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

Part 4:

Analysis of non-quantitative and quantitative Voice of Customer and Voice of Stakeholder (standards.iteh.ai)

Application des méthodes statistiques et des méthodes liées aux nouv<u>elles technologi</u>es et de développement de produi —

https://standards.iteh.partie 4: Analyse du letour client (Voice of Customer) ou du retour des departies prenantes (Voice of stakholders) quantitatif et non-quantitatif



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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.

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

Introduction

Quality Function Deployment (QFD) is a method to ensure 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 should be 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, and 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 have found that these improvements make QFD easier and faster to use. The methods and tools shown and referenced in this document 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.

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

Part 4: Analysis of non-quantitative and quantitative Voice of Customer and Voice of Stakeholder

1 Scope

This document describes the analysis of the voice of the customer (VOC) and the voice of the stakeholder (VOS). These include translation of VOC and VOS into true customer needs, prioritization of these needs, and competitive benchmarking of alternatives from the customer's perspective. This document also provides recommendations on the use of the applicable tools and methods.

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

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

3 Terms and definitions

For the purpose 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.

5 Integration of VOC and VOS analysis and product development methods

5.1 QFD support for product development methods

QFD support for product development methods is referenced in ISO 16355-1:2015, 5.1.

5.2 Flow of product development with VOC and VOS analysis

5.2.1 Organization of the VOC and VOS analysis

The flow of VOC and VOS analysis methods and tools can vary according to the organization and project requirements. Typically, they begin with broad concerns and through prioritization flow down to specifics.

5.2.2 Outline of VOC and VOS analysis

Figure 1 illustrates the organization of the clauses of this document. Here is an outline of the specific steps and their respective clause numbers. Further in the document, each clause describes the step and suggests applicable methods and tools with guidance that can be used to accomplish the step.

Customers and Stakeholders 9.1.1 Benefits of VOC/VOS analysis 9.1.2 Sources of VOC/VOS 9.1.3 Information types in VOC/VOS 9.2 Translating VOC/VOS int customer needs 10 Structuring information sets 11 Prioritizing customer needs 12 Quantifying customer needs PREVIEW

Figure 1 – VOC and VOS analysis outline

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6 Types of QFD projects

QFD projects can encompass new developments, as well as generational improvements, to existing products. The types of QFD projects are referenced in ISO 16355-1:2015, Clause 6.

7 VOC and VOS analysis team membership

7.1 VOC and VOS analysis uses cross-functional teams

Cross-functional teams are referenced in ISO 16355-1:2015, 7.1

7.2 Core team membership

Core team membership is referenced in ISO 16355-1:2015, 7.2.

7.3 Subject matter experts

Subject matter experts involvement is referenced in ISO 16355-1:2015, 7.3.

7.4 VOC and VOS analysis team leadership

VOC and VOS analysis teams can be led by members of business functions such as sales, marketing, market research, customer service, customer support, and others with firsthand knowledge or contact with customers and stakeholders.

NOTE The VOC or VOS team leader can take a position of being function-agnostic so as to remain neutral to any business department or activity.

8 Seven management and planning tools

The seven management and planning tools are referenced in ISO 16355-2:2017, 8.2.

9 Analysis of the voice of customer (VOC) or voice of stakeholder (VOS)

9.1 General

9.1.1 Benefits of VOC and VOS analysis

The benefits of VOC and VOS analysis include the following.

a) Simplify complex statements into single issue statements.

EXAMPLE A VOC can state that the process should be "quick and easy," but are both equally important? The VOC should be simplified into "quick" and "easy" so that the customer can prioritize more precisely.

b) Discover unspoken or latent customer or stakeholder needs.

EXAMPLE A VOC can state that the customer wishes to tag photographs with meta information. It is reasonable to conclude that the customer can also with to tag videos, music and audio, and other types of non-text information for ease of retrieval.

c) Improve accuracy of prioritizing which customer needs matter most.

Accurate prioritization requires having subject matter knowledge. Generally, customers have more knowledge about their needs than about solutions. Similarly, producers have more knowledge about solutions than customers. So, if VOC or VOS is about a solution, translating it into a need first helps customers prioritize more accurately.

EXAMPLE A VOC for web access states account should have no more than one screen to login, and should have high security. Both are product functions of ease of access and user account security. Translating these into customer needs, these could mean "I can login quickly just to check on my bank balance while at the register", and "my money is safe when making online payments." Depending on the use case, there would be different priorities, and it would be more accurate for customers to prioritize these statements as needs rather than as product functions.

d) Quantify current and hoped for levels of satisfaction.

EXAMPLE A customer buying a laptop computer can more easily state a desire to store twice as many photographs as now, rather than needing a 500 GB hard drive.

e) Benchmark alternatives.

EXAMPLE A customer can more easily relate to how many photos can be stored on one laptop vs another model.

f) Identify selling points.

EXAMPLE Sales promotion and labelling can point to photo storage capacity instead of hard drive size.

g) Keep from arriving at solutions too quickly.

EXAMPLE If solutions are identified before key stakeholder needs have been clarified, then the ability to reconfigure the solution to satisfy missing needs can be precluded. As an example, in information and communications technology (ICT) solution designs, key information access needs can be blocked if extreme information security measures have been committed too early in the solution design. Similarly, if information access needs are translated into solutions independently of consideration of security needs, then solution security vulnerabilities can be introduced that are difficult or costly to address during solution development.

h) Assure solutions are complete.

This ensures consistent quality in the solutions developed later in the product development process.

