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Improvement to Quality Function Deployment Methodology

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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

technical characteristics (TCs), and its enhancement.

conclusions. iii) Close observation and interpretation of the final prioritisation of

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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 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)