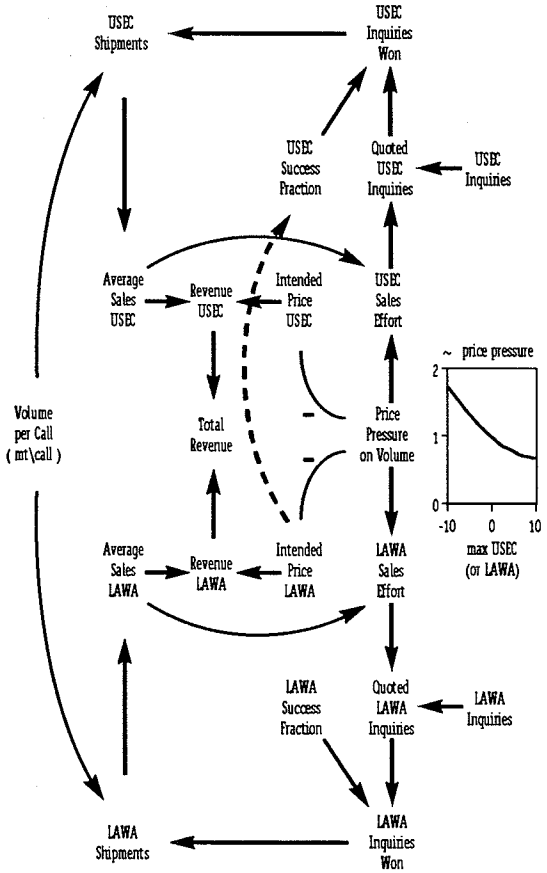
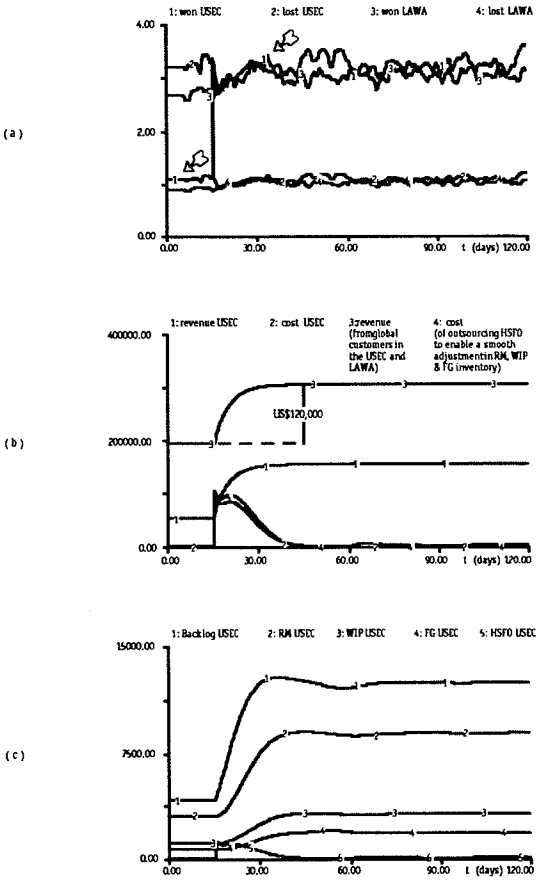



Fig. 5
Simulation results



The US$2.50/MT discount in LAWA at time t = 15 causes inquiries won in the USEC to increase instantly. Within thirty days from its implementation, at t = 45, this single change causes revenue from global customers in the USEC and in LAWA to rise by US$120,000/day. By then, the cost of outsourcing HSFO has dropped to zero, yielding a sustainable increase in profit of 62 percent.

As Fig. 5.a shows, however, the inquiries won in the LAWA region also increased after t=15 days. Initially, the modeling team expected revenue in LAWA to drop as a result of the US$2.50 discount given to global customers in that region. The team members were willing to trade off a few dollars of revenue in LAWA in exchange of a—hopefully—large gain in the USEC region. However, the simulation results showed how the redesign of HSFO marketing can bring about a *tradeoffs-free*, win-win outcome (Georgantzas, 1995).

Although counterintuitive at first, the unexpected increase in revenue in the LAWA region results from the increase in the number of inquiries won in LAWA. This increase in inquiries can be attributed to the graphical table function of the price pressure in LAWA (Fig. 3), which is shown next to the influence diagram of Fig. 4.

That is, the price pressure on volume—a change in which affects the sales effort in LAWA—is itself affected by the change in the intended price in the region. Because of this inverse relationship, indicated by the negative sign next to the arrow connecting intended price to price pressure, the US$2.50 discount given to global customers in LAWA, not only causes the USEC success fraction to increase (broken-line arrow of Fig. 4), but also increases price pressure in LAWA. As a result, the firm's sales force in LAWA feels pressured to sell more to global customers locally, thereby causing the quoted LAWA inquiries to rise, which in turn causes the inquiries won in LAWA to increase (lower right of Fig. 4).

The additional inquiries won, however, may bring about risk exposure, a phenomenon frequently observed in the trading of financial instruments as their markets mature. This fear of exposure to credit risk led to the addition of the *fr* (fraction) creditworthy parameter in Fig. 3.

The outsourcing of fuel from local competitors within each region, which has been a common industry practice, was necessary in order to allow for a smooth adjustment of the Backlog (USEC and LAWA), RM (raw material), WIP (work-in-process) and FG (finished goods) inventory stocks. Without the outsourcing (i.e., the HSFO USEC and HSFO LAWA flows of Fig. 3), the long time lags of the HSFO inbound logistics (i.e., t:negotiate–time to negotiate the purchase of HSFO, t:ship—time to ship it, and t:blend—time to blend it in order to assure a consistent quality) would rapidly amplify any abrupt change in marketing, causing the inventory stocks to oscillate violently into a vortex pattern. Figure 5.c shows the inflow of outsourced HSFO in the USEC region (5: HSFO USEC) which helps to absorb the system's oscillatory tendencies and allows for a smooth transition in the Backlog, RM, WIP and FG inventory.

Figure 5.a shows the simulation results produced with the standard deviation parameters of:

customer calls (sd cc USEC and sd cc LAWA, respectively, Fig. 3) ,
the metric ton per call (sd mt USEC and sd mt LAWA, respectively, Fig. 3), and
Platt's spot prices (sd Ps USEC and sd Ps LAWA, respectively, Fig. 3)

set to their estimated values, while Fig. 5.b and Fig. 5.c show the simulation results produced with the value of these standard deviation parameters set to zero. Although extensive statistical estimation tests helped the model reproduce historical behavior patterns for the purpose of validation, turning the Lognormal and Normal distributions of customer calls and Platt's spot prices, respectively, into their respective degenerate functions (by using only their mean, i.e., 'μ' on Fig. 3, parameter values), allowed for a clear assessment of the benefits that resulted from globalizing HSFO marketing.

As a result of this intervention in the HSFO marketing firm, a team of 23 engineers was formed in order to identify additional opportunities for strategy and business process redesign, not only locally, but world-wide.

## References

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Yip, G. S. (1995) *Total Global Strategy: Managing for Worldwide Competitive Advantage.* Englewood Cliffs, NJ: Prentice Hall.