STRATEGIC DIRECTION, QUALITY POLICY AND QUALITY OBJECTIVES: A THREE-COURSE MEAL OF QUALITY PLANNING

Strategic Direction

Quality Policy

Quality Objectives

ASA SCOTTSDALE, AZ AFRA 24-26 JUNE 2018

ASA 2018 Annual Conference

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1.

Quality Objectives Begin with Strategic Direction

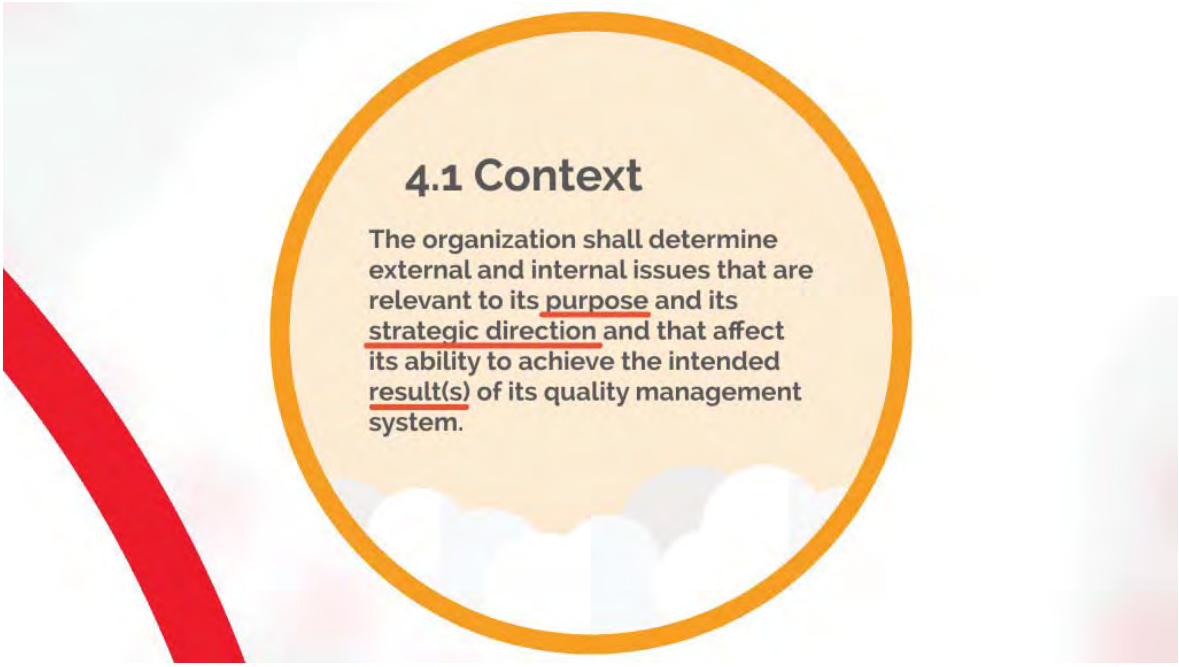
33rd Fighter Wing
Strategic Direction

Context

Mission
Vision
Values
Priorities

Strategic Direction

2.


4.1 Context
The organization shall determine external and internal issues that are relevant to its purpose and its strategic direction and that affect its ability to achieve the intended result(s) of its quality management system.

4.


Are Mission, Vision, Values, and Priorities an acceptable Strategic Direction?
ISO 9000 Vocabulary
Mission Vision Strategy
System
Unity of Purpose & Direction

5.

What does ISO 9000 (Vocabulary) say?

Context of an organization:
Understanding the context of the organization is a process. This process determines factors which influence the organization's purpose, objectives and sustainability. It considers internal factors such as values, culture, knowledge and performance of the organization. It also considers external factors such as legal, technological, competitive, market, cultural, social and economic environments.

Examples of the ways in which an organization's purpose can be expressed include its vision, mission, policies and objectives.

