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Information technology — Process assessment — Process assessment model for quantitative processes to support higher levels of process capability in ISO/IEC 33020

Technologies de l'information — Évaluation du processus — Modèle d'évaluation du processus pour les processus quantitatifs pour prendre en charge des niveaux plus élevés de capacité du processus dans l'ISO/IEC 33020

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Foreword

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This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology,* Subcommittee SC 7, *Software and systems engineering.*

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Introduction

The standards on process assessment developed by ISO/IEC JTC 1/SC 7 define the requirements and resources needed for process assessment. The overall architecture and content of standards on process assessment developed by ISO/IEC JTC 1/SC 7 is described in ISO/IEC 33001. Several standards on process assessment developed by ISO/IEC JTC 1/SC 7 are intended to replace and extend parts of the ISO/IEC 15504 series. Abstracts and previews of on process assessment developed by ISO/IEC JTC 1/SC 7 can be found on the ISO and IEC websites.

A process assessment model is related to one or more process reference models. The process reference model for quantitative processes is used as the basis for the process assessment model in this document.

A process assessment model incorporates a process measurement framework conforming to the requirements of ISO/IEC 33003 and is expressed as a process quality characteristic with a defined set of process attributes.

A process assessment model includes a set of assessment indicators. Process performance indicators address the process purpose and outcomes of each process in the process assessment model. Process quality indicators demonstrate the achievement of the process attributes in the process measurement framework. These indicators may also provide a reference source of practices when implementing a process improvement program.

The assessment indicators are used as a basis for collecting objective evidence to support an assessor's judgement in assigning ratings of the performance and quality of an implemented process. The set of indicators defined in this document are not intended to be an all-inclusive set and applicable in its entirety. Subsets appropriate to the context and scope of the assessment should be selected and potentially augmented with additional indicators.

A process assessment is conducted according to a documented assessment process. A documented assessment process identifies the rating method to be used in rating process attributes and identifies or defines the aggregation method to be used in determining ratings.

Information technology — Process assessment — Process assessment model for quantitative processes to support higher levels of process capability in ISO/IEC 33020

1 Scope

This document defines a process assessment model for quantitative processes, conforming to the requirements of ISO/IEC 33004, for use in performing a process assessment in accordance with the requirements of ISO/IEC 33002.

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/IEC 33001, *Information technology — Process assessment — Concepts and terminology*

ISO/IEC 33004:2015, *Information technology — Process assessment — Requirements for process reference, process assessment and maturity models*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 33001 apply.

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 The process assessment model

4.1 General

This document provides a basis for a process assessment model that is two-dimensional. In one dimension, the process dimension, the processes are defined and classified into process groups together with the set of assessment indicators of process performance. In the other dimension, the quality dimension, for each process attribute in the process measurement framework a set of process quality indicators is defined for the selected process quality characteristic.

