



BSI Standards Publication

Applications of statistical and related methods to new technology and product development process

Part 8: Guidelines for commercialization
and life cycle

National foreword

This British Standard is the UK implementation of ISO/TR 16355-8:2017.

The UK participation in its preparation was entrusted to Technical Committee MS/6, Methodologies for business process improvement using statistical methods.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2017.
Published by BSI Standards Limited 2017

ISBN 978 0 580 80509 7

ICS 03.120.30

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 March 2017.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

TECHNICAL REPORT

ISO/TR
16355-8

First edition
2017-02

Applications of statistical and related methods to new technology and product development process —

Part 8: Guidelines for commercialization and life cycle

*Application des méthodes statistiques et des méthodes liées aux
nouvelles technologies et de développement de produit —*

Partie 8: Lignes directrices pour la commercialisation et le cycle de vie



Reference number
ISO/TR 16355-8:2017(E)



COPYRIGHT PROTECTED DOCUMENT

© ISO 2017, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

Foreword	vi
Introduction	vii
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Basic concepts of QFD	1
5 Integration of QFD and product development methods	2
5.1 QFD support for product development methods.....	2
5.2 Flow of product development with QFD.....	2
5.3 Customers and stakeholders.....	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 Lifestyle and emotional quality deployment	4
8.1 Kansei engineering.....	4
8.2 Setting product image strategy.....	4
8.3 Identifying stakeholders and customers.....	4
8.4 Visiting customers and stakeholders to understand context of use.....	4
8.5 Interviewing and doing ethnographies to understand customer lifestyle and self-image ...	5
8.6 Deriving lifestyle words with a customer lifestyle table.....	5
8.7 Affinity diagram of lifestyle words.....	6
8.8 Hierarchy diagram of lifestyle words.....	6
8.9 Identifying product attributes and set up experimental trials.....	7
8.9.1 Selecting product concepts to be evaluated.....	7
8.9.2 Creating survey of concepts and lifestyle words.....	7
8.10 Statistical analysis of customers' evaluations of products.....	9
8.11 Deploy to design and development.....	10
9 Component deployment	10
9.1 General.....	10
9.2 Modern Blitz QFD®and the maximum value table (MVT).....	11
9.3 Functional requirements-components matrix.....	11
9.3.1 Purpose of the functional requirements-components matrix.....	11
9.3.2 Building the functional requirements-components matrix.....	11
9.4 Component-sub-function matrix and value engineering.....	13
9.4.1 Purpose of the component-sub-function matrix.....	13
9.4.2 Building the component-sub-function matrix.....	13
9.4.3 Value analysis (VA).....	15
9.4.4 Value engineering (VE).....	16
9.5 Function-subassembly and component matrix.....	17
9.5.1 Purpose of the function-components matrix.....	17
9.5.2 Building the function-component matrix (unweighted).....	17
9.6 Subsystem-components matrix.....	17
9.6.1 Purpose of the subsystem-components matrix.....	17
9.6.2 Building the subsystem-components matrix.....	18
9.7 Component-failure mode matrix.....	19
9.7.1 Purpose of the component-failure mode matrix.....	19
9.7.2 Building the component-failure mode matrix.....	19
9.8 Component failure mode and effects analysis (FMEA).....	19