Vision

Company's aspiration of what an organization would like to become as expressed by top management

Mission

Organization's purpose for existing as expressed by top management

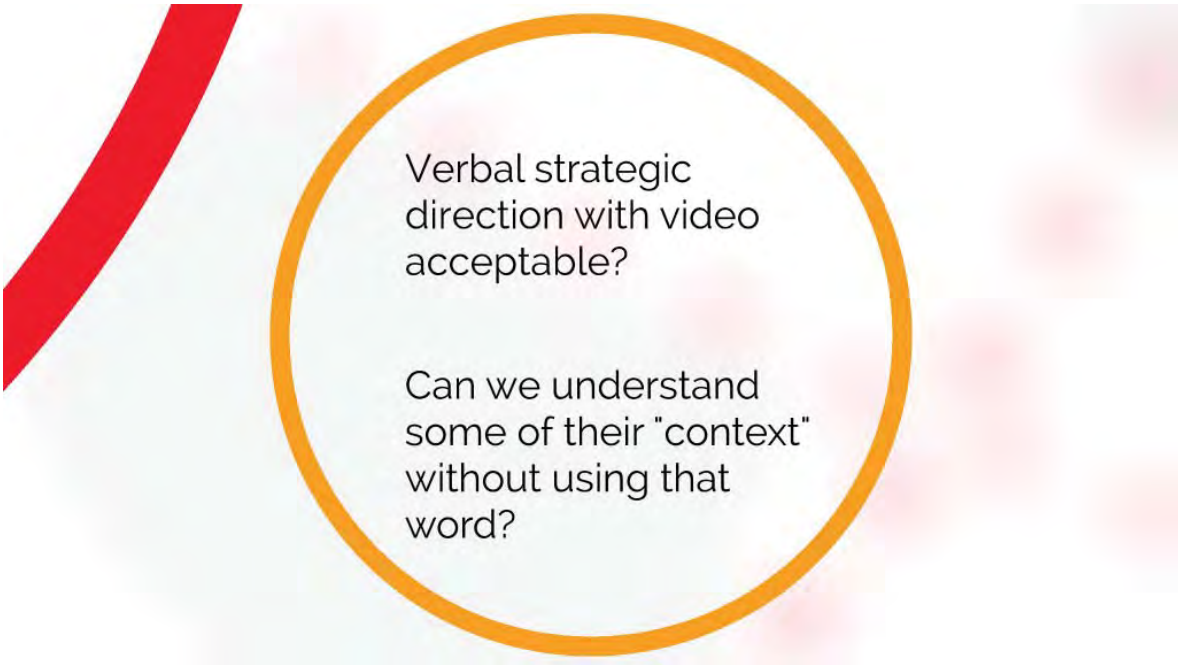
Strategy

Plan to achieve a long-term or overall objective

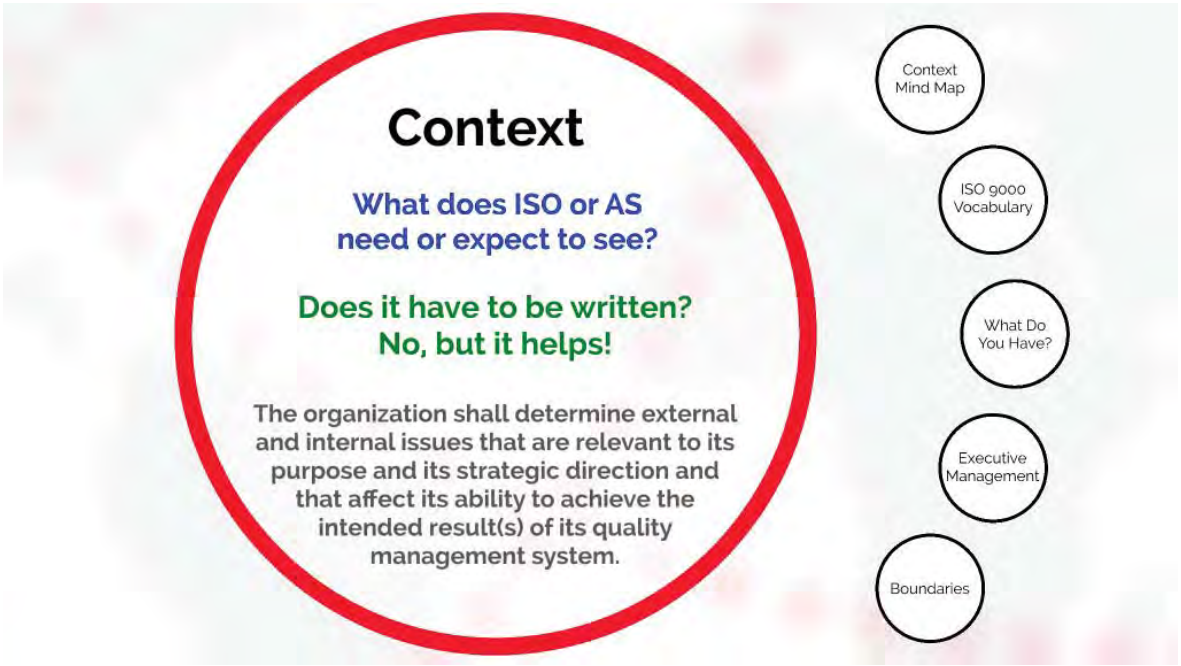
ISO 9000:2015


Management System
Policy
Mission
Vision
Strategy
Plan to achieve long term or overall objectives
Quality Policy
Quality Management System
Quality Policy, QMS, Strategic Direction, and Objectives are required by ISO
ISO 9000:2015
MISSION AND VISION ARE NOT REQUIRED FOR ISO
