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Improvement to Quality Function Deployment Methodology

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Zafar Iqbal

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Abstract

Quality Function Deployment (QFD) is a quality improvement methodology which translates true customer requirements into technical solutions. The major purposes in implementing QFD are enhancing quality, decreasing production cycle time, and lowering costs. QFD methodology utilises a system of matrix like structures known as the House of Quality (HOQ) which work collectively to determine final weightings of the technical characteristics. The derivation of final weights of the technical characteristics and their prioritisation is the final key in QFD process. One of the main theoretical difficulties in employing QFD is that it deals with multidimensional categorical (ordinal) data variables. The rating data of these categorical variables varies from person to person and case study to case study. In prioritising the technical characteristics, QFD practitioners often fail to fully integrate the diverse information extractable from ordinal data and ignore some sections of QFD, House of Quality (HOQ). It is also observed that in each matrix of QFD-HOQ, numerous heuristics have been introduced to suppress the variation, uncertainty and vagueness. During the QFD process, any mistakes such as selection and interpretation of rating scales, application of methods, or integration of various matrices can fail the whole process.

In this project with the rationale to improve QFD methodology, a systematic emphasis is placed on the following issues i) Application of methods, procedures, techniques for the appropriate selection of likert scales within each matrix of QFD-HOQ. ii) Application to each matrix, data and their integration towards statistically valid conclusions. iii) Close observation and interpretation of the final prioritisation of technical characteristics (TCs), and its enhancement.

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List of Abbreviations

AHP	Analytical Hierarchy Process
ANP	Analytic Network Process
CA	Competitive Analysis
CI	Confidence Interval
CPR(s)	Competitor Performance Rating(s)
CR(s)	Customer Requirement(s)
FMEA	Failure Mode and Effects Analysis
FW(s)	Final Weight(s)
HOQ	House of Quality
I	Importance Ratings
IEEE	Institute of Electrical and Electronics Engineers
IR(s)	Improvement Ratio(s)
LS(s)	Likert Scale(s)
MCDM	Multiple Criteria Decision Making
MDM	Manhattan Distance Measure
MS Excel	Micro Soft Excel
RM	Relationship Matrix
QC	Quality Control
QE	Quality Engineering
QFD	Quality Function Deployment
QQ Plots	Quantiles Quantiles Plots

RMC(s)	Roof Matrix Correlation(s)
RPN	Risk Prioritization Number
SMM(s)	State Multipole Moment(s)
SQC	Statistical Quality Control
TA(s)	Technical Attribute(s)
TR(s)	Technical Requirement(s)
VOC(s)	Voice of Customer(s)