Scheda informativa su nuove norme

La Norma ISO 13053-2 Ed. 1-2012

Metodi quantitativi per il miglioramento dei processi- Sei Sigma

(Quantitative methods in process improvement - Six Sigma -

Parte 2: Tools and techniques

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NOTA. La norma sarà pubblicata da UNI in lingua italiana nel prossimo futuro

Scopo.

Questa seconda parte della ISO 13053 descrive gli strumenti e le tecniche da utilizzare in ciascuna fase dell'approccio; ogni tecnica viene illustrata in specifica scheda.
La metodologia presentata nella Part 1 di ISO 13053 ha validità generale, indipendente dai settori economici o industriali. Ciò rende gli strumenti e le tecniche descritti in questa norma applicabili in ogni settore di attività e in ogni dimensione di business, con l'intento di guadagnare un vantaggio competitivo.

Indice

[1] Gennaio 2013 -RIPRODUZIONE VIETATA SENZA IL CONSENSO DI AICQ CENTRONORD E DELL'AUTORE

La Norma ISO 13053-2 Ed. 1-2012

Metodi quantitativi per il miglioramento dei processi- Sei Sigma

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Parte 2: Tools and techniques

Introduzione

Le pratiche del sei sigma sono progettate per essere funzionali a guidare il miglioramento dei processi, a prendere decisioni statisticamente fondate, a misurare i risultati di business con un livello di fiducia, premunendosi verso incertezze ed errori, combinando benefici e altri ritorni nel breve, medio e lungo termine, e rimuovendo lo spreco da ogni processo.

Il punteggio di sigma (scritto Zvalore) è un indicatore della qualità del processo che esprime la prestazione di un processo in termini di capacità a fornire un prodotto o servizio che incontra le attese e le specifiche del cliente e delle parti terze. Esso è direttamente collegato :

-alla proporzione di esiti buoni o positivi (rese) generate da un processo, oppure

-alla proporzione di esiti cattivi o negativi (percento, ppm o difetti per milione- (DPMO)]) da un processo.

La seguente tabella traduce il sette al valore nella proporzione di difetti che possono essere aspettati.

Calculated value of DPMO (YDPMO)	Sigma score (Zvalue)
308 538,0	2
66 807,0	3
6 210,0	4
233,0	5
3,4	6
NOTE A full table of sigma scores can be found in ISO 13053-1:2011, Annex A.	

4 -Sequenza del processo DMAIC

Ciascuna delle cinque fasi viene articolata in obiettivi e operazioni specifiche.

4.1 Define phase

4.1.1 Obiettivi

Gli obiettivi di questo passaggio sono:

a) Identificare i requisiti e le attese delle parti interessate

b) Identificare la voce dei clienti delle parti terze (CTQC, etc.),

c) selezionare il gruppo di progetto

d) sviluppare la mappa del processo (SIPOC), visualizzare i dati (Pareto)

e) costituire il progetto.

4.1.2 Passaggi

4.1.2.1 Step 1

Identificare i clienti e le parti interessate, capire i loro bisogni e tradurli in requisiti misurabili. Fissare gli obiettivi di miglioramento.

Techniques	Scheda o International Standard
Customer claims, market feedback, surveys	Scheda 04, ISO 9001 or other management stds
Third party expectations, ethics surveys	Scheda 04, ISO 14001 or other management stds
ROI, costs and accountability	Scheda 01
Six Sigma indicators	Scheda 20
Affinity diagram	Scheda 02
Kano model	Scheda 03
CTQ requirements	Scheda 04
House of quality	Scheda 05

4.1.2.2 Step 2

Definire e stabilire gli obiettivi del gruppo di progetto: scadenze,risultati attesi, vincoli, rischi, ritorno dell'investimento, competenze e scopo del progetto.

Techniques	Scheda o International Standard
Project charter	Scheda 07
Project planning tool: Gantt chart, project schedule	Scheda 08
RACI competencies matrix	Scheda 28
ROI, costs and accountability	Scheda 01
Project risk analysis (in Project charter)	Scheda 07

4.1.2.3 Step 3

Caratterizzare le attività o il processo.

Techniques	Scheda o International Standard
SIPOC	Scheda 09
Process mapping and process data	Scheda 10

La norma procede con analoga impostazione per tutti gli altri sotto -punti del Cap. 4 dell'indice (che non possono qui essere riportati).