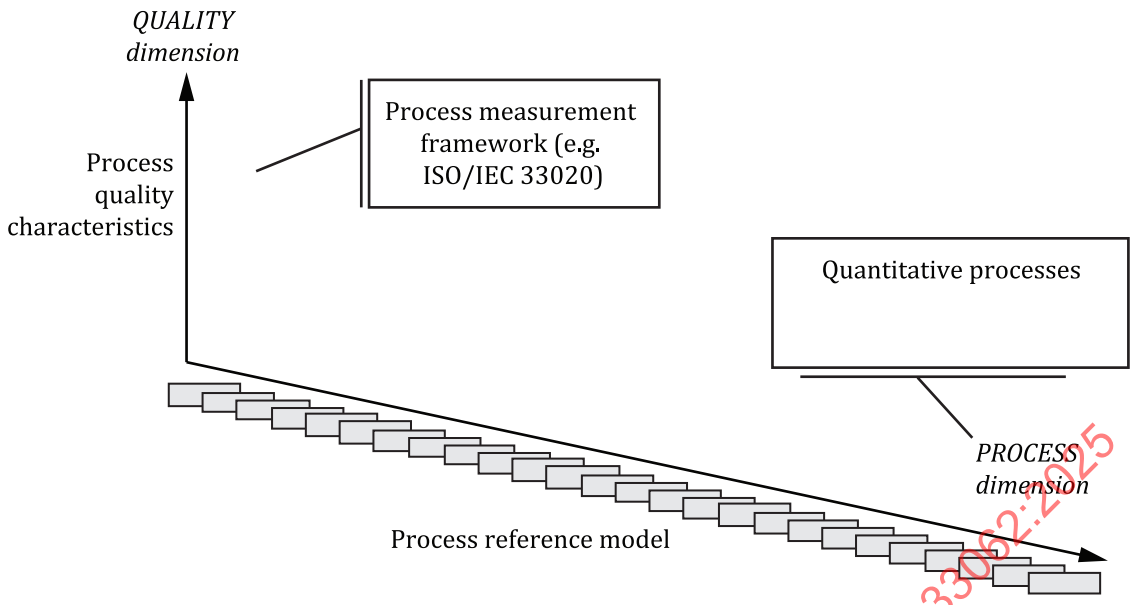

Figure 1 — Structure of the process assessment model

Figure 1 shows the process assessment model as a two-dimensional model, the process dimension with its relationship to quantitative processes, and the quality dimension in relationship to a process measurement framework.

Users of this document may freely reproduce the detailed descriptions contained in the assessment model as part of any tool or other material to support the performance of process assessments, so that it can be used for its intended purpose.

4.2 Structure of the process assessment model

4.2.1 General

This subclause describes the detailed structure of the process assessment model and its key components.

The process dimension comprises the set of processes defined with process purpose and process outcomes together with a set of assessment indicators of process performance.

Processes included in a process reference model shall be in accordance with ISO/IEC 33004:2015, 5.4.

The processes in this document meet the ISO/IEC 33004 requirements for process descriptions, process purposes and outcomes.

The quality dimension comprising a set of process attributes for a selected process quality characteristic is incorporated as a process measurement framework together with a set of process quality indicators.

NOTE ISO/IEC 33020 provides a process measurement framework for the assessment of process capability which can be incorporated into this document. ISO/IEC 33020 also includes a set of process quality indicators for each process attribute in the process measurement framework.

4.2.2 Processes

Figure 2 lists the processes that are included in the process dimension of the process assessment model and shows their classification into a process group.

The process group and its associated processes are described in Clause 5. The description of each process group includes a characterization of the processes it contains. In this process assessment model, each process belonging to a group is identified with a process identifier [ID] consisting of the group abbreviated name and the sequential number of the process in that group.

Quantitative processes (QNT)
QNT.1 Quantitative performance management
QNT.2 Quantitative process improvement

Figure 2 — Process groups

4.2.3 Process dimension

Each process is described in terms of a purpose statement. These statements contain the unique functional objectives of the process when performed in a particular environment. A list of specific process outcomes is associated with each of the process purpose statements, as a list of expected positive results of the process performance.

4.2.4 Quality dimension

For the quality dimension, the minimum requirement is that the process is performed, i.e. the implemented process achieves its process purpose and the expected outcomes are observable.

Process attributes are features of a process that can be evaluated on a scale of achievement, providing a measure of the quality of the process and are applicable to all processes.

4.3 Assessment indicators

A process assessment model is based on the principle that the quality of a process can be assessed by demonstrating the achievement of process attributes on the basis of evidences related to assessment indicators.

There are two types of assessment indicators: process performance indicators and process quality indicators. Process performance indicators address the process purpose and outcomes of each process in the process dimension. Process quality indicators demonstrate the achievement of the process attributes in the quality dimension.

The process performance indicators are:

— base practice (BP);

— process input (PI);

— process output (PO).

The performance of base practices (BPs) provides an indication of the extent of achievement of the process purpose and process outcomes. Process outputs (POs) are either used or produced (or both), when performing the process. Information items that are the key outputs of the processes are primarily used as performance indicators.

Annex A provides the list of process outputs associated with the processes in Clause 5. The process outputs are identified by categories. The process outputs are indicated by process IDs.

Process quality indicators depend on the process quality characteristic of interest. The minimum requirement is that at least one of the process attributes shall comprise the achievement of the defined process purpose and process outcomes for the process; this is termed the process performance attribute (see ISO/IEC 33003:2015, 4.2.1). Other process quality attributes can be defined as needed.

The process performance and process quality indicators represent types of objective evidence that might be found in an instantiation of a process and therefore could be used to judge achievement of quality. Figure 3 shows how the assessment indicators are related to process performance and process quality.

