

Why Do we need Data Driven Decision Making Techniques?

Today we are at great risk of “drowning in data”. Terabytes of data are being generated within our business’s, by our customers, competitors and suppliers, by the media, and by Government departments. The constant measurement of performance, aided by computerised data capture and management tools such as Statistical Process Control, Six Sigma and TQM can leave us all drawing inferences from the raw data, unfortunately very many of these can lead us in the wrong direction.

Example: Operational output from a manufacturing operation was closely monitored by shift and it was consistently noticed that the night shifts performance was consistently less than either of the other two shifts. Further analysis identified that extended stoppage times on the equipment were the primary contributor to this decrease in performance. The focus could easily have been on the team’s motivation and or capability to fix problems. A slightly different analysis of the data showed that the drop in performance actually occurred “out of normal” hours i.e. between 18:00 hrs and 08:00 hours. It could easily have been overlooked that the business infrastructure of Engineers, technical stores and availability of external remote help was extremely limited during these hours.

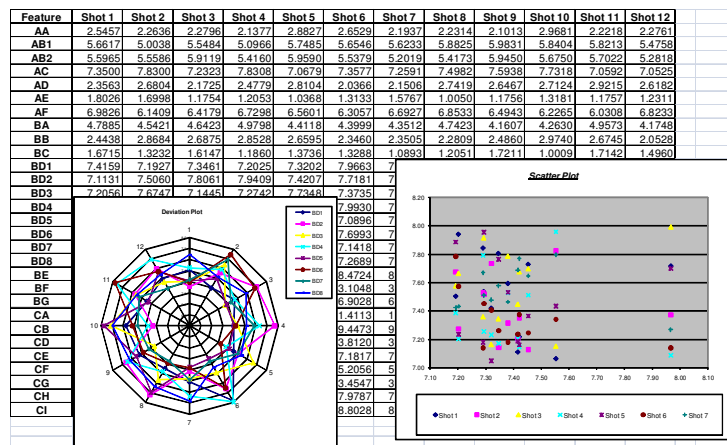
The validity of any statistical (data) analysis is only ever going to be as good as its constituent parts. This is an important distinction often overlooked in the fast paced environments in which we work.

The example on the left illustrates an important truth. It is much easier in an experimental or hard science setting to isolate and exclude unwanted influences or erroneous data. In the business world there is much more opportunity and risk that “confounding” factors are present and require to be unearthed before sound decisions can be made on the data presented. Too often can we then uncover that apparently sound business decisions “choose their facts carefully”. Only with a complete picture can we start to understand the potential outcomes, risks and uncertainties that undoubtedly face us in the majority of the decisions we are called to make.

Generally it can be assumed that if decisions are clear cut, simple and certain they do not need to be made, they will already have been taken.

Whilst there are numerous illustrations where selective use of the data (“lies, damn lies and statistics”) have been used to support and attempt to substantiate a particular point of view we are faced in business with many more where the outcome is not tied to a particular point of view and what we really require is unbiased data in a useful format that assists us in making good decisions in the face of uncertainty.

The possibility of unintentional errors in any analysis is also a cause for concern. Even if care is taken to establish a good sample, there are possibilities of misleading results, a common problem can be when a large dataset is looked at for long enough, there is eventually bound to be found a statistically significant effect or difference between some set of variables.



Unfortunately, it is often the case that this single significant finding is reported without acknowledging the "many" insignificant tests performed. A similar error is often made where we challenge the data we do not believe, or does not meet our expectations whilst accepting without question the data that complies with our current view. A proper accounting of the entire testing process is needed to keep these types of results in perspective and the correct and efficient use of such techniques as measurement systems analysis are required if we are not to be misled about the certainties of results. At least two factors routinely work against effective analyses. The first is a mistrust of statistical analyses due to the complex maths that often underpins them, and the second is a lack of dialogue between statisticians and practitioners. Many studies in all fields of business could benefit from more discussion about the analysis of collected data and the collection of the data itself.

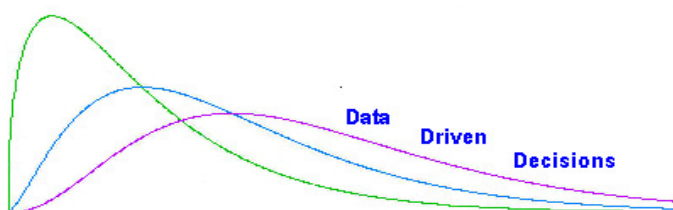
It is also very appropriate to show due concern over the interpretation of statistical outcomes. Too often we are seeking that the data will make the decision for us, but it is quite likely that the data cannot tell you the right answer but can tell you which answers to eliminate because they are not supported by the data. It is possible to prove a negative but almost impossible to prove a positive. The real value of statistical analysis is that it helps users to properly characterize uncertainty as opposed to a "best guess," to realize what outcomes are statistically significant, and to answer specific hypotheses. The key issue here is representation, managers and staff should always concern themselves with how the data are obtained and if this is not fully understood, then one has to be careful in one's conclusions. A key to minimizing the misuse of data involves intuitive plausibility, or understanding the approach and the interplay of forces. It is important to know what the drivers are behind the variables, so that with these established, a better understand can be gained, causality established and high quality decisions from the data made.

Example As an example to reduce costs related to the manufacture of a specific product a company introduced a bonus payment scheme for reduced scrap generated during manufacture of orders on this production line. Initial indications were good the scrap rates decreased month on month as the operatives identified ways to minimise waste and eliminate scrap from the process. It was only after several months it was noted that actual cost of goods purchased had increased above the rate of price increases. Detailed process mapping and analysis showed that whilst many of the improvements had reduced scrap they had actually increased raw material consumption greater than the original scrap levels. This is by no means a unique case where the specific measure chosen failed to relate exactly to the intent behind its introduction.

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August 2009



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