La norma contiene inoltre, in allegato, la seguente lista di SCHEDE, particolarmente significativa, relative ai metodi e strumenti citati dalla norma.

Annex A (informativo) Schede

Scheda 01 — ROI, costs and accountability

Scheda 02 — Affinity diagram

Scheda 03 — Kano model

Scheda 04 — CTQ tree diagram

Scheda 05 — House of quality

Scheda 06 — Benchmarking

Scheda 07 — Project charter

Scheda 08 — Gantt chart

Scheda 09 — SIPOC

Scheda 10 — Process mapping and process data

Scheda 11 — Prioritization matrix

Scheda 12 — Cause and effect diagram

Scheda 13 — Brainstorming

Scheda 14 — Failure mode and effects analysis (FMEA)

Scheda 15 — Measurement system analysis (MSA)

Scheda 16 — Data collection plan

Scheda 17 — Determination of sample size

Scheda 18 — Normality testing

Scheda 19 — Descriptive statistics visualization tools

Scheda 20 — Indicators

Scheda 21 — Waste analysis

Scheda 22 — Value stream analysis (VSM)

Scheda 23 — Services delivery modelling

Scheda 24 — Hypothesis testing

Scheda 25 — Regression and correlation

Scheda 26 — Design of experiments (DOE)

Scheda 27 — Reliability

Scheda 28 — RACI competencies matrix

Scheda 29 — Monitoring / control plan

Scheda 30 — Control charts

Scheda 31 — Project review

Ogni scheda è costituita da una pagina in cui sono riportati gli elementi essenziali di ogni tecnica.

Ne riportiamo nel seguito alcuni esempi.

Factsheet 01 — ROI, costs and accountability

WHAT DOES IT INVOLVE?

A Six Sigma project aims at improving operating profit or revenue or both. It is important to manage this programme as any business task with

a) operating and financials objectives (ROI and costs),

b) an accounting model that illustrates the expenses and incomes of the project, and

c) a budgeting process to help manage the Six Sigma project on a medium term time scale.

WHAT ROLE DOES IT PLAY?

ROI and cost accounting provide the proof that a Six Sigma project will deliver financial results.

ROI techniques, combined with an appropriate accounting model, help to manage the progress of a project and verify that each milestone is within the scope of the financial target.

WHAT NEEDS TO BE DONE?

There are three steps :

1. Build a cost accounting model for the Six Sigma project.

   A Six Sigma project is driven by a process principle: the value of it is the difference between the value of the outputs of the activities and their costs. Each activity produces revenues (linked to the outputs) but also generates some costs. The cost accounting is a breakdown of the general accounting with some specific accounts for the cost and revenue of a process activity.

   The cost accounting offers an identical vision for both the finance and the operational departments about the revenues and the costs of a process. It is important that the financial and the operation departments use the same accounting model for business performance.

   As a result, cost accounting is able

   to give the cost and revenue of each unit from a process, and

   to build the accounting process for the value chain.

2. Establish the ROI for the project.

   The main objective of this step is to provide a recommendation to fund the project, or not.

   The ROI calculation must be understandable in the cost accounting model built in Step 1.

3. Build the budget and manage the project.

   For a medium or a long term Six Sigma project, the timing of the improvement effort, and the timing of the anticipated benefit, will be different, and most probably expenditure will start before any benefits are accrued. A budget is a tool that allows the scheduling of both income and expenditure.

GUIDELINES

ROI and cost accounting is an ongoing process that supports all activities and processes.

TO FIND OUT MORE:

Factsheet 02 — Affinity diagram

WHAT DOES IT INVOLVE?

The "affinity diagram", sometimes referred to as the "KJ method", was devised by Jiro Kawakita.

The method involves gathering all the ideas, opinions and reactions raised by subjects or specific questions and then organising and sorting them to facilitate more structured analysis and discussion.

This method generally follows on from a brainstorming session (see Factsheet 13).

WHAT ROLE DOES IT PLAY?

The affinity diagram provides a straightforward approach for handling subjective ideas, affective impressions or highly personal perceptions. The tool generates important clues for identifying real causes.