Mission & Vision are evidence of a strategic direction

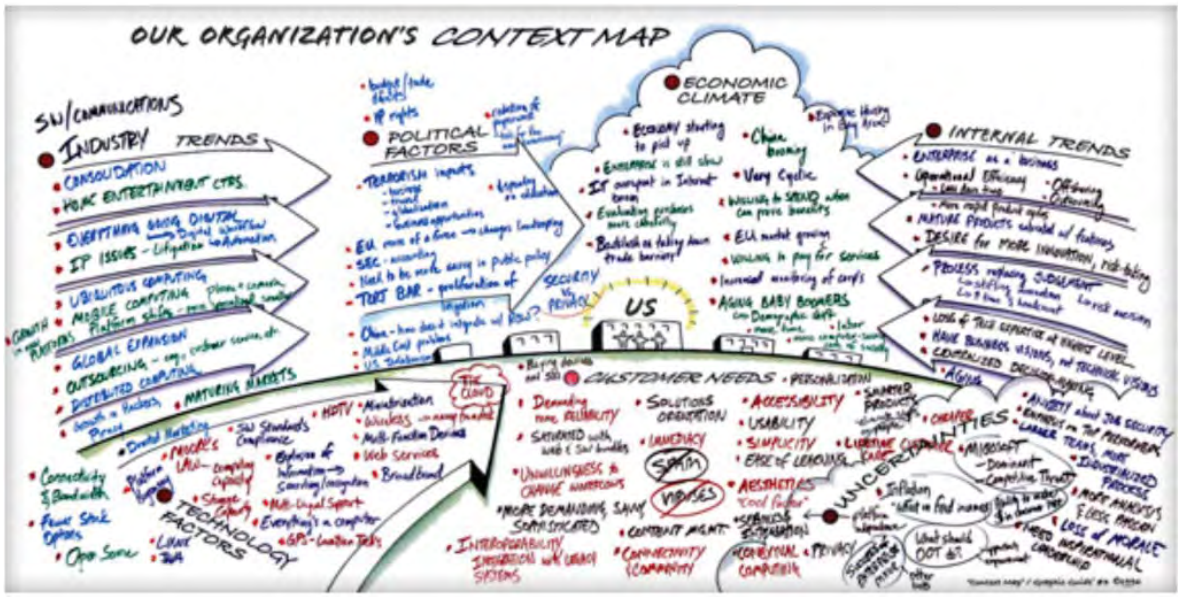

Leaders at all levels establish unity of purpose and direction and create conditions in which people are engaged in achieving the organization's quality objectives.
Creation of unity of purpose and the direction and engagement of people enable an organization to align its strategies, policies, processes and resources to achieve its objectives.
ISO 9000:2015


Verbal strategic direction with video acceptable?
Can we understand some of their "context" without using that word?