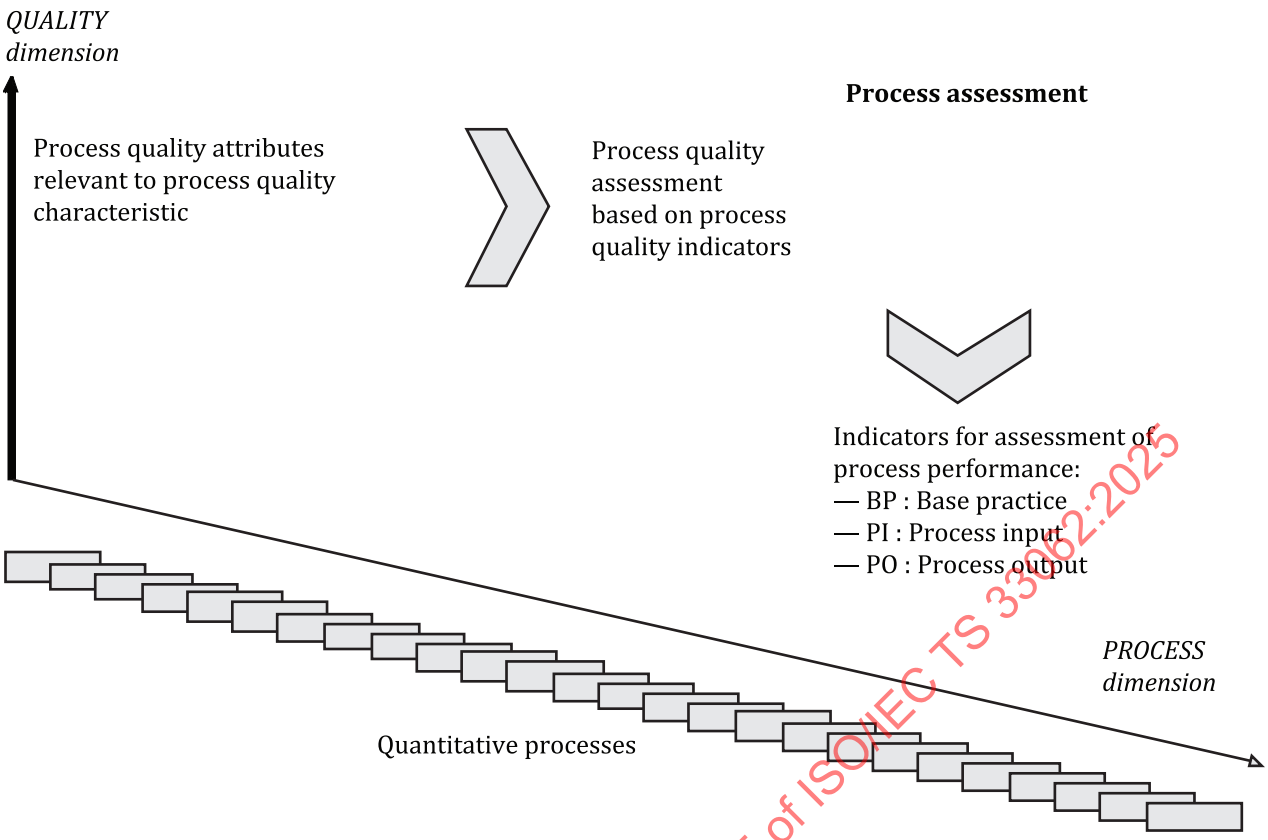

Figure 3 — Assessment indicators

5 The process dimension

5.1 General

The process dimension comprises the set of processes defined with process purpose and process outcomes together with a set of assessment indicators of process performance.

The individual processes each have a process identifier [ID] consisting of the process group abbreviated name and the sequential number of the process in that group and are described in terms of process name, process purpose, and process outcomes as described in ISO/IEC/IEEE 24774.

In addition, the process dimension of the process assessment model provides information in the form of a set of:

a) base practices for the process providing a definition of the tasks and activities needed to accomplish the process purpose and fulfil the process outcomes; each base practice is associated to one or more process outcomes; and

b) process outputs that are related to one or more process outcomes.

The process purposes, outcomes, base practices and process outputs associated with the processes are included in this clause. The base practices and process outputs constitute the set of indicators of process performance.