The affinity diagram is useful to promote the involvement of a group of people in addressing issues and concerns by getting people to organize their data into a structure that is natural to the participants.

WHAT NEEDS TO BE DONE?

Through topic-based group work, each participant airs their ideas, concerns and feelings in response to the subject raised.

Each idea is recorded onto a note card or a "sticky note". The moderator clarifies the ideas aired where appropriate, and asks the participants to classify inter-related ideas into categories. One idea may be classified under more than one different category.

Sticky notes carrying "loner" ideas that do not seem to fit are put back with the so-far unsorted notes.

The group reviews the pattern of categories and may choose to produce new sub-categories or groupings.

When, and only when, all the sticky notes have been satisfactorily classified, the focus group selects a heading for each category.

The final pattern of inter-category relationships can be reviewed to highlight and then analyse the causes of the problem.

GUIDELINES

This tool can be used alongside other, more fact-based and more measure-based tools.

Associations between ideas need to be intuitive. A single category can contain only one idea note card.

Keeping the classification process as short as possible will let the categories emerge naturally, using the right side of the brain, leaving no time for rational explanations and reasoned advocacy.

TO FIND OUT MORE:

See Brassard [32] and Rochet [45].

Factsheet 05 — House of quality

WHAT DOES IT INVOLVE?

The "house of quality" is a matrix tool for identifying and formulating relationships between:

1. customer expectations or the objectives targeted; and
2. the solutions put forward or regular practices (functional specifications).

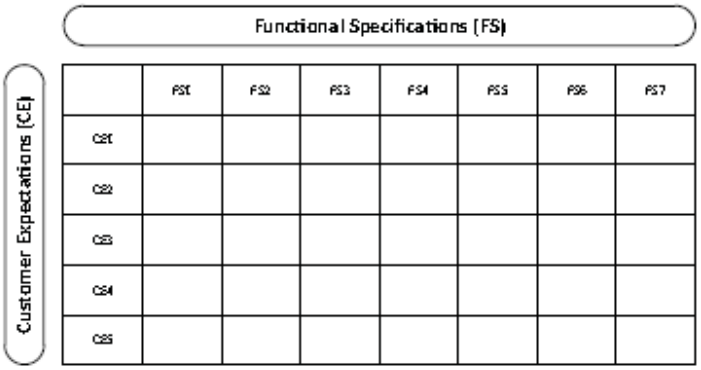
The house of quality belongs to the quality function deployment (QFD) process that embraces the entire cycle of the product life, from customer expectations to the product / service delivery, maintenance and retrieval.

WHAT ROLE DOES IT PLAY?

The tool is designed to formulate different decision criteria and cross-check solutions against customer expectations. The tables produced make it possible to draw together a focus group's opinions and thereby facilitate decision making.

The method also makes it possible to integrate design engineering considerations and nurture a customer-centric viewpoint.

House of Quality



WHAT NEEDS TO BE DONE?

The tool works in four steps:

1. identify the solutions (functional specifications) put forward and the targeted objectives (customer expectations, for example);
2. define internal relationships:
   a. relationships and design constraints between the solutions offered (functional specifications), and
   b. relationships and design constraints between the objectives targeted (customer expectations);
3. assess how the solutions offered fit the objectives targeted; and
4. "weigh-up" the suggested solutions and the objectives targeted.

GUIDELINES

Pre-requisites for deploying this tool include

i. capture the "voice of the customer", document the objectives targeted, candidate solutions, etc., and
ii. a cross-functional focus group.

TO FIND OUT MORE:

See Fiorentino [37], Mizuno [41], Vigier [48] and Yoji [49].

Factsheet 10 — Process mapping and process data

WHAT DOES IT INVOLVE?

Process flow mapping is a visual display tool for representing and analysing a process flow.

The process map is a formalized representation of a flow. Process mapping yields a single map featuring all the processes and their interactions. The business process map is used to analyse the interactions between many processes. Any individual process may include a number of flows, but not every business flow is contained in this process. There is no one-to-one relationship between processes and flows, for several reasons:

a. some flows are left out as the process does not describe all the real-world flows involved in the activity or the process may be poorly formalized;

b. there are many flows that do not need to be formalized (filing into cabinets, moving between workshops, etc.), the process should only map out significant flows (otherwise it would be impossible to navigate through them); and

c. at any given moment in time, the process will cover the main flows, but changes in practices combined with the constant drive towards improvement will mean that some flows get phased out while new flows get created, and there is no reason for these new flows to be contained in a single process.

