Quality Function Deployment
-QFD matrix analysis software review

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I. Introduction

Quality Function Deployment (QFD) is one of the many management planning tools that modern organizations take advantage to achieve highest customer satisfaction. It is originated from Japan by Dr. Mizuno in 1972, and was introduced to the United States in 1984 by Dr. Clausing of Xerox (Besterfield, 1999, pp. 283). Now it has become a standard practice by most leading companies. Over the years some of the major proponents of QFD have been Volkswagen, General Motors, Budd, and ITT. QFD played a major role in Ford Motor Company’s last major turnaround in 1987, and Toyota cut the cost of launching a minivan by 61% thanks to QFD (Piszczalski, 2003).

QFD employs a series of matrices to quantify customer requirements, product ratings and technical descriptors. By identifying the correlation factors among all these factors, the importance weights of each technical detail toward actually production can be calculated through simple algorithm. One major approach to implement the QFD process is through the House of Quality (Figure 1)

House of Quality is a plan of four stages in which a QFD Team translates customer requirements into product characteristics, product characteristics into part characteristics, part characteristics into process targets, and finally process targets into production targets. Further refinement can be done be putting the output of first matrix into the input part of the second, and so on. Usually a four-phase refinement process can reach the most detailed requirements during production, like machine settings, material measurements, etc.
Since QFD process may take into account of so many customer requirements and technical descriptors, it is wise to take advantage of computer aided planning software. Such software may ease but not limit the process of organizing information and matrix calculation, plus the benefit of recursive usage of each output in next phase.

II. QFD Softwares

Table 1 is a list of QFD software that was gathered around the Internet in this research. It may not a complete list since newer and more advanced tools are emerging, and companies typically have their own internal specialized QFD software, which are excluded from this list.

<table>
<thead>
<tr>
<th>Tool Name</th>
<th>Vendor</th>
<th>Description</th>
<th>Hardware Supported</th>
<th>Operating Systems</th>
<th>Uniform Resource Locator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invention Machine</td>
<td>IM Corporation</td>
<td>A series of software packages (TRIZ) designed to meet the complex requirements of engineers, scientists, and inventors who seek creative solutions for developing new technologies</td>
<td>x86</td>
<td>Win16 Win32</td>
<td><a href="http://www.amsup.com">http://www.amsup.com</a></td>
</tr>
<tr>
<td>QFD 2000</td>
<td>Total Quality Software</td>
<td>Quality Functional Deployment (QFD) software</td>
<td>x86</td>
<td>Win95 Win32</td>
<td><a href="http://www.totalqualitysoftware.co.uk/">http://www.totalqualitysoftware.co.uk/</a></td>
</tr>
<tr>
<td>QFD Designer</td>
<td>QualiSoft</td>
<td>Quality Functional Deployment (QFD) software.</td>
<td>X86</td>
<td>Win16 Win32</td>
<td><a href="http://www.amsup.com">http://www.amsup.com</a></td>
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<td>QFD DesignerQS</td>
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<td>Win16 Win32</td>
<td><a href="http://www.amsup.com">http://www.amsup.com</a></td>
</tr>
<tr>
<td>QFD/CAPTURE</td>
<td>International TechnoGroup Incorporated</td>
<td>Quality Functional Deployment (QFD) software.</td>
<td>X86 PPC 68k</td>
<td>Win16 Win32 MacOS</td>
<td><a href="http://www.qfdcapture.com">http://www.qfdcapture.com</a></td>
</tr>
<tr>
<td>Qualica QFD</td>
<td>Qualica</td>
<td>Quality Functional Deployment (QFD) software.</td>
<td>X86</td>
<td>Win32</td>
<td><a href="http://www.qualica.de">http://www.qualica.de</a></td>
</tr>
</tbody>
</table>

Table 1
Almost all these software excluded ‘Save’ and ‘Print’ functions in their demo versions, and thus in our group projects we cannot produce single outputs for compassion. The following review is based upon if the software is easy-to-use, powerful, and fully functional to all types of matrix.

III. Reviews

Not all of the listed software were compared because of limitations in download website and/or those in the program demos. Some typical or similar features may be mentioned only once in detail.

- Qualica QFD

  Qualica QFD is developed by a German company and naturally embodies their nationality like prudence and seriousness. The first impressive feature of it is they use a database-like matrix management system to manage the versions, structures and storage of each House of Quality. Further, Qualica QFD has also integrated Cause-Effect matrix and Pugh new concept selection, which make it the most powerful and comprehensive analyzing tools during this research. (These two methods are similar applications to HOQ that are used to induct result of certain procedures during the production or service.)

Figure 2
Individual Research Paper

Qualica QFD has all the common easy-to-use features like all editable units, interactive structures and cells, floating input bar, import and export function, etc. It also allows a user to do sensitive analysis, Web publication, and customize and add Plug-in tools. The Plug-in feature enables better flexibility and can extend the function of the software greatly by adding newly formulas and tools.

- QFD/Capture
  Since the Qualica is so comprehensive and had so many powerful tools integrated, it may look too complex to beginners. On the contrary, QFD/Capture, which is developed by International TechneGroup Inc., seems very easy to start for beginners without much complexity. The typical working interface of QFD/Capture is like Figure 3.

![Figure 3](image)

One impressive feature in QFD/Capture is it can automatically generate a market opportunity map (in Microsoft PowerPoint format). This map uses an intuitionistic illustration chart to demo the degree of importance vs. degree of satisfaction.

Maybe because of the limitation of the demo version, this software can only do a simple House of Quality, and contains only few models for large projects or complex product plans. In general, this is a good one to begin with the study of QFD process, but probably not powerful enough to manage large organization project or complex product/service plan.
• QFD 2000

QFD 2000 is also an ‘easy’ software because it uses another way to simply the whole QFD processes. It takes advantage of a commonly used technique – Wizard. For example, the create New Matrix wizard guide the user to finish creating a new basic House of Quality in 8 steps by simply following the instructions and filling in blanks. Figure 4 show a typical wizard window:

![Figure 4]

For advanced users, QFD 2000 also provided a manual method to create a customizable matrix series, and formula/graphic tools for analysis. It also provides diagram tools to finely organize customers’ requirements, and even questionnaires for gathering respective information.

Although QFD 2000 does not provide plug-in features to add-in new tools, it actually integrated many analysis tools in it and thus can perform fairly complex job. So, for both easy-of-use and analysis power, QFD 2000 can earn double high scores.

Note: the Quick-Start Help often overlaps small input boxes, which appears to be a software bug in this demo version.

• QFD Designer

The main feature of QFD Designer (v4) is its matrix templates. It contains many templates that belong different categories like Voice of Customers, Product and Service Development, Business Planning, Six Sigma and Failure analysis. These
templates are particularly useful when the QFD want to compare the results of different QFD processes.

**III. Summary**

All these software are capable of finishing a complete QFD process and generate target reports as an output. All have stressed customer requirements as a crucial part and provided tools to generalize, fine-tune, and organize the information. However, users need to take precaution to select which one to use according to the characteristics of your product/service plan, because these software have different point-of-interest in their original design. For example, a pizza maker may find QFD/Capture is quite good and simple to complete his/her recipe, while a motor manufacturer may find only Qualica can fit their design needs.

Finally, since tool is made to just aid people, even the most fully functional and powerful QFD software cannot replace a bit of any creativity and team works. So the best strategy should be: take advantages of best minds first, then the best software.

**References:**