A documented assessment process and assessor judgment is needed to ensure that process context (application domain, business purpose, development methodology, size of the organization, etc.) is considered when using this information.

5.2 Quantitative processes (QNT)

The process dimension comprises the set of quantitative processes defined with process purpose and process outcomes together with a set of assessment indicators of process performance, namely, base practices and input and output information items. See Table 1 and Table 2.

Table 1 — QNT.1 Quantitative performance management

Process ID	QNT.1
Name	Quantitative performance management
Purpose	The purpose of the quantitative performance management process is to establish and maintain a quantitative understanding of the performance of the organization's processes through measurement and the use of appropriate quantitative techniques to ensure that performance of the organization's implemented processes support the achievement of the organization's relevant business goals.
Process outcome	As a result of full achievement of this process attribute: 1) Processes or process elements are selected for quantitative management on the basis of their relevance and significance to the achievement of business goals; 2) Measures and analytical techniques to be used in quantitatively managing the processes or process elements are established and maintained; 3) Process performance data is collected and analysed using appropriate statistical or other quantitative techniques to establish an understanding of the variation of the selected processes or process elements; 4) Special causes of variation (assignable causes) in process performance are identified; 5) Corrective and preventive actions are implemented to address the special and other causes of variation to the business quality and performance objectives; 6) Performance of the selected processes or process elements is monitored and controlled to establish stable, capable and predictable processes within control limits.
Base practices	**QNT.1.BP1 Determine the business goals to be addressed by quantitative management.** 1) Select the relevant business goals from the organization's business goals to be addressed by quantitative measurement. [Process outcome 1] **QNT.1.BP2 Select the processes or process elements to be addressed by quantitative management based on the relevant business goals.** 1) Select the processes or process elements from the organization's set of standard processes that are to be included in the organization's quantitative measurement. [Process outcome 1] **QNT.1.BP3 Establish the organization's set of appropriate quantitative techniques.** 1) Establish the organization's set of statistical or other quantitative techniques to manage the organization's set of processes. [Process outcomes 1,2] **QNT.1.BP4 Collect and analyse the measurement data.** 1) Analyse the measurement data using the organization's set of statistical or quantitative techniques to establish an understanding of the variation of the selected processes or process elements. [Process outcomes 3,6] **QNT.1.BP5 Establish the control limits of process performance.** 1) Establish and maintain the control limits of process performance for the process or process elements based on historical data. [Process outcome 6] **QNT.1.BP6 Identify and analyse special causes of variation.** 1) Identify and analyse special causes of variation to determine the root cause. [Process outcome 4] **QNT.1.BP7 Determine the corrective and preventative actions.** 1) Determine corrective and preventative actions (as needed) to be taken to address the special and other causes of variation to prevent re-occurrence. [Process outcomes 5,6] **QNT.1.BP8 Implement the corrective and preventative actions.**

Table 1 *(continued)*

	1) Implement the corrective and preventative actions (as needed) to address variances outside control and performance limits. [Process outcome 5] **QNT.1.BP9 Monitor the performance of the selected processes or process elements.** 1) Monitor the performance of the selected processes or process elements to establish stable, capable and predictable processes within control and performance limits. NOTE An organization may establish process performance models based on organizational process performance baselines to establish predictable processes. [Process outcome 3]
Inputs	
03-04 Customer satisfaction data [Process outcome 3] 03-06 Process performance data [Process outcome 3] 07-05 Project measure [Process outcome 2] 07-06 Quality measure [Process outcome 2] 08-13 Quality plan [Process outcome 1]	
Outputs	
03-06 Process performance data [Process outcome 3] 07-01 Customer satisfaction survey [Process outcome 3] 07-04 Process measure for performance management [Process outcome 2] 07-10 Process performance model for performance management [Process outcome 2] 10-06 Process control limit [Process outcomes 4,6] 14-02 Corrective action register for performance management [Process outcome 5] 14-12 Preventive action register for performance management [Process outcome 5] 15-01 Analysis report for performance management [Process outcome 3] 15-08 Risk analysis report [Process outcome 6] 15-18 Process performance report [Process outcome 6] 16-06 Process repository [Process outcome 1] 16-07 Measurement repository [Process outcome 3] 19-02 Process strategy [Process outcome 1] 19-15 List of selected processes and/or process elements [Process outcome 1]	

