

# "Concept to Customer"

(Integrating DFSS "best-practices" into a Product Development Flowchart)

In the late 20th century leading companies realized that the Product Development Process was as important as the product itself. This process must involve Strategic Thinking, Customer Input, Technical Discipline, Advanced Knowledge, Creativity, Speed, and Innovation to ensure a successful output for your Customers. This uniquely structured "C2C Flowchart" integrates leading **Design for Six Sigma (DFSS)** "tools" which accelerate product introduction and ensures profitable life cycles. Along the right side is a **very brief explanation** of the Integration steps. Each step represents a DFSS "tried and proven" technique which additional detailed explanation is available. Detailed explanation of each step is available upon request. © 1999 - 2008 C2C Solutions, Inc. (All rights reserved) - [www.c2c-solutions.com](http://www.c2c-solutions.com)

**A. Business Case / Project Plan** - Here the team explains why it is important to work on this "Project" and develops a plan which includes the Issues, identification of Customers, Market, Scope, Goals, Constraints, Strategy, Team Membership, etc.

**B. Understanding your Customer's Needs** - The cornerstone for every successful project. The "Enhanced" Kano Model illustrates three critical types of needs that must be delivered to the customer: **1) Basic Needs** - Are expected needs, yet unspoken by the customers. **2) Performance Needs** - Are the spoken and consciously evaluated needs that customers will talk about. **3) Excitement Needs** - Are the Innovations, "WOWs", & neat surprises. Over 35 strategies exist to "uncover" the Voice of the Customer (VOC) and truly understand the "Mind" of the Customer (MOC).

**C. Document & Prioritize the Customers' "Needs"** - A well documented and prioritized list of requirements helps keep them current and visible. This (eQFD "shortcut") uses specific criteria to help decide how each requirement will be "deployed". This also keeps a "House of Quality" from turning into a "Mansion of Quality"!!

**D. Developing Metrics & Goals** - It's very hard to improve things that can't be measured. The QFD "House of Quality" is an excellent "tool" to help develop metrics and specific goals for the customer's "fuzzy" requirements.

**E. Product Function Analysis** - "A problem well described is a problem 80% solved." Functions are the most important aspect of any engineering system. Here, we describe in terms of functions, our engineering system, it's problems, and perform a comprehensive "Value" Analysis.

**F. Design & Process FMEA's** - An FMEA (Failure Modes & Effects Analysis) is a proactive systematic approach used by Product & Process Engineers to help assure your product and processes perform their intended functions over their entire life span. A tabular method is applied to analyze potential failure modes, their effects, and develop an action plan to ensure your customers never see these failures.

**G. The "Trimming Technique"** - When cost reduction, complexity reduction, or a true breakthrough is needed in the design, this technique uses cost and complexity reduction strategies and algorithms for simplified product or process scenarios. (VA/VE "Tool")

**H. 25+ Strategies for Innovation** - Difficult problems need breakthrough thinking. Most people think only "special" people have the ability to innovate. **NOT TRUE!!** Several Psychological and Technological strategies for "Systematic Innovation" are being leveraged by "normal" people to accelerate innovation.

**I. Concept Selection** - Several methods for Concept Selection exist ranging from simple multivoting techniques to sophisticated mathematical methods that take into consideration multiple opinions, confidence levels and risk. Deciding which method to use depends on the importance of the decision.

**J. Detailed Product Design** - This step integrates DFM principles & Taguchi's Methods for "Robust Designs" with QFD to detail critical Design Characteristics with "optimized" target values to achieve a "Robust Design" that is easy to manufacture.

**K. Process Function Analysis** - "A problem well described is a problem 80% solved." Process functions are the most important aspect of manufacturing design. Here we describe, in terms of functions, our manufacturing process, its problems, and perform an operational "Value" Analysis.

**L. Detailed Process Design** - This step integrates Dr. Taguchi's philosophy of "Robustness" with QFD to detail the critical Process Parameters and "optimized" target values to achieve a "Robust Process".

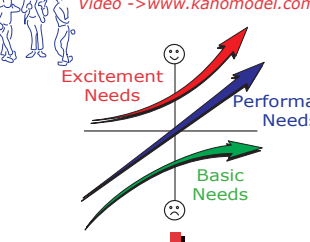
**M. Production Control** - These are the "shop floor" activities that are needed in order to maintain capable processes and approach a Six Sigma operation. These activities help to prevent reverting back to the "old way".

**N. Kaizen** - Methods to encourage gradual, structured, and continuous improvement for internal and external "customers" through the elimination of waste. People work together on making small continuous improvements without large capital investments.

