Chapter 4 - Discovering System Requirements

What should be gained from this chapter?

(1) You should know what a requirement is.

(2) You should be able to identify and describe the basic characterizations of a requirement.

(3) Using the information in the chapter as a reference, you should be able to write a reasonably good requirement, and you should be able to assess the quality of a requirement written by someone else.

(4) You should have a reasonably good understanding of the level of difficulty of identifying and writing good requirements.

(5) You should know and be able to describe the basic stages in the requirements development process.

(6) You should have a reasonable level of comprehension of some of the tools that can be useful in developing system requirements.

REQUIREMENTS:

Are statements:

- **Of the problem to be solved**
- **That define what a system must do**
- **That define how well a system must perform**

CHARACTERIZATIONS OF REQUIREMENTS:

Types	**mandatory; preference**
Sources	**e.g., technology, performance, law**
Modalities	**e.g., narrative, prototype, schematic**
Input-Output	**system input-output as function of time**

REQUIREMENTS SOURCES (DSMC):

Customer Requirements

Facts and assumptions defining basic expectations of the system

Functional Requirements

Tasks or activities to be accomplished

Performance Requirements

Extent to which function must be executed

Design Requirements

"build to," "code to," "purchase to"

Derived Requirements

Implied from higher-level requirement

Allocated Requirements

Division of higher-level requirement into several lower-level ones

ATTRIBUTES OF GOOD REQUIREMENTS (DSMC):

- **Achievable**
- **Verifiable**
- **Unambiguous**
- **Complete**
- **Expressed in terms of need**
- **Consistent with other requirements**
- **Appropriate for level of system hierarchy**

REQUIREMENTS EXPRESSION:

Operational view - how users are served by the system

Functional view - what the system must do

Physical view - how the system is constructed

FORMAT FOR WRITTEN REQUIREMENT:

The system shall <function>
for use by <users>
if <conditions>
using <inputs>
where <conditions>

where <function> usually in form of <verb> <output>

REQUIREMENTS DEVELOPMENT BASIC STAGES:

- **Define and state problem**
- **Write system requirements**
- **Review system requirements**
- **Confirm requirements needed**
- **Define figures of merit**
- **Validate system requirements**

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- **Verify system requirements**
- **Define technical performance measures**
- **Mitigate risk**

VERIFICATION AND VALIDATION (V&V):

Verify - confirm accuracy

Validate - confirm relevance and meaningfulness

TOOLS:

Pareto diagram:
Sage and Rouse, page 262

QFD (Quality Function Deployment aka House of Quality):
Sage and Rouse, bottom of page 331, pages 563-569 and pages 960-969

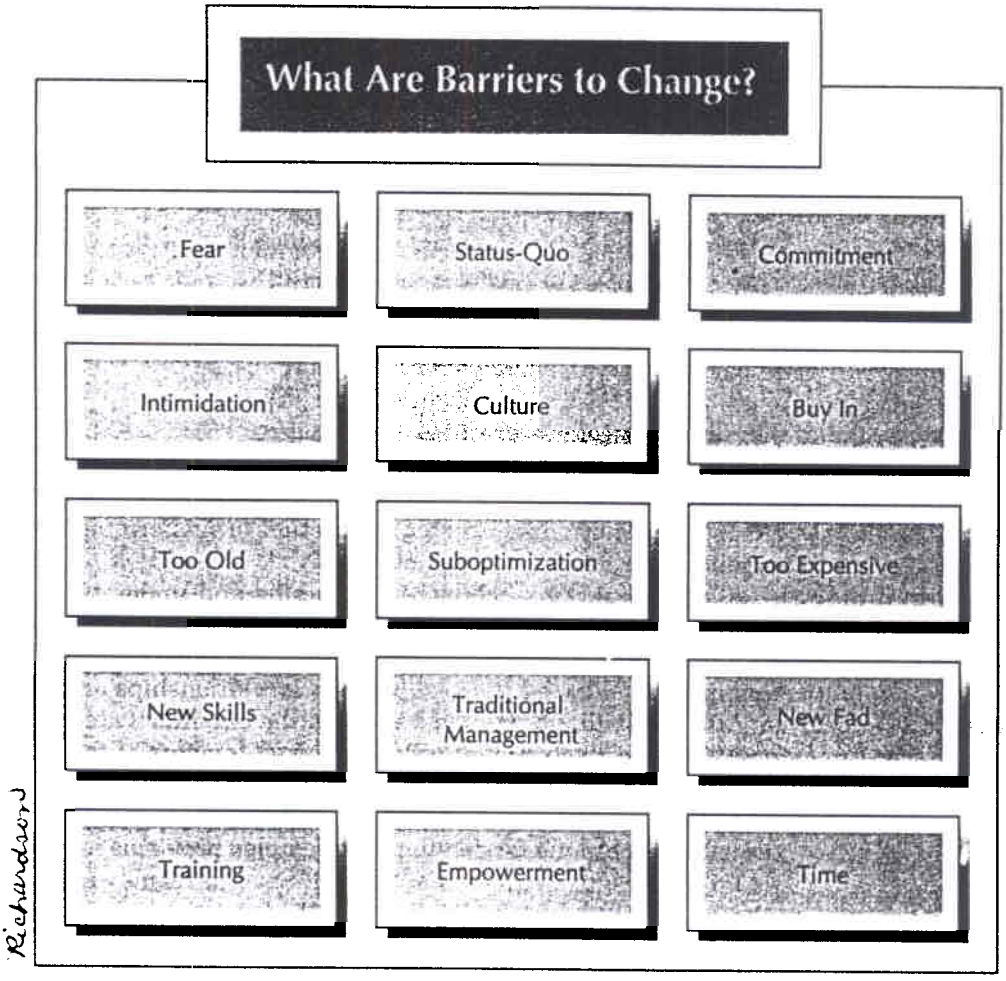
Functional decomposition:
Sage and Rouse, pages 998-1002

Wymorian T3SD design:
Sage and Rouse, pages 1003-1006 for taxonomy basis

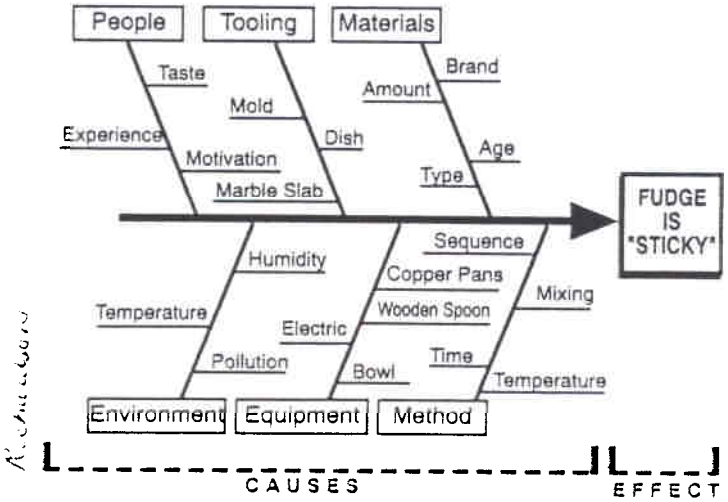
RDD-100, Slate, CORE:
software packages

TOOLS:

Affinity "Diagram"



Ishikawa Fishbone Diagram



TOOLS:

Force-Field Analysis Diagram