Table 2 — QNT.2 Quantitative process improvement

Process ID	QNT.2
Name	Quantitative process improvement
Purpose	The purpose of the quantitative process improvement process is to improve the performance of selected processes that are fundamental to achieve an organization's business goals in a systematically planned and predictable manner, based on quantitative analysis of the impact of the proposed changes.
Process outcome	As a result of full achievement of this process attribute: 1) New processes, new technologies and new process concepts are examined to identify improvement opportunities on the basis of their relevance and significance to the achievement of key business goals; 2) Results of data analysis are used to identify common causes of variation in process performance and opportunities for best practice and innovation; 3) Each improvement opportunity is analysed and selected based on their relevance and significance to the achievement of business goals; 4) Process improvements are piloted to select those for implementation across the organization; and 5) Process improvements are deployed and the effects of implementation are quantitatively analysed on the basis of actual performance against the defined process improvement objectives.
Base practices	**QNT.2.BP01 Identify improvement opportunities.**

Table 2 *(continued)*

	1) Identify potential improvement opportunities for processes, arising from new technologies and process concepts. [Process outcome 1] **QNT.2.BP02 Identify common causes of variation.** 1) Analyse process performance and other data using of statistical or quantitative techniques to identify common causes of variation. [Process outcome 2] **QNT.2.BP03 Identify opportunities for best practice and innovation.** 1) Analyse process performance and other data to identify opportunities for best practice and innovation. [Process outcome 2] **QNT.2.BP04 Select the improvement opportunities.** 1) Select the improvement opportunities based on their relevance and significance to the achievement of business goals. [Process outcome 3] **QNT.2.BP05 Establish process improvement objectives for improvement opportunities.** 1) Analyse the costs, benefits, and risks of the improvement opportunities and the contribution towards meeting the organization's process performance objectives. [Process outcome 3] **QNT.2.BP06 Establish quantitative measures for the improvement opportunities.** 1) Establish quantitative measures for improvement opportunities with respect to the process improvement objectives. [Process outcomes 1,4] **QNT.2.BP07 Plan the pilot improvements.** 1) Select and plan the pilot improvements including criteria to be used for evaluating results in order to gain early feedback on the potential benefits. [Process outcome 5] **QNT.2.BP08 Review the results of pilot improvements.** 1) Review the results of pilots to determine whether to proceed with organization wide deployment. [Process outcome 4] **QNT.2.BP09 Select improvements to be deployed.** 1) Prioritize and select candidate improvements for deployment based on priorities and available resources. [Process outcome 3] **QNT.2.BP10 Monitor the deployment of the improvements.** 1) Plan and monitor the deployment of the improvements according to the deployment plan. [Process outcome 5] **QNT.2.BP11 Measure progress towards achieving process improvement objectives.** 1) Quantitatively measure the progress towards achieving the defined process improvement objectives on the basis of actual performance. [Process outcome 5] **QNT.2.BP12 Take corrective actions when process improvement objectives are not achieved.** 1) Take corrective actions when process improvements fail to meet the defined process improvement objectives. [Process outcome 5]
Inputs	
03-03 Benchmarking data [Process outcome 1] 05-02 Business goals [Process outcome 1] 05-07 Process performance goal [Process outcome 2] 07-09 Quantitative analysis technique [Process outcome 2] 09-02 Quality policy [Process outcome 1] 10-05 New process concept [Process outcome 1] 15-04 Market analysis report [Process outcome 1] 15-14 Customer satisfaction report [Process outcome 1] 16-01 Assessment results repository [Process outcome 2] 16-07 Measurement repository [Process outcome 2] 19-13 Decision-making strategy [Process outcome 3] 19-14 Selection criteria [Process outcome 3]	
Outputs	

Table 2 *(continued)*

06-04 Training material [Process outcome 5]
07-11 Process measure for improvement [Process outcome 1]
07-12 Process performance model for improvement [Process outcome 3]
08-13 Quality plan [Process outcome 4]
08-29 Improvement plan [Process outcome 5]
14-13 Corrective action register for improvement [Process outcome 5]
14-14 Preventive action register for improvement [Process outcome 3]
15-05 Evaluation report [Process outcome 5]
15-16 Improvement opportunity [Process outcome 1]
15-25 Pilot evaluation report [Process outcome 4]
15-26 Analysis report for improvement [Process outcome 2]
15-27 Causes of variation analysis report [Process outcome 2]
19-02 Process strategy [Process outcome 3]
19-16 Selected improvement opportunity [Process outcome 3]