13.


Context
What does ISO or AS need or expect to see?
Does it have to be written? No, but it helps!
The organization shall determine external and internal issues that are relevant to its purpose and its strategic direction and that affect its ability to achieve the intended result(s) of its quality management system.
Context Mind Map
ISO 9000 Vocabulary
What Do You Have?
Executive Management
Boundaries

17.



Context in ISO 9000 Vocabulary

Combination of internal and external issues that can have an effect on a company's approach to developing and achieving its objectives.

Context is often referred to by other terms such as "business environment", "organizational environment" or "ecosystem of an organization".

In the context of the QMS quality objectives are set by the company, consistent with the quality policy to achieve specific results.

The company's objectives can be related to its products and services, investments and behavior towards its interested parties.

Understanding the context of the company is a process. This process determines factors which influence the company's purpose, objectives and sustainability. Examples of the ways in which a company's purpose can be expressed include its vision, mission, policies and objectives.


What do you have for Context and Strategic Direction?
SWOT Analysis
PEST Analysis
Strategic Plan
Business Plan
Management Review
Company History/ Background
Staff Meetings
Industry Analysis
Competitive Analysis
Budget
Industry Analysis
Industry Analysis
Industry Analysis
industry Analysis
Industry Analysis
Context Documented


SWOT Analysis
PEST Analysis
Strategic Plan
Business Plan
Management Review
Company History/ Background
Staff Meetings
Industry Analysis
Budget
Competitive Analysis
What happens if its not written?

IBISWorld Industry Report OD5511

Aircraft Parts Distributors in the US

Autugst 2016

Maksim Soshkin

2 About this Industry
2 Industry Definition
2 Main Activities
2 Similar Industries
2 Additional Resources

3 Industry at a Glance

4 Industry Performance
4 Executive Summary
4 Key External Drivers
6 Current Performance
9 Industry Outlook
11 Industry Lifecycle

13 Products & Markets
13 Supply Chains
13 Products & Services
14 Demand Determinants
15 Major Markets
16 International Trade
17 Business Locations

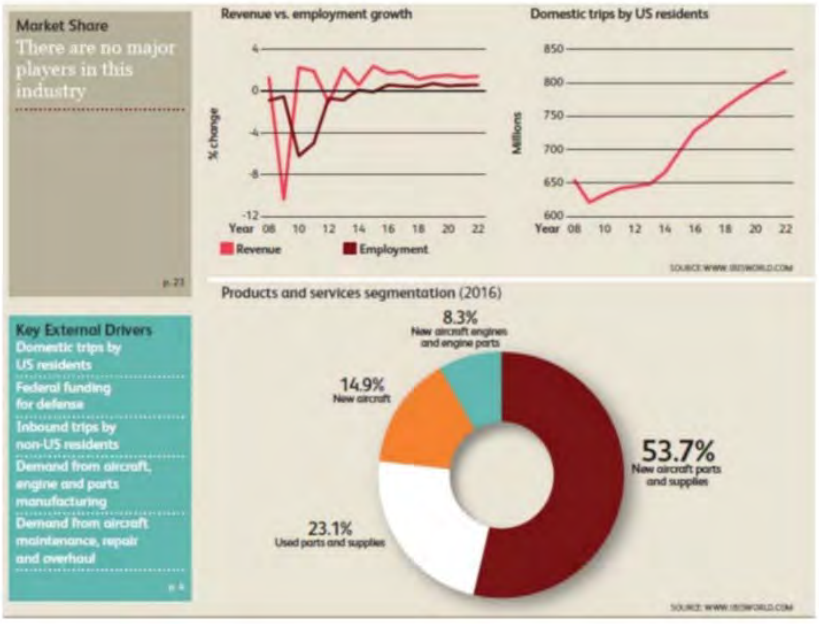
19 Competitive Landscape
19 Market Share Concentration
19 Key Success Factors
19 Cost Structure Benchmarks
21 Basis of Competition
22 Barriers to Entry
22 Industry Globalization

