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QFD INSTITUTE

QFD Institute Newsletter

Bringing your QFD math to Six Sigma level
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in this issue

Is your QFD math up to date?

QFD's renewed popularity in the United States is due, in part, to its increased use in Six Sigma and Design for Six Sigma. Most readers know that this Six Sigma is rich in statistical tools to provide the accuracy necessary to achieve 3ppm levels of quality.

It is time, then, that QFD practitioners address the issue of the numerical inaccuracy of the QFD matrices.

Historically, QFD began at a time when even four- function calculators were unknown. Early Japanese practitioners made their charts manually and often used the letters a, b, c to determine importance and other measures.

As simple calculators became available, numbers became easier to manipulate and so were used more and more. Since customer needs and functional characteristics had different scales of measurement, it was hard to compare them, and so a simple 1-5 rating scale was adopted to keep all the data in a comparable scale.

Ordinal scale, suspect math

The problem is that this 1-5 rating scale is an ordinal scale. The QFD operations performed in the Quality Planning Table, such as the Customer Importance and Competitive Assessments are suspect.

Is a rating of 4 twice as important as a rating of 2 for all the customer needs, or could it be different? With an ordinal scale we cannot tell. The Improvement Ratio where we divide the Plan by the Current level is improper math because you cannot divide ordinal scale numbers.

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The Sales Point, too, is an ordinal scale, and it is equally improper math when we multiply the Customer Importance x Improvement Ratio x Sales Point to calculate the Absolute Weight and Customer Needs Weight because multiplying ordinal scale numbers is also improper math. Then, we multiply the Customer Needs Weight by the Relationship Strength (1, 3, 9 is also an ordinal scale), and then sum and divide again for Functional Characteristic Weights.

Can anybody really know what these weights mean?

Analytic Hierachy Process

To increase the accuracy of QFD numbers for better Six Sigma compatibility, we should also consider using ratio scale numbers.

Fortunately, such a method exists and has been used in QFD since the late 1980s. It is called the Analytic Hierarchy Process or AHP for short. It was developed by Dr. Tom Saaty and is one of the most rigorous tools used in QFD today.

The AHP has added benefits in that it can capture priorities using natural language comparisons and convert them into ratio scale numbers. The process can be done with a calculator, a spreadsheet, and even with dedicated software.

Bring your QFD math to Six Sigma level

This approach is now an integral part of the QFD Institute's QFD Green Belt® and QFD Black Belt® programs.

These programs are tailored to the unique needs of each company and project. If you want to scout these courses first, several public courses are available but we use generic models. Subsequent tailoring is then recommended.

More can be learned by contacting the QFD Institute at the email address or phone number below.

email: registration@qfdi.org
voice: +1 734-995-0847
web: http://www.qfdi.org