6 The quality dimension

A process assessment model shall incorporate a process measurement framework conformant with the requirements of ISO/IEC 33003 and is expressed as a process quality characteristic with a defined set of process attributes. At minimum, a process measurement framework includes a process quality attribute of process performance, which is needed to demonstrate that the process achieves its expected process outcomes. Other process quality attributes may be added over the process performance attribute.

NOTE 1 ISO/IEC 33020 provides a process measurement framework for the assessment of process capability which can be incorporated into this document. ISO/IEC 33020 also includes a set of process quality indicators for each process attribute in the process measurement framework.

The assessment indicators are used as a basis for collecting objective evidence to support an assessor's judgement in assigning ratings of the performance and quality of an implemented process. The set of indicators defined in this document are not intended to be an all-inclusive set and applicable in its entirety. Subsets appropriate to the context and scope of the assessment should be selected, and potentially augmented with additional indicators.

A process assessment is conducted according to a documented assessment process. A documented assessment process will identify the rating method to be used in rating process attributes and identify or define the aggregation method to be used in determining ratings.

NOTE 2 ISO/IEC 33020 includes a process attribute rating scale, process attribute rating method, and aggregation method which can provide a suitable basis for use for incorporating into any documented assessment process.

Annex A
(informative)

Information item description

A.1 Generic input and outputs

The generic work product indicators are sets of characteristics that would be expected to be evident in input / outputs of a generic type as a result of achievement of an attribute (see Table A.1). The generic input / outputs support the class structure of the input / outputs defined as process performance indicators. These input / output types are basic input types to process owners of all types of processes.

Table A.1 — Generic categories of inputs and outputs

Reference	Category	Purpose	Source
1.0	Contract	A contract (or agreement) is the formal agreement between an acquirer and a supplier. Informally, commitments or agreements may be specified between parts of the same organization (sometimes called a memorandum of understanding).	ISO/IEC/IEEE 15289
2.0	Data	Ordered informational content a. Result of applying a measure b. Available to those who need to know within defined timeframe	-
3.0	Description	Information item that represents a planned or actual concept, function, design, or object.	ISO/IEC/IEEE 15289
4.0	Goals	1. intended outcome.	ISO/IEC/IEEE 24765:2017, 3.1756
5.0	Measure	1. variable to which a value is assigned as the result of measurement.	ISO/IEC/IEEE 24765:2017, 3.2391
6.0	Plan	Information item that presents a systematic course of action for achieving a declared purpose, including when, how, and by whom specific activities are to be performed	ISO/IEC/IEEE 15289
7.0	Policy	Clear and measurable statement of preferred direction and behaviour to condition the decisions made within an organization.	ISO/IEC/IEEE 15289
8.0	Procedure	Information item that presents an ordered series of steps to perform a process, activity, or task	ISO/IEC/IEEE 15289
9.0	Product	Output of an organization that can be produced without any transaction taking place between the organization and the customer.	ISO 9000:2015, 3.7.6
10.0	Record	Set of related data items treated as a unit.	ISO/IEC/IEEE 15289

Table A.1 *(continued)*

Reference	Category	Purpose	Source
11.0	Register (log)	1. a document used to record and describe or denote selected items identified during execution of a process or activity. Usually used with a modifier, such as issue, quality control, action, or defect.	ISO/IEC/IEEE 24765:2017, 3.2262
12.0	Report	Information item that describes the results of activities such as investigations, observations, assessments, or tests.	ISO/IEC/IEEE 15289
13.0	Repository	Storage facility for data a. Repository for components b. Storage and retrieval capabilities c. Ability to browse content d. Listing of contents with description of attributes e. Sharing and transfer of components between affected groups f. Effective controls over access g. Maintain component descriptions h. Recovery of archive versions of components i. Ability to report component status j. Changes to components are tracked to change / user requests	-
14.0	Request	Record information needed to solicit a response.	ISO/IEC/IEEE 15289
15.0	Specification	Provide requirements for a required service, product, or process.	ISO/IEC/IEEE 15289
16.0	Strategy	1. organization's overall plan of development, describing the effective use of resources in support of the organization in its future activities	ISO/IEC/IEEE 24765:2017, 3.4003
17.0	User documentation	1. documentation for users of a system, including a system description and procedures for using the system to obtain desired results	ISO/IEC/IEEE 24765:2017, 3.4472

A.2 Specific outputs

Specific outputs are typically created by process owners and applied by process deployers in order to satisfy an outcome of a particular process purpose (see Table A.2).