23 Major Companies

24 Operating Conditions
24 Capital Intensity
25 Technology & Systems
25 Revenue Volatility
26 Regulation & Policy
27 Industry Assistance

28 Key Statistics
28 Industry Data
28 Annual Change
28 Key Ratios

29 Jargon & Glossary



Major Companies

There are no Major Players in this industry Other Companies

Other Companies

Aviall Inc.
Estimated market share 4.4%

Dallas-headquartered Aviall Inc. was founded in 1932 and is a wholly owned subsidiary of Boeing's global services and support division. The company distributes aviation parts for more than 240 manufacturers, offers about 2.0 million catalog items and has more than $1.0 billion in inventory. Moreover, as a subsidiary of Boeing the company benefits from integration with the largest aircraft manufacturer in the country, including being part of point of sales after service deals. Aviall also offers MRO, logistics and inventory management services. The company has about 1,000 employees and will generate an estimated $1.9 billion in revenue in 2016.

Wesco Aircraft Holdings Inc.
Estimated market share 2.5%

Valencia, CA-based Wesco Aircraft Holding Inc. (Wesco) was founded in 1953 and has grown into one of the

of 2015, 61.0% of the company's revenue came from commercial markets, with 39.0% coming from the military. Original equipment manufacturers and subcontractors account for 75.0% of Wesco's sales. In 2015, the company acquired Haas, a provider of chemical supply chain management services to the commercial aerospace, airline, military, energy, and other markets, which significantly boosted revenue. In 2016, the company is expected to generate $1.1 billion in industry specific revenue.

KLX Inc.
Estimated market share: 2.3%

KLX Inc. is one of the largest independent aerospace distributors in the country. The company was formed in December 2014, when B/E Aerospace Inc. spun off its consumables management segment. KLX operates through two units, the aerospace solutions group and the

A few questions to understand context and strategic direction:

Why are you in business?
What value are you bringing your customers?
What changes do you anticipate and why?
Where do you want to be 1 year from now?

- or 5 years from now?
- What are you doing to achieve that vision?

What markets are you trying to serve? Why?
What customers are you trying to gain?

Quality Manual Section:
Introduction & Context of the Business

Our policy, mission, vision and core values (all listed above) help define the strategic direction and culture of our business. We formally evaluate our internal and external issues affecting our business during our strategic planning process. More detail and records can be seen with the strategic planning which includes 360 feedback for SWOT analysis, 7 factors analysis (context evaluation), and much more. As context changes, we evaluate those factors affecting the business throughout the year, and adjust accordingly.

SimpleQuE is a private, mid-sized company. Over 90% of our competitors are single shingle shops. The value offered to our clients are the expertise we bring from the certification world, along with work experience from all sides of the table (industry, registrar, auditor) and simplifying their understanding and compliance with the requirements. "Quality excellence made simple" is our tag-line and value proposition, and is what our company name stands for in every job we perform for our clients. Being ISO 9001 certified, we practice what we preach. We stay focused on fewer standards to be the best at what we can do for our clients. We don't want to be all things to all people. Our employees work at client sites or their homes, so we are a virtual organization that relies heavily on a highly skilled workforce, the internet and technology.

Quality Manual Section:
Introduction & Context of the Business

COMPANY is a privately held company specializing in _____. Located in __, FL, the company as formed in 1970, and is under second generation ownership and management. We are a service company and have no product – all of the parts processed are customer supplied. Parts are _____ to very specific customer requirements. Our range of capabilities in _____ is greater than most of our competitors, especially with very small and very large parts. Most of our work is single piece or small quantities, with occasional low volume production jobs. Environmental impact and other factors affecting neighboring businesses and residences resulting