9.8.1	General.....	19
9.8.2	Risk priority number (RPN) calculation	20
9.9	Quality assurance (QA) table	24
9.9.1	Purpose of the QA table.....	24
9.9.2	Building the QA table	24
10	Production method (manufacturing and process) deployment.....	24
10.1	General.....	24
10.1.1	Objective.....	24
10.1.2	Composition.....	25
10.2	Modern Blitz QFD® and the maximum value table (MVT)	25
10.3	Components-manufacturing operations matrix	26
10.3.1	Purpose of the components-manufacturing operations matrix.....	26
10.3.2	Building the components-manufacturing operations matrix.....	26
11	Testing, validation, design review, and prototyping.....	27
11.1	General.....	27
11.2	Testing.....	27
11.2.1	Purpose of components-test matrix.....	27
11.2.2	Building the components-test matrix.....	27
11.3	Validation.....	28
11.3.1	General.....	28
11.3.2	Focus groups.....	28
11.3.3	Kano surveys.....	28
11.3.4	Conjoint analysis.....	28
11.4	Design review.....	29
11.5	Prototyping	29
12	Production planning.....	29
12.1	General.....	29
12.2	Process capability.....	29
12.2.1	C_p	29
12.2.2	C_{pk}	30
12.3	Optimize process.....	30
12.4	Make-or-buy decision	30
12.5	Project work or task management.....	31
13	Build and process planning.....	32
13.1	General.....	32
13.2	Quality control (QC) process planning table.....	32
13.3	Quality control (QC) tables for component production and assembly.....	33
13.4	Process FMEA.....	34
13.5	Work standards	35
13.5.1	QC process table based work standard	36
13.5.2	L-matrix based work standard	36
13.6	Other tools and methods.....	38
14	Build.....	38
14.1	General.....	38
14.2	Applicable tools and methods.....	38
15	Packaging design, logistics, channel management, consumer information, and operating instructions.....	39
15.1	Functional packaging.....	39
15.2	Aesthetics and packaging.....	39
15.3	Logistics.....	39
15.4	Marketing claims.....	39
15.5	Marketing collateral, operating instructions, service and repair documents, service parts.....	40
16	Customer support.....	40
16.1	General.....	40

17	Customer satisfaction	41
17.1	Customer satisfaction surveys.....	41
17.2	Reporting customer satisfaction results.....	42
17.3	Tying customer satisfaction results back to project goals.....	43
18	Product end-of-life disposal, recycle, reuse, and other sustainability concerns	43
19	Flow to next generation development	45
19.1	Generational improvements with modern Blitz QFD®.....	45
19.2	Generational improvements with comprehensive QFD.....	45
19.2.1	General.....	45
19.2.2	Updating comprehensive QFD.....	46
20	Quality assurance network	47
20.1	Objective.....	47
20.2	Composition.....	47
	Bibliography	49

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 69, *Applications of statistical methods*, Subcommittee SC 8, *Application of statistical and related methodology for new technology and product development*.

A list of all parts in the ISO 16355 series can be found on the ISO website.

Introduction

Quality Function Deployment (QFD) is a method to assure customer or stakeholder satisfaction and value with new and existing products by designing in, from different levels and different perspectives, the requirements that are most important to the customer or stakeholder. These requirements are well understood through the use of quantitative and non-quantitative tools and methods to improve confidence of the design and development phases that they are working on the right things. In addition to satisfaction with the product, QFD improves the process by which new products are developed.

Reported results of using QFD include improved customer satisfaction with products at time of launch, improved cross-functional communication, systematic and traceable design decisions, efficient use of resources, reduced rework, reduced time-to-market, lower life cycle cost, improved reputation of the organization among its customers or stakeholders.

This document demonstrates the dynamic nature of a customer-driven approach. Since its inception in 1966, QFD has broadened and deepened its methods and tools to respond to the changing business conditions of QFD users, their management, their customers, and their products. Those who have used older QFD models will find these improvements make QFD easier and faster to use. The methods and tools shown and described represent decades of improvements to QFD; the list is neither exhaustive nor exclusive. Users should consider the applicable methods and tools as suggestions, not requirements.

This document is descriptive and discusses current best practice; it is not prescriptive by requiring specific tools and methods.

Applications of statistical and related methods to new technology and product development process —

Part 8: Guidelines for commercialization and life cycle

1 Scope

This document describes after optimization of product design to address non-functional requirements, for example, test, produce, commercialize, deliver, support, and eventually retire a product from the market and provides guidance on the use of the applicable tools and methods. The goal is to identify and assure key processes and measures in order to satisfy and deliver value to customers and stakeholders. The topics in this document are not exhaustive and vary according to industry, product, and markets. They are considered a guide to encourage users of this document to explore activities needed to accomplish the same goal for their products.

NOTE Some of the activities described in this document can be used at an earlier stage.

Users of this document include all organization functions necessary to assure customer satisfaction, including business planning, marketing, sales, research and development (R&D), engineering, information technology (IT), manufacturing, procurement, quality, production, service, packaging and logistics, support, testing, regulatory, business process design, and other phases in hardware, software, service, and system organizations.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 16355-1:2015, *Application of statistical and related methods to new technology and product development process — Part 1: General principles and perspectives of Quality Function Deployment (QFD)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 16355-1 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

4 Basic concepts of QFD

The basic concepts of QFD are described in ISO 16355-1:2015, Clause 4.