1 Company Strategy, Policy and Operational Decisions

A company’s strategy is a direction along which the company moves to achieve its mission. Strategy is a statement of very general guidelines. Strategy is a more general concept than policy. Several different policies can all be a part of the same strategy. Similar to the general to specific relationship between strategy and policy, we have the same relationship between policy and decision.

For example, when Columbus sailed for India (and mistakenly discovered America), his strategy was to go to west as far as he could. In order to achieve this strategy, he might have used several different policies: Using supplies meagerly, moving to northwest or southwest according to the direction of the wind, keeping a strict control of the sailors to avoid mutiny, etc. These policies in turn must have dictated specific decisions. To use food meagerly, Columbus might have occasionally told the cook to decrease rations for the sailors. To use gunpowder meagerly, he might have forbidden shooting in small engagements with the natives.

Another example comes from OM:

- Mission: Make profit.
- Strategy: Capture the market.
- Policy: Sell at least 10% below the market price.
- Operational decision: Sell at 20% below the market price for the next two weeks.

As these examples illustrate, a strategy resembles the root of a tree, policies resemble the several trunks of this tree and finally operational decisions resemble the brunches and leaves. As there is no clear distinction possible between a small trunk and a big brunch, we should not expect such a distinction between strategies and policies, or policies and decisions.

2 Sources of Difficulties with OM

Clearly OM is drawing unprecedented attention from the industry and from the academia because there are still many unresolved questions relating to OM. Effective OM is far from being trivial for the following reasons:

1. Operations are too big and complex to run efficiently. Furthermore, different parts of OMs are run by different people with different local objectives. These local objectives may be contrary to the overall OM objectives.

2. There is always a piece of operations under transition or there are always some parameters in operations that keep changing. Operations never become stable to allow for experimental learning or for building up the relevant experience and understanding. With the changes, past experiences are becoming obsolete constantly. Thus, many OM problems are new and it takes time to solve this problems. Unfortunately by the time we solve a problem, that problem may not even exist.

3. In addition to instability, Operations have fair amount of randomness. Randomness is worse than instability; Instability means that future will be different but we will exactly know how different it will be; contrary to that in the case of randomness we do not know how the future will be. Randomness is generally found in customer demand, lead times, machine break downs, raw material quality, production yields, etc. Planning against randomness is very tricky; There is not a universally accepted consensus among OM professionals how to treat randomness.
Recent attention to OM looks like the gold rush of the 19th century: Everybody knows that OM principles are valuable but cannot find the correct principles. However, there is a lot of gold in operations waiting to be digged out. Beware, nobody says that the digging will be sweat-free!

3 Common OM Difficulties

Having explained why OM is challenging, let us discuss the common OM mistakes and problems:

1. Lack of OM metrics: By a metric we mean a measurable quantity representing the performance. For example the more established disciplines of cost accounting and quality control are dedicated to developing and monitoring meaningful metrics. Without metrics, it is not possible to measure the performance. Even we can find global metrics for OM, we will have to find local metrics for departments, groups and individuals. These new local metrics must agree with global ones and must facilitate coordination.

An important aspect of OM is customer service. Metrics must be developed for this aspect. Currently many companies use fill rate (percent of demand met on time) to measure customer service. Note that fill rate does not take into account the late delivery of orders. Late orders, regardless of how late they are, contribute by the same amount to the fill rate metric. The customer retention rate is also an important metric, it indicates the percentage of customers who are happy with the current product so they continue to come back. There are a few companies measuring customer retention.

2. Poor IT design: When databases at different sites of an OM are not linked, data retrieval and storage becomes very time-consuming and prone to manual errors. Such delays and inaccuracy can drastically slow down the decision making process. These delays can lead to longer decision making cycle hence decreasing the responsiveness of operations.

3. Poor delivery status information: The first interaction with a customer happens when the customer orders a product and asks for when the order will be shipped. At that moment the person in charge (usually a sales or a marketing person) has to quote a due date for delivery. This person needs information regarding the status of the operations and a decision support system to process the information to come up with a due date. The information about the status of OM may not be available immediately or may not be accurate (see Poor IT design). Even when the information is available, many companies lack decision support systems to quote due dates. What they need is a system that will net all the outstanding orders from inventories and schedule production. This schedule cannot alter previously set customer delivery dates for previous orders, but can tweak the starting times of individual operations of those orders.

Even when companies can quote due dates, many of them have problems tracking the order. A customer can ask for an update on the delivery date of a late order or demand an expedited delivery by paying more. The first step of meeting such a request is finding the order (its subassemblies and parts). Many companies have trouble at this first step. Only after the order is located, a new due date can be quoted as discussed above.

4. Ignoring the uncertainties: There are uncertainties in operations. Finding where they are and measuring them contributes greatly to planning the OM operations. There are many analytical techniques that deal with uncertainties. However, all these techniques require measurement of uncertainties (see Lack of OM metrics). Instead of developing metrics for uncertainties, many companies choose to ignore them (this is no different than a scared ostrich putting its head into the sand). Then customer demands are not met on time and managers are at a loss without knowing how to improve operations.