WHAT ROLE DOES IT PLAY?

Gives an in-depth display of process activities for a flow.

WHAT NEEDS TO BE DONE?

Symbolic representation designed to establish:

1. movements;
2. process steps (transforming or assembling) that are value-added for the customer;
3. "non-value-added" process steps;
4. waiting time (including work in progress stocks); and
5. the value-added ratio.

GUIDELINES

Training for users.

Use a symbols library.

TO FIND OUT MORE:

See Biteau [30] and Crouhy [34].

Factsheet 27 — Reliability

WHAT DOES IT INVOLVE?

Reliability is a characteristic of an item, component, sub-assembly, process, system or network that indicates the ability of the item to perform its purpose for a given period of time and under a given set of conditions. Non-repairable items means zero failures from the time they are commissioned into operation.

Since repairable equipment may require preventive or corrective maintenance, reliability is expressed as availability, the ratio of time in a state of able readiness to the total amount of time the item is called upon.

Equipment that is held on standby (such as safety equipment) or stock and that needs to be fully operational as soon as required tends to have to be designed to meet specific reliability features.

Software reliability is managed through particular field-specific methods.

WHAT ROLE DOES IT PLAY?

Reliability gives confidence. Not only is reliability a strong selling point, it is also pivotal information to how equipment usage is organized: forecasting uninterrupted periods of operational activity, with its impact on productivity, implementing support by scheduling maintenance plans (frequencies, levels, resources employed), assessing unit quantities of spare parts and equipment stocks.

WHAT NEEDS TO BE DONE?

Reliability is determined on failure periods.

The indicators of on-line or off-line (testing) reliability are MTTF (mean time to failure) and MTBF (mean time between failures). The first is the average time an item remains operational before it fails for the first time. The indicator for repairable items is MTBF, the mean time between two consecutive failures.

The probability distribution of failure according to time is obtained by adjusting the failure time data to fit statistical distributions – the negative exponential distribution for electronic systems, and the Weibull distribution for mechanical systems.

The reliability indicator for a fleet of equipment is the proportion of equipment ready for service at a given point in time or on average over a given timeframe.

Reliability prediction is an approach employed upstream of the new product development phase, or before making changes, i.e. when specifications are drafted or as part of the design phase. Depending on available input, the approach draws on feedback on previous products or similar products, on databases, and on expert opinion, since experts can provide *a priori* knowledge.

In order to maintain reliability over a long period of time, the deployment of a TPM (total productive maintenance) plan is recommended.

GUIDELINES

Reliability hinges on consistent data collection, including records of incidents and technical events, through every stage of the product life cycle.

For repairable equipment, opt for the RCM (reliability-centred maintenance) method.

TO FIND OUT MORE:

See Crowder [35] and for details, BS 5760 [25].

La norma richiama la seguente, ricca bibliografia.

[1] ISO 2854, Statistical interpretation of data — Techniques of estimation and tests relating to means and variances

[2] ISO 3534-1, Statistics — Vocabulary and symbols — Part 1: General statistical terms and terms used in probability

[3] ISO 3534-2:2006, Statistics — Vocabulary and symbols — Part 2: Applied statistics

[4] ISO 3534-3, Statistics — Vocabulary and symbols — Part 3: Design of experiments

[5] ISO 5479:1997, Statistical interpretation of data — Tests for departure from the normal distribution

[6] ISO 7870-1:2007, Control charts — Part 1: General guidelines

[7] ISO 9000:2005, Quality management systems — Fundamentals and vocabulary

[8] ISO 9001:2008, Quality management systems — Requirements

[9] ISO/TR 10017:2003, Guidance on statistical techniques for ISO 9001:2000

[10] ISO 11453, Statistical interpretation of data — Tests and confidence intervals relating to proportions

[11] ISO/TR 12845, Selected illustrations of fractional factorial screening experiments

[12] ISO/TR 12888, Selected illustrations of gauge repeatability and reproducibility studies

[13] ISO/TR 13195, Selected illustrations of response surface method

[14] ISO 14001:2004, Environmental management systems — Requirements with guidance for use

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