EXAMPLE A VOC for an industrial vehicle is for a 2,8 m lift height. What the customer forgets to mention is that the loads typically weigh 250 kg and at that height would cause the vehicle to tip. By translating this product specification into a customer need of "I can maximize the footprint of the storage facility," the QFD team was able to determine other product specifications related to centre of gravity, swing arc, mast diameter, and others missing from the original VOC.

i) Greater solution options.

EXAMPLE A VOC for hot coffee translated into "It is cold outside and I want to feel warm." The QFD team identified other solutions for feeling warm, such as alcohol and spice.

j) Predict satisfaction with different solutions.

EXAMPLE A VOC for greater maneuverability of a farm tractor was more clearly understood when translated into customer needs related to the soil type and travel speed. These identified different turning radii that could later be tested in the field.

9.1.2 Sources of VOC and VOS

ISO 16355-2 and ISO 16355-3 identify potential sources of VOC and VOS that include, but are not limited to, the following:

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- a) customer process model things-gone-right and things-gone-wrong;
- b) customer gemba table clarified items; (standards.iteh.ai)
- c) customer support and help systems;
- d) customer supplied specifications: https://standards.iteh.ai/catalog/standards/sist/391caa99-85ba-4413-9476-
- e) focus groups;

f) social media;

- g) free response questionnaires;
- h) interviews;
- i) customer satisfaction surveys and sampling surveys;
- j) lead user analysis;
- k) warranty returns, scrap, maintenance records, unplanned field failures, and complaints;
- l) sales, maintenance, and technical visit reports;
- m) ethnographies;
- n) continuous QFD and collaborative QFD;
- o) design thinking;
- p) conference papers, reports, and journals;
- q) market research;
- r) big data;
- s) gender mainstreaming analysis.

9.1.3 Information contained in VOC and VOS

9.1.3.1 General

VOC and VOS is raw, unprocessed information from the customer or stakeholder. It often includes complaints, needs, functional requirements, performance specifications and targets, solutions, components, materials, activities, information, and other customer or stakeholder statements. The following are examples of different statements or narratives in VOC and VOS. These vary according to the product, service, information technology, or process, but the following are common.

NOTE To be most useful, these can be sorted, analysed, structured, quantified, and prioritized by key customers.

9.1.3.2 Customer or stakeholder use

Information related to customer or stakeholder segment or attributes, modes or environment of use or use case.

EXAMPLE Customer is certified or chartered public accountant working on end-of-year financial statements. Some tax law changes have not been published.

9.1.3.3 Customer needs

The benefit to a customer from having their problem solved, their opportunity enabled, their image (to oneself or to others) enhanced, or being advanced to a more desirable state. Customer needs should be positively stated if possible, and independent of the product.

NOTE A customers need explains why a customer wants something, not what a product does.

EXAMPLE filed on time. I must ensure my client follows all applicable tax codes. I must ensure all applicable tax forms are https://standards.iteh.ai/catalog/standards/sist/391caa99-85ba-4413-9476-

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9.1.3.4 Functional requirements

Inherent performance of the product or an action that the product must be able to accomplish. The manner in which the product accomplishes the action is not part of the functional requirement.

NOTE 1 Can be expressed as a capability.

NOTE 2 Some QFD texts call this a quality element or substitute quality characteristic.

EXAMPLE Tax reporting software must be up-to-date within 24 h of changes. Tax reporting software must flag for tax preparer all applicable changes in tax code since last filing for client.

9.1.3.5 Function

Specific statement of what needs to be done, expressed as a verb plus noun (English), without specifying how to accomplish it. Can be mechanical, human, or software.

EXAMPLE Support weight.

9.1.3.6 Technology

A specific way to enable a function.

EXAMPLE For the function transfer data, technologies include Ethernet, Bluetooth, Wi-Fi, 4G.

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9.1.3.7 Reliability or failure mode

Function or performance expected life, or inability to meet that expected life.

EXAMPLE Product shall have mean time between failures (MTBF) of 1 000 h.

9.1.3.8 Subsystem or component

A part of the product.

EXAMPLE Product filter is replaceable.

9.1.3.9 Material

What the product is made from.

EXAMPLE Stainless steel.

9.1.3.10 Test or regulation

Must meet or pass a test or regulatory requirement.

EXAMPLE 1 Must meet TG-53 and TG-101 regulations.

EXAMPLE 2 Perform routine regulatory analysis and reporting.

9.1.3.11 Process

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Steps, jobs, and tasks the product engages.

EXAMPLE 1 Exposed areas shall be treated with corrosion resistant coating.

EXAMPLE 2 Provide management with consistent, yearly, performance trending benchmarks both internally and externally against available industry peer groups across key operating metrics.

9.1.3.12 Cost

Monies associated with selling price, indirect expenses such as facilities, administration, and equipment, and direct expenses associated with labour, components (purchased or internally sourced), energy, disposal.

EXAMPLE Target price = \notin 17.

9.1.3.13 Manufacturing or build methods

Equipment, facilities, methodologies, and techniques concerning how the product is to be made.

EXAMPLE Sonic welding instead of adhesive.

9.1.3.14 Measurement methods

Methods, equipment, gauges, templates, and their maintenance.

EXAMPLE Must use coordinate measuring machine (CMM) on 1 m concrete base.

9.1.3.15 Quality

Quality assurance, quality control, inspection, and problem solving methods and skills.

EXAMPLE Must follow APQP (advanced product quality planning) phases.