The easiest way to measure uncertainties is by putting the uncertain quantity in a range: say, transportation times are 3-5 days, demand is 80-150 per day, etc. A more statistics oriented way is computing the mean and variance of the uncertain quantity: transportation times have mean of 4 days
and variance of 1/4 day. A more complicated measurement way is coming up with the distribution of the uncertain quantity: transportation times have a normal distribution over [3,5] days. As more information in the form of accurate metrics is made available to decision support systems, the quality of decisions improve.

Another negative effect of ignoring uncertainties is failing to eliminate them. Some uncertainties are very hard/costly to reduce, but some are not. With an innovative product or OM design uncertainties can be reduced. Of course such innovative designs are not free, but the spending on designs can be compensated by the savings due to less uncertainty. To quantify such a tradeoff, we again need metrics measuring uncertainties.

5. Internal customer discrimination. Until recently, internal customers were thought to be loyal and would buy no matter how poor service they may get. This belief was the source of internal customer discrimination; given the choice, companies chose to prioritize external customer orders over internal customer orders. That led to internal customer’s suffering of long uncertain lead times. Thus, for items supplied from within a company, the inventories were higher. Moreover, each internal order is a part of an external order, so delaying internal orders is delaying external orders as well. The system-wise understanding has started to find root in companies so there is less but still significant internal customer discrimination.

6. Poor integration: Integration is an important theme in OM. OM strives to cut costs by creating a synergy among plants, warehouses, suppliers and customers. However, the best way to achieve this synergy is not clearly known. Lack of OM metrics is contributing to this problem because without metrics who is to tell one synergy is better than the other. OM metrics are necessary but not sufficient. Effective OM requires turning global metrics into local metrics so that local metrics also support the overall OM goals. Controversially put, OM advises integration by smart decomposition of global metrics into local metrics.

For example, lack of integration has led many distribution center managers to deliver products to local warehouses with ground transportation as opposed to air transportation. That means a longer transportation time but lower transportation costs. Distribution center managers especially like this practice when they are responsible for the transportation costs. However, at the receiving end, the local warehouses must keep a large inventory to counterbalance long and generally uncertain delivery lead times. If we can make distribution center managers responsible for warehouse inventories through a local metric that accounts for those inventories, distribution centers may choose air transportation. In this case, although the choice of transportation method is made locally at the distribution centers (hence the term decomposition), the decision takes care of warehouse inventories (hence the term integration).

Another example of poor integration comes from the mismatch between the metrics of sales and manufacturing departments. Sales departments are praised for how much they sell. It is rare that the conditions of a sale is scrutinized. It is conceivable that a sales department which quotes unrealistic short delivery lead times will increase its sales. Therefore, sales department increases the sales and looks good on the sales metric. On the other hand, the manufacturing department is burned by the short lead times and falls behind the schedule and it often resorts to overtime to make promised deliveries. With overtime, manufacturing costs increase. Without overtime, manufacturing misses due dates, a loss-loss situation. However, this situation will not occur if marketing is made sensitive to manufacturing metrics, such as fill rate, production costs, current system load. Another way to overcome this problem is by supplying marketing with a decision support system that automatically quotes due dates according to the status of the operations (see Poor delivery status information).

7. Elusive inventory costs. The basic question is how much it costs to hold a product, say a laptop or a cabbage, in the inventory, say for a week? Many people agree that the inventory holding cost
must include opportunity cost (generally based on internal rate of returns), warehouse space, lighting, cooling costs. However, there may be other costs. Note that a cabbage is rotten if kept a long time in the inventory. Similarly a laptop can fall behind the state of the art technology while waiting in the inventory. In either case, discounts over the regular price must be made to get rid of the cabbage or the laptop. These discounts are hard to expect in advance but they must be considered as a part of inventory costs.

8. OM-insensitive product design: Many times products are designed by R&D to perform a function without paying attention to how they will be produced. These products face many problems when they are put into production in mass quantities. There must be a smooth transition from product design to its production, which can be achieved by foreseeing potential OM problems that may arise in mass production. Even without any such problems, it makes sense to tweak the design to simplify the operations.

A smart idea that simplifies operations is delayed product differentiation. That is, push a generic product as far as possible, and make different products from the generic product as late as possible. The common story that made this concept popular is Hewlett and Packard. HP used to produce printers in US and package them with product manuals in different languages in US. These packages were then sent to distribution centers over the world. Note that HP was making its products different with various type of manuals even before they left US. Then there were instances of HP overstocking in Germany and understocking in France. Since printers in Germany had manuals in German they could not be shipped to France. An OM study at HP concluded that HP should send printers to distribution centers without manuals. According to demand, manuals should be put into packages at country distribution centers. Basically printers are kept as generic products until demand occurs for them. HP has implemented this plan without incurring much cost. Now in the case of local demand-supply mismatches, country distribution centers can transfer printers among each other. HP reported major savings with this simple idea of delayed product differentiation.