NOTE In Table A.2, the set of items in a category is ordered alphabetically using the name of the item.

Table A.2 — Specific outputs

Reference	Name	Category	Characteristics
03-03	Benchmarking data	Data	1) Results of measurement of current performance that allow comparison against historical or target values 2) Relates to key goals / process / product / market need criteria and information to be benchmarked
03-04	Customer satisfaction data	Data	1) Relates to levels of customer satisfaction with products and services 2) Results of applying field measures 3) Results of customer satisfaction survey 4) Interview notes 5) Meeting minutes from customer meetings
03-06	Process performance data	Data	1) Appropriate to compare process performance against expected values 2) May include records, such as: a) meeting minutes; b) change records; c) quality records 3) May include data on: a) resource usage; b) process adherence; c) extent to which quality criteria are met; d) extent to which task completion criteria are met
05-02	Business goals	Goals	1) Contains a description of the goal 2) Identifies a requirement specification for the business need 3) Identifies association and interfaces to other goals 4) Identifies the level of degree of the need and effect on the business of not having that need
05-07	Process performance goal	Goals	1) Process performance goals aligned with business goals and context-specific other relevant goals like: a) project / process effectiveness; b) baselines for process performance and product quality
06-04	Training material	User documentation	1) Updated and available for new releases 2) Coverage of system, application, operations, maintenance as appropriate to the application 3) Courses listings and availability
07-01	Customer satisfaction survey	Measure	1) Mechanism to collect data on customer satisfaction: a) identifies customers to be contacted; b) identifies the data to be collected from the customer; c) target date for responses; d) identifies products/services under investigation 2) Methods to analyse feedback
07-04	Process measure for performance management	Measure	1) Includes measures related to the performance of a process, such as: a) size and number of work products produced; b) adherence to the process; c) time needed to perform process; d) effort needed to perform process; e) number of defects related to the process 2) Measures the impact of process change 3) Measures the efficiency of the process
07-05	Project measure	Measure	1) Appropriate to monitor key processes and critical tasks of a project 2) Includes measures related to the project on: a) project performance against established plan; b) resource utilization against established plan; c) time schedule against established plan; d) process quality against quality expectations and/or criteria; e) product quality against quality expectations and/or criteria; f) highlight product performance problems, trends; g) amount of work schedduled; h) actual cost against tasks completed

Table A.2 *(continued)*

Reference	Name	Category	Characteristics
07-06	Quality measure	Measure	1) Measures quality attributes of the work products defined, such as: a) functionality; b) reliability; c) usability; d) efficiency; e) maintainability; f) portability 2) Measures quality attributes of the end customer product quality and reliability
07-09	Quantitative analysis technique	Measure	1) Guidelines to determine which issues or problems are subject to a quantitative analysis 2) Measures and historical data required in quantitative analysis technique 3) Appropriate analysis technique considering the measures as well as the purpose 4) Assumptions of selected technique 5) Contribution to measurement repository
07-10	Process performance model for performance management	Measure	1) Purpose of analysis 2) Measures related to the purpose of analysis 3) Operational definition of the measures 4) A model appropriate to the process context 5) Model calibration 6) Assumptions and limitations of the model 7) Baseline update 8) Distribution to relevant stakeholders 9) Contribution to measurement repository 10) Quantitative measures related to improvement
07-11	Process measure for improvement	Measure	1) Includes measures related to the performance of a process, such as: a) size and number of work products produced; b) adherence to the process; c) time needed to perform process; d) effort needed to perform process; e) number of defects related to the process 2) Measures the impact of process change 3) Measures the efficiency of the process
07-12	Process performance model for improvement	Measure	1) Purpose of analysis 2) Measures related to the purpose of analysis 3) Operational definition of the measures 4) A model appropriate to the process context 5) Model calibration 6) Assumptions and limitations of the model 7) Baseline update 8) Distribution to relevant stakeholders 9) Contribution to measurement repository 10) Quantitative measures related to improvement

