First edition
2015-01-15

Statistical methods — Six Sigma — Basic criteria underlying benchmarking for Six Sigma in organisations

Méthodes statistiques — Six Sigma — Critères fondamentaux d'une évaluation comparative Six Sigma pour les organisations

Reference number
ISO 17258:2015(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

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 WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword — Supplementary information.

The committee responsible for this document is ISO/TC 69, *Statistical methods*, Subcommittee SC 7, *Six Sigma*.

Introduction

Benchmarking is frequently used in various domains in connection with business activities. The Six Sigma methodology requires an evaluation step using a benchmarking process. In other words, a method for the comparison of levels of quality, performance, and productivity with the state-of-the-art is required. This International Standard establishes what to compare and develops a methodology to conduct a correct comparison between an organization's levels of quality, performance, and productivity. The numbers given by the benchmarking can be integrated into any improvement programme to quantify any progress. They can also be used by other assessment processes in the organization such as regulation compliancy or financial performance evaluation.

Benchmarking is the whole process of collecting and processing data and information and comparing the results. The benchmark is the reference point for comparison.

The main point of this benchmarking methodology, based on transparency and the universal principle of evaluation, is to give confidence to its calculating procedures and the results, so that comparisons between organizations are accepted by all parties.

Benchmark and Six Sigma's principles

The Sigma measure is a number ranging from, typically, near zero to 10 or more. The value six has traditionally been considered "world class" (that can be approximated by 3,4 defects per million opportunities — see ISO 13053-1 5.3) for mechanical and electronic industries. The criticality of defects within each industry typically defines the Sigma level required in order to be a "world class" benchmark quality level for that application. So, according to the different sectors and markets, the level of "world class" can be different.

The Sigma level is an estimate of the proportion of defects (typically expressed in defects per million). A "world class" Sigma level is the Sigma level that is considered essential to consistently deliver excellence of product and service.

This benchmarking method is applicable to all types of sectors, to all type of processes, to organizations of all sizes, and to all methodologies for improvement, in association with DMAIC, or issues relating to Design for Six Sigma (DFSS).

Criteria and defects

The Sigma level is based on the ratio of estimated (or observed or predicted) number of defects to the number of opportunities according to the specifications and the variability of the process (for example, one "defect" in a million deliveries).

A defect is something that a customer or a user cannot accept or it might have a negative impact on performance.

Two types of customer are identified:

— the end user or consumer (Business to Consumer) and

— the professional (Business to Business).

The consumer has some needs but these needs are often implicit. Product requirements that address these needs are not numerous and they can be summarized by the following:

a) to be safe in its intended usage (security, safety);

b) to do what it is supposed to do (functional, conformity);

c) to be available in the expected shape and not to break in its intended usage (availability, ease of use, reliability);

d) to not do any harm to persons (ethical) or environment (pollution control).

These four criteria cover most of the consumer's needs for all sectors and on all continents.

A customer will have other criteria but all of these are likely to be summarized by the four generic criteria described above.

Supply chain

A supply chain is the whole supplier/transformer link from the raw material to the final product or the service for the consumer. Each sector has its supply chain organization.

Examples:

— Petrol sector — from the offshore extracting (extractor) unit to the gasoline retailer for consumers.

— Food sector — from the fields and orchards (raw material) to the consumer.

— Automotive sector — from the steel and glass supplier to the car manufacturer.

— Cosmetic sector — from the molecule to the perfume or beauty cream.

The level of quality and performance delivered to the consumer is the "total" of all quality and performance levels of the different transformers along the supply chain.

This benchmarking methodology aims to give a comparison of levels between upstream and downstream transformers (chain efficiency benchmarking) or between transformers at the same step (competitive benchmarking).

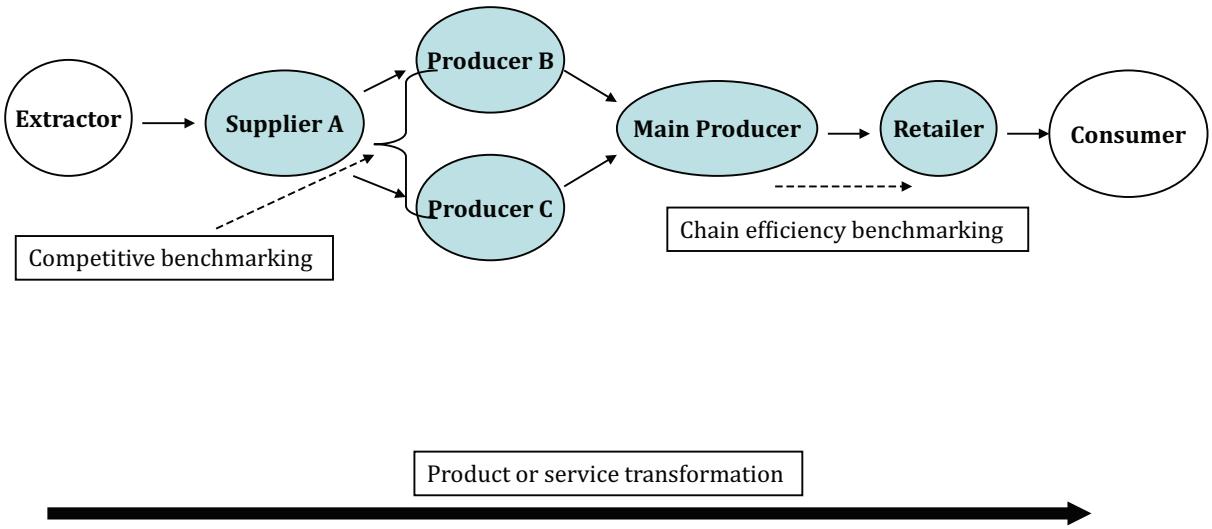

Figure 1 — Supply Chain Cycle