**Delivery to Customer** (With Quality, Cost, and Time Objectives Achieved)

**(N) Kaizen!**

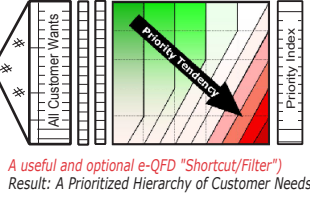
**(B) Understanding your Customers better than they do ! (VOC + MOC)**



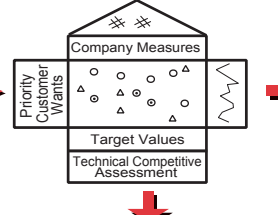
**(A) Business Case and Project Plan**



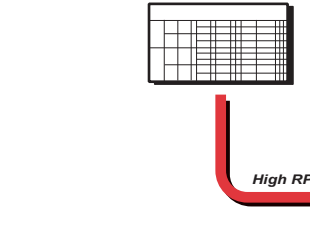
**(C) Document & Prioritize the Customers' "Needs"**



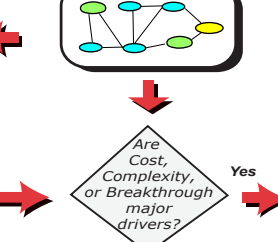
**(D) Develop Metrics and set Product Goals (HOQ Optional)**



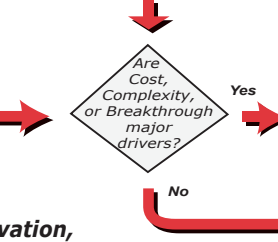
**(F) Design FMEA (If Design Concept is known)**



**(E) Product Function Analysis**



"\*\*" - TRIZ Techniques



**(H) 25+ Tools for Innovation, Problem Solving, and Concept Generation**

Watch Video --> [www.c2c-solutions.com/sys-inn01.html](http://www.c2c-solutions.com/sys-inn01.html)

**"Left Brained" Strategies** ..... **"Right Brained Strategies"**

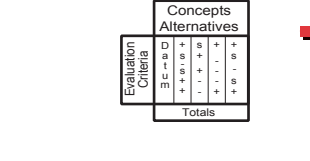
- 1) Knowledge base of 9,000 Scientific Effects \*\*
- 2) Separation Principles for Physical Conflicts \*\*
- 3) Inventive Principles for Engineering Conflicts \*\*
- 4) Technology Trends and Forecasting \*\*
- 5) The "Ideal" System and the Use of Resources \*\*
- 6) Strategic Patent Analysis
- 7) Semantic "Knowledge" Mining

Ideas, Concepts, Solutions

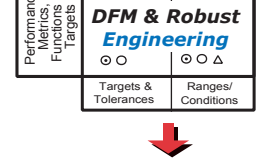
H

- 8) Product & Society Trends
- 9) Lateral Benchmarking
- 10) Scope Expansion
- 11) Customer Modifications
- 12) The Trimming Technique \*\*
- 13) Morphological Tables
- 14) Feature Transfer
- 15) Classic Brainstorming
- 16) Have the "Right" People
- 17) "Painstorming"
- 18) Unintended Uses/Applications
- 19) The MSE Effect
- 20) Super Lateral Benchmarking
- 21) Using Nature/Biomimicry
- 22) DeBono's 6 Hats
- 23) Simplified Synectics
- 24) Time Savers
- 25) Can't Fix It?, Feature It!
- 26) The "Pagoda" Effect
- 27) Future-Mapping
- 28) And several more . . . .

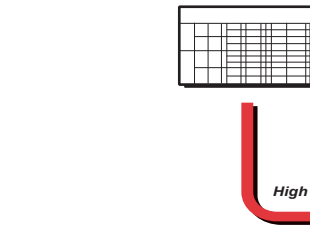
**(I) Design Concept Evaluation and Selection**



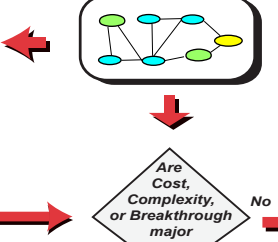
**(J) Detailed Product Design**



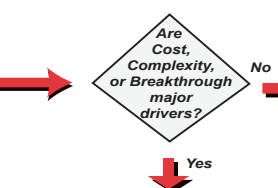
**(F) Process FMEA (If Process Concept is known)**



**(K) Process Function Analysis \*\***



High RPN's

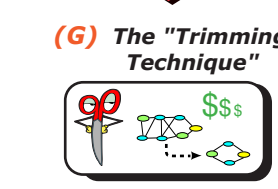


**C2C SOLUTIONS**

CONCEPT → CUSTOMER

Product Development Services

Technical Workshops, Training, Consulting, Project based Coaching



D. Verdunyn - 6/23/00 - Revision Date: 10/23/2007 - This roadmap gets "enhanced & updated" regularly. What you are reading is "probably" an "out-of-date" version - E-mail us at [info@c2c-solutions.com](mailto:info@c2c-solutions.com) for a printable electronic copy of the latest version of this Roadmap