

TO CENTRALISE OR NOT?

STEVEN MASON and DAVID GRUEBELE look at the advantages and disadvantages of centralised distribution

To centralise distribution, or not to centralise distribution, that (with apologies to the Bard) is the question. Specifically, are there times when centralised logistics operations ought to be decentralised, lest the companies that control those operations suffer the suicidal fate upon which Hamlet contemplated? The answers, as we shall see, are varied, and they depend on software, geography, unpredictable events like the weather, and the relevance assigned to risk mitigation. Let us begin by identifying reasons for and circumstances concerning both centralised and decentralised models.

WHEN WILL CENTRALISATION WORK?

We observe first that centralised distribution models are optimal when one can objectively define and move goods over a closed system or network, and when that movement would be faster, less subject to error, and less costly than alternatives. When would such circumstances be true?

The first case is when (i) the quantity of each separate SKU that needs to be delivered is inversely proportional to the distance over which the delivery must be made; (ii) the quantity of each such good is maximised within a set of minimised destination radii; (iii) delivery is time-constrained; and (iv) the delivery schedule is stochastic, neither fixed nor easily predictable. We will call this the Concentrated Case.

The second clear-cut case occurs when (i) the distances are great; (ii) the number of unique SKUs is few; (iii) the quantities are high or, if not, the dollar value of each item is high; and (iv) time is not of the essence. We will call this the Dispersed Case.

The third case occurs when a centralized hub is used to pool risk factors and thereby reduces aggregate risk.

SITUATIONAL ANALYSIS – I

Let us use an analogue of the mathematical device of proof by contradiction and consider what happens when the Concentrated Case does not apply. Consider the example of very small quantities of large numbers of separate goods that would each need to be delivered to non-clustered geographic areas at arbitrary times. In other words, even if a cluster is geographically and temporally distinct from another, one would need to create clusters – ideally of both origins and destinations -- in order to establish the need for a centralised hub.

In some instances, the distinction would be at the level of a continent, and a North American, South American, European,



and Asian hub would solve the problem. In fact, localisation requirements for containering, packaging, labeling, routing, and other matters not internationally common could very well require different hubs (each of which would "understand" the localised regulations and requirements) in each logically and/or physically distinct area. In yet other cases, the distinction would be even finer-grained, and the hubs and associated localizations would need to be country-based (in Europe) or state-based (in the US).

THE ROLE OF SUPPLY CHAIN FORECASTING

Let us consider a concrete example in the matter of the Concentrated Case. A hub for harvested donor organs would be useless, because the location where the donor organ becomes available cannot be known ahead of time, and the type of organ (e.g., kidney, liver, heart is unknown a priori) and the destination of that organ would be geographically- and temporally-constrained. This leads to an essential rule: when forecasting is next-to-impossible, decentralisation becomes a necessity, and centralisation produces higher costs and waste, along with reductions in productivity. Getting goods to a hub faster is an exercise in futility if one doesn't know where and when they should be ultimately going. Thus, a single hub for beer, soda, or other perishables would be of less utility in the meteorologically diverse United States, but of greater value in Arctic or Equatorial regions, where the climates are both more homogeneous and more predictable (i.e., more accurately and reliably forecast).

Of course, the rule's converse is equally valid: where accurate forecasting is possible, centralisation (assuming sufficient quantity and timeliness) becomes a necessity, and decentralisation becomes a business's hemlock. The Arctic/Equatorial example above is but one instance where this converse rings true. Other cases would include a foundry that requires silicon, an automobile manufacturer that uses steel, and a bread factory that utilises flour. All would be more efficient if each could depend on predetermined shipments scheduled through automated supply-chain applications, and if a centralised hub enabled logistics enablers to synchronise every aspect of loading, transportation, and final delivery. Equally important, the more efficient these mechanisms, the more trading leverage that will arise out of the economics of comparative advantage.

Relevant corollaries of these rules are that good supply chain forecasting tools that enhance visibility can help the process of centralised distribution work. However, the absence of such tools suggests that centralisation will fail to produce the desired benefits.

SITUATIONAL ANALYSIS – II

What of the Dispersed Case? Suppose we are shipping \$100 million in supercomputers or in newly constructed space shuttles; or in antidote to a very rare, progressive neurological disease. For each example, the shipping distances (and obstacles) could be great, the quantities extremely low, the values extremely high, and the time not

critical. Here, a centralised hub is a bureaucracy-in-waiting, and serves no useful purpose. In fact, it actually becomes harmful. Moreover, the supply chain is neither large nor continuous enough to justify the use of forecasting tools.

Therefore, while centralised distribution strategies and hubs can solve many problems, the mere existence of logistical problems may be nothing more than a red herring auguring for centralisation.

CENTRALISED HUBS & RISK POOLING

Insurance companies manage risk by pooling it, and by charging fees based on actuarial statistics. Those at greatest risk pay higher premiums, but far lower than they would if individually insured. Those at lowest risk benefit, because their scarce demand for insurance payouts is exceeded by the high supply of premium dollars from large numbers of low risk policyholders.

