

# ISO 16355-3:2025-10 (E)

## Applications of statistical and related methods to new technology and product development process - Part 3: Quantitative approaches for the acquisition of voice of customer and voice of stakeholder

### Contents

Page

- Foreword..... vi
- Introduction..... vii
- 1 Scope..... 1
- 2 Normative references..... 1
- 3 Terms and definitions..... 1
- 4 Basic concepts of QFD..... 2
- 5 Integration of quantitative voice of customer (VOC) and voice of stakeholder (VOS) acquisition with customer research methods..... 2
- 6 Types of QFD projects..... 2
- 7 QFD team membership..... 2
  - 7.1 QFD uses cross-functional teams..... 2
  - 7.2 Core team membership..... 2
  - 7.3 Subject matter experts..... 2
  - 7.4 QFD team leadership..... 2
- 8 Types of information..... 2
  - 8.1 General..... 2
  - 8.2 Market strategy and trends..... 2
    - 8.2.1 General..... 2
    - 8.2.2 Analytic network process (ANP)..... 3
    - 8.2.3 Porter 5 force competitive analysis..... 3
    - 8.2.4 Market position analysis..... 3
    - 8.2.5 Project selection..... 3
  - 8.3 Market segments..... 3
    - 8.3.1 General..... 3
    - 8.3.2 Demographic market segmentation..... 3
    - 8.3.3 Attitudinal and cultural dimensions..... 3
    - 8.3.4 New Kano model studies..... 3
    - 8.3.5 Repertory grid technique..... 3
  - 8.4 Competitive space..... 3
    - 8.4.1 General..... 3
    - 8.4.2 Benchmarking..... 4
    - 8.4.3 Market position analysis..... 4
    - 8.4.4 Multidimensional scaling (MDS)..... 4
    - 8.4.5 Repertory grid technique..... 4
  - 8.5 Customer and stakeholder applications..... 4
    - 8.5.1 Frequency of use or application..... 4
    - 8.5.2 Robust parameter design..... 4
  - 8.6 Customer needs..... 4
    - 8.6.1 Functional needs using text analytics and text mining..... 4
    - 8.6.2 Emotional or attractive needs using kansei engineering..... 4
  - 8.7 Prioritization..... 5
    - 8.7.1 General..... 5
    - 8.7.2 Analytic hierarchy process (AHP)..... 5
    - 8.7.3 L-matrices..... 5