Table A.2 *(continued)*

Reference	Name	Category	Characteristics
08-13	Quality plan	Plan	1) Objectives / goal for quality 2) Defines the activities tasks required to ensure quality 3) References related work products 4) Method of assessment / assuring quality 5) References any regulatory requirements, standards, customer requirements 6) Identifies the expected quality criteria 7) Specifies the monitoring timeframe and quality checkpoints for the defined life cycle and associated activities planned 8) Target timeframe to achieve desired quality 9) Method to achieved goals: a) tasks to be performed; b) ownership for tasks; c) audit to be performed; d) resource commitments 10) Identifies the quality criteria for work products and process tasks 11) Specifies the threshold / tolerance level allowed prior to requiring corrective actions 12) Defines quality measurements and benchmark data 13) Defines the quality record collection mechanism and timing of the collection 14) Specifies mechanism to feed collected quality record back into process impacted by poor quality 15) Approved by the quality responsible organization / function
08-29	Improvement plan	Plan	1) Improvement objectives derived from organizational business goals 2) Organizational scope 3) Process scope, the processes to be improved 4) Key roles and responsibilities 5) Appropriate milestones, review points and reporting mechanisms 6) Activities to be performed to keep all those affected by the improvement programme informed of progress
09-02	Quality policy	Policy	1) Established by the top management 2) Appropriate to the organisation 3) Addresses product and process quality goals 4) Supports the establishment and review of quality objectives 5) Commitment to comply with requirements 6) Commitment to improve the effectiveness of the quality management system
10-05	New process concept	Process description	1) Potential improvement: a) advances in related hardware products; b) new techniques, methodologies, processes, or lifecycle models; c) new quality-improvement techniques; d) new process development and deployment support tools 2) Expected benefits, costs, and risks

Table A.2 *(continued)*

Reference	Name	Category	Characteristics
10-06	Process control limit	Process description	1) Guideline to determine which issues of process or product are subject to process control 2) Characteristics of process or products subject to control chart 3) Selection of an appropriate control chart 4) Initial control limit 5) Control chart monitored 6) Special and common causes identified and their sources 7) Validated result after remedial activities of special and common causes 8) Control limits re-established 9) Distribution to relevant stakeholders
14-02	Corrective action register for performance management	Register	1) Identifies the initial problem 2) The need for action to treat the problem is evaluated. 3) Identifies the ownership for completion of defined action 4) Defines a solution (series of actions to fix problem) 5) Identifies the open date and target closure date 6) Contains a status indicator 7) Indicates follow up audit actions 8) Selected problems are resolved and closed
14-12	Preventive action register for performance management	Register	1) Identification of the potential problem(s) or issue(s) 2) The need for action to treat the potential problem is evaluated 3) Ownership for completion of defined action 4) Solution (series of actions to fix problem) 5) Open date and target closure date 6) Status indicator 7) Follow-up audit actions 8) Selected potential problems are resolved and closed
14-13	Corrective action register for improvement	Register	1) Identifies the initial problem 2) The need for action to treat the problem is evaluated 3) Identifies the ownership for completion of defined action 4) Defines a solution (series of actions to fix problem) 5) Identifies the open date and target closure date 6) Contains a status indicator 7) Indicates follow up audit actions 8) Selected problems are resolved and closed
14-14	Preventive action register for improvement	Register	1) Identification of the potential problem(s) or issue(s) 2) The need for action to treat the potential problem is evaluated 3) Ownership for completion of defined action 4) Solution (series of actions to fix problem) 5) Open date and target closure date 6) Status indicator 7) Follow-up audit actions 8) Selected potential problems are resolved and closed
15-01	Analysis report for performance management	Report	1) What was analysed 2) Who did the analysis 3) The analysis criteria used: a) selection criteria or prioritization scheme used; b) decision criteria; c) quality criteria 4) Records the results: a) what was decided / selected; b) reason for the selection; c) assumptions made; d) potential risks 5) Aspects of correctness to analyse include: a) completeness; b) understandability; c) testability; d) verifiability; e) feasibility; f) validity; g) consistency; h) adequacy of content