By viewing a centralised hub metaphorically as an insurance "company," the use of the hub minimises risk and maximises returns to all those who use the hub, since a priori knowledge of risk cannot exist in a logistics environment. In this metaphor, the policyholders are the trading partners themselves, both on the buy and the sell side. Using a centralised hub to pool risks, yields the following benefits:

- Material can be quickly reconfigured for other customers (including its being shipped to an adjacent regional hub).
- Excess material can be utilized wherever it is needed, simply by moving it from the hub to the geographical spoke on the wheel. Since the material remains at the hub, it is equally accessible to all potential destinations. Since the demand is maximised, the odds of having to auction off the material at a low price are minimised. Moreover, the odds increase for trading with consortia that possess great buyer power.
- Pricing becomes more efficient, because one can establish and manage indices for spot pricing. As volume increases, price efficiencies increase, and the bid/ask spread narrows, thereby enabling more economically and geographically efficient transactions to occur. These greater efficiencies will also be driven by the selection and introduction of alternate suppliers into the trading and logistics networks.
- All of the foregoing translate into better management of volatility, which further encourages new parties to participate in a trading network that is mediated by objective market pricing mechanisms.

HOW CENTRALISATION CAN DRIVE SUPPLY CHAIN REENGINEERING

Let us now approach the problem from another angle. Suppose we take centralised distribution as a given, even if it is not recommended, and even if risk mitigation is unlikely to be a salient factor. Will this have any salutary effects on the rest of the supply chain or on the business itself? While it isn't yet possible to remake wide-scale geographies or change the weather on-the-fly, the answer

is that, yes, the a priori existence of centralized distribution would indeed provide a firm with the opportunity to reengineer its supply chain and business processes.

If, through a merger or acquisition, or through outsourcing partnerships, a firm acquires the capability to centralise, it would then be able to create clusters of business around its hubs. Whereas decentralisation (or the lack of centralisation) may have forced a company to compete in low-volume, high-price, time-insensitive goods, newfound centralisation capabilities would allow it to consider entering new markets, acquiring lower-cost, higher-margin, higher-volume product lines, and taking other measures to deal with current economic realities.

A high-volume, low-cost company may be suffering from too much competition and from having its margins eaten away by a raft of competitors. Rather than surrender its cause as hopeless, this type of firm should consider whether a low-volume, high-value item would set it apart from its competitors. If so, then by throwing off the yoke of margin-eating partners, this company could revert to a pay-as-you-go basis for logistics and achieve market dominance through quality, not quantity, and by selling to business customers where that quality is more important than the refusal to wait an extra few days or a week

Centralised distribution, therefore, can actually compel a firm to abandon its "old way" of doing business, to take more rational risks, and to include modern supply chain automation and forecasting tools as weapons in its competitive arsenal.

HOW DECENTRALISATION CAN DRIVE SUPPLY CHAIN REENGINEERING

Interestingly enough, decentralisation can itself drive supply change reengineering, but just on differently competitive grounds. For example, a high-volume, low-cost company may be suffering from too much competition and from having its margins eaten away by a raft of competitors. Rather than surrender its cause as hopeless, this type of firm should consider whether a low-volume, high-value item would set it apart from its competitors. If so, then by throwing off the yoke of margin-eating partners, this company could revert to a pay-as-you-go basis for logistics and achieve market dominance through quality, not quantity, and by selling to business customers where that quality is more important than the refusal to wait an extra few days or a week. The authors of the best-selling book *The Discipline of Market Leaders* noted that leading companies excel only in one of price, service, and quality. While centralisation supports an increase in the quality of service, decentralisation could be used to justify leadership based on quality per se.

QUO VADIS?

In this era of specialisation, no firm ought try to mix

centralisation and decentralization – at least on the same continent or within a holistically connected cluster. Within a single enterprise, these philosophies of distribution are inherently incompatible, at least at the divisional level. What firms need to do is to determine whether their existing and future core competencies are aligned with centralisation – or with its antipode.

The continuing economic downturn and ominous deflationary spiral into which America and perhaps Europe and Asia may be falling mean that market share, rather than profit, has again become the watchword for larger enterprises (Smaller ones need both right away.) Market share gains will depend on a firm's ability to demonstrate excellence in at least one of areas described previously. In this context,

centralised distribution offers firms a way to reorganise themselves around geographic and product-based Lines of Business (LOBs).

SUMMARY

As is the case in so many business challenges, there is no Holy Grail. Wisdom in logistics consists, among other things, of defining and validating process-based and mathematically-based models that are objectively verifiable and of applying these models to the problems of risk mitigation among diverse trading partners. In some cases, these models will point toward a centralized model as optimal; in other cases, they will point toward a decentralized model. It is a substantial and important task to match the reality of the outside world in which logistics processes must operate to an internal enterprise environment in which supply chains are planned and implemented. It is the job of sellers and buyers both to ensure that this task be as frictionless an endeavor as possible. **LS**

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