|          |  |          |
|----------|--|----------|
| 8.7.4    | Cluster analysis   | 5        |
| 8.7.5    | Analytic network process (ANP)   | 5        |
| 8.7.6    | Benchmarking   | 5        |
| 8.8      | Product requirements, feature sets, concept options                              | 5        |
| 8.8.1    | Conjoint analysis  | 5        |
| 8.8.2    | Customer needs — Functional requirements matrix (house of quality)               | 5        |
| 8.8.3    | Quantification method III  | 5        |
| 8.8.4    | Regression analysis  | 5        |
| 8.8.5    | Repertory grid technique   | 5        |
| 8.8.6    | Text analytics and text mining   | 6        |
| 8.9      | Distribution, logistics and inventory, sales channels                            | 6        |
| 8.10     | Customer satisfaction surveys and preference benchmarking                        | 6        |
| 8.10.1   | Customer satisfaction surveys  | 6        |
| 8.10.2   | Factor analysis and covariance structure analysis                                | 6        |
| 8.10.3   | Fuzzy set theory   | 6        |
| 8.10.4   | Net promoter score (NPS)   | 6        |
| 8.10.5   | Neural networks and artificial intelligence                                      | 6        |
| 8.10.6   | Regression analysis  | 6        |
| <b>9</b> | <b>Tools for quantitative VOC and VOS acquisition and analysis</b>               | <b>7</b> |
| 9.1      | Analytic network process (ANP)   | 7        |
| 9.1.1    | General  | 7        |
| 9.1.2    | Building and analysing the network   | 8        |
| 9.2      | Artificial intelligence (AI)   | 9        |
| 9.3      | Conjoint analysis  | 10       |
| 9.3.1    | General  | 10       |
| 9.3.2    | Types of conjoint analyses used with QFD   | 10       |
| 9.3.3    | Building the conjoint analysis survey  | 10       |
| 9.3.4    | Case study of conjoint analysis and QFD  | 11       |
| 9.4      | Cluster analysis   | 12       |
| 9.5      | Cultural dimensions  | 12       |
| 9.5.1    | General  | 12       |
| 9.5.2    | Cultural dimension scores  | 13       |
| 9.5.3    | Cultural dimensions and QFD  | 13       |
| 9.6      | Factor analysis with covariance structure analysis                               | 13       |
| 9.6.1    | General  | 13       |
| 9.6.2    | Factor analysis to classify functional requirements into satisfaction factors    | 13       |
| 9.6.3    | Covariance structure analysis  | 14       |
| 9.7      | Fuzzy set theory and multi-attribute utility theory                              | 14       |
| 9.7.1    | General  | 14       |
| 9.7.2    | Difficulties in scoring customer satisfaction                                    | 14       |
| 9.7.3    | Fuzzy sets   | 14       |
| 9.7.4    | Crisp scores   | 15       |
| 9.7.5    | Customer preferences by benchmarking competition                                 | 15       |
| 9.7.6    | Failure mode and effects analysis using fuzzy multiple-objective decision models | 15       |
| 9.8      | Market position analysis   | 16       |
| 9.8.1    | General  | 16       |
| 9.8.2    | Types of market positioning  | 16       |
| 9.9      | Market segmentation using cross tabulations                                      | 16       |
| 9.9.1    | General  | 16       |
| 9.9.2    | Types of cross tabulations   | 17       |
| 9.9.3    | Uses of cross tabulations  | 18       |
| 9.10     | Multidimensional scaling (MDS)   | 18       |
| 9.10.1   | General  | 18       |
| 9.10.2   | Conducting the MDS study   | 18       |
| 9.10.3   | Case study on toothpaste   | 19       |
| 9.11     | Net promoter score (NPS)   | 20       |
| 9.11.1   | General  | 20       |
| 9.11.2   | NPS survey   | 20       |
| 9.11.3   | NPS survey results   | 20       |
| 9.12     | Neural networks (NN)   | 21       |
| 9.12.1   | General  | 21       |
| 9.12.2   | Preparing the surveys  | 21       |

|  |  |           |
|--|--|-----------|
| 9.12.3   | Interpreting the NN output.....                    | 22        |
| 9.12.4   | Using the NN output in a QFD study.....            | 22        |
| 9.13   | Quantification methods (QM).....                   | 23        |
| 9.13.1   | General.....                                       | 23        |
| 9.13.2   | Quantification method III (QM III).....            | 23        |
| 9.13.3   | Applying QM III to a 2-dimensional QFD matrix..... | 23        |
| 9.14   | Regression analysis.....                           | 27        |
| 9.14.1   | General.....                                       | 27        |
| 9.14.2   | Regression analysis in QFD.....                    | 27        |
| 9.14.3   | Regression data.....                               | 28        |
| 9.15   | Repertory grid technique.....                      | 30        |
| 9.15.1   | General.....                                       | 30        |
| 9.15.2   | The repertory grid technique process.....          | 30        |
| 9.16   | Text analytics and text mining.....                | 31        |
| 9.16.1   | General.....                                       | 31        |
| 9.16.2   | Text clustering.....                               | 31        |
| 9.16.3   | Topic modelling.....                               | 32        |
| <b>10</b>  | <b>Deployment to next stage.....</b>               | <b>33</b> |
| 10.1   | Customer needs related information.....            | 33        |
| 10.2   | Product related information.....                   | 33        |
| <b>Annex A (informative) Using sampling surveys.....</b> |  | <b>34</b> |
| <b>Bibliography.....</b>                                 |  | <b>42</b> |