Decision Traps

An audit for decision making in manufacturing operations

by **Seyda Deligonul**

COMMON SENSE SUGGESTS THAT INDIviduals instinctively develop rules of thumb to reduce the demands of decision making. Accordingly, the complicated elements of a situation are fed into a mental abstraction to give us a tentative conclusion about the decision we are pondering. A careful thinker then tries to imagine a situation in which the tentative conclusion would not hold. If no situation is found, then the decision is assumed to be accurate. Gradually a collection of rules to guide decisions is assembled through repeated handling of similar situations.

Confidence in our rules feeds on itself. As vindication is strengthened we let down our guard and neglect to seek counter-examples or obstacles. Eventually many of the rules become disconnected from their original context and provisions, resulting in questionable rigor.

The table in this article provides an audit for decision making in the face of some management cliché's about manufacturing operations. That is, it identifies possible problems that may arise from blind use of these statements. Such an audit can be used as a warning sign of the decision traps of reflexive thinking. The examples are gathered from the author's experience in process industries, but these concepts can also be found in Eli Goldratt's *The Goal*.

WHEN WE SAY...	MAKE SURE THAT WE SEE...
We need to be committed to companywide goals.	The need for organizational harmony in setting goals may be too strong an assumption. Subunit goals are not necessarily in line with corporate goals. In practice, certain agendas often are not consistent with the desired orientation of the company. They may be clouded by personal needs, performance guidelines and departmental key measures.

WHEN WE SAY...	MAKE SURE THAT WE SEE...
We need to increase throughput.	Managers often strive for increasing throughput. This may be a valid goal, but its poor implementation may tend to increase work-in-process inventories and operational expenses. It is not sufficient to focus on only one of these measurements. All relevant components of a decision need to be addressed. In order to make a good decision, one needs to see the trade-offs in the whole situation.
We need to achieve overall improvement.	Overall improvement is a cliché. Real gains are obtained by identifying the bottlenecks and then adding capacity to those operations. Improvements reflect on overall operations when they are implemented on bottlenecks.
We need to budget more in order to prevent resource deficiencies.	Managers may seek additional resources without realizing that the capacity measurement of a particular machine or quantity of labor can only be significant with respect to its role in operations. The capacity of a resource cannot be judged in isolation. It is determined by the way the resources match or complement each other.
We need to boost capacity.	The capacity of a plant is equal to the capacity of its bottleneck operations. A system is only as effective as its weakest link. Therefore, across the board capacity improvement may be expensive yet ineffective.
Every step in our chain of operations is important.	Operations are important if they contribute to the overall goal. Bottlenecks must be given priority. Investment into nonlimiting factors will not contribute to overall performance unless these turn into bottlenecks.
We need to improve productivity in every stage of production.	Every step in a series of operations cannot be equally significant. Higher overall productivity may mean forgoing some improvement in specific areas. A rule in mathematics states that the optimization of an overall system does not necessitate the optimization of subcomponents.
We cannot afford to keep resources idle.	It is acceptable to have idle resources in nonbottleneck operations. The removal of all slack in the system is not an end itself; it arises from anxiety related to the traditional performance indicators. When a bottleneck resource is idle, we indeed have a problem. On the other hand, it does not degrade overall performance to keep a non-bottleneck resource idle.
We have to keep an eye on finished goods inventories and ship them from the warehouse as fast as possible.	Managers mistakenly concentrate on the finished goods inventories and may overlook the value of work-in-process inventory. There are many companies out there with good earnings who suffer from liquidity problems. They need to consider inventories not only in the warehouse but also on the shop floor.

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We need to monitor the purchase price of inputs used in work-in-process parts.	Managers often misjudge the cost of work-in-process inventory, calculating the cost as the sum of the book value of parts. Although this may be appropriate for accounting purposes, it may negatively affect manufacturing decisions. In a decision setting, the opportunity value expected from the sale of the finished product may be a better guide. Granted there are times when a part starts out inexpensive and ends up being costlier than anticipated, but managers should not always equate value to price.
We need to improve performance by eliminating all idle machinery, labor and activities.	Managers often react to symptoms rather than the core problem. For example, full capacity utilization is often sought, but can be rather costly. It is often coupled with inventory stuffing (both in-house and in channels) which, in turn, is a sign of poor system performance.
Performance needs to be driven by careful assessment of our record.	It is not unusual to see reports showing productivity declines and cost increases when operations are successful. Even though no past-due orders remain to be filled and customers are pleased with delivery, lead-times and quality, the current measurement may indicate poor performance. When there is a disparity between performance reports and the manager's own assessment of the picture, managers react to performance reports.
If we anticipate problems with well-established procedures, then we will know how to handle those problems.	Procedures are convenient, but the solution of a nonrecurring problem requires challenging the usual thinking. A manager has to tear down the assumptions upon which previous behavior was based and employ the scientific method. Effective solutions require a shift from stet bureaucratic mentality to the creative problem-solving mode.
We need to achieve 100 % resource utilization.	An idle resource does not necessarily lead to inefficiency. System inefficiencies arise only from bottlenecks. These are overextended resources that constrain the attainment of goals. A weakening of these constraints contributes to the realization of goals. A blind strategy to improve performance by pushing all resources to full utilization may result in cost increases
Once we develop the momentum, the success will repeat itself.	Managers sometimes assume that once they've achieved success, it will continue. Every achievement is a novel victory of inspiration and hard work, not necessarily the beginning of a pattern of success.
We need to establish very powerful quality procedures throughout the plant.	Quality must be managed at the source. Quality control procedures should be established in front of the bottlenecks, not at the end of the process. The main goal of quality management is not reactive, but proactive strategies of process improvement to prevent defects. Identifying and fixing defects after the fact is always more expensive than implementing preventive measures.

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We need to have a high turnover ratio in terms of costs.	The throughput in a system should be measured in terms of actual sales not costs. This is in line with the current philosophy of customer orientation and value management.
We need inexpensive suppliers and low-cost contracts.	Wise managers see costs in a broad sense. Costs must be measured in terms of alternative uses. Accounting costs are useful for bookkeeping purposes, but do not reflect opportunity costs in terms of alternative uses.

General rules are convenient because they can render reflexive thinking. But, to paraphrase the architect, painter and poet, Charles-Edouar Jenneret, a.k.a. Le Corbusier, "the devil is in the details." If we violate underlying provisions, then a statement about a situation may not hold and may not be precise enough to be relevant for other situations. Therefore, a manager must be alert in every case, approaching every significant decision as if it were a first encounter. Otherwise, the manager as decision-maker may just fall into a decision trap.

REFERENCES

1.Eliyahu M. Goldratt, The Goal: A Process of Ongoing Improvement, (Great Barrington, MA: North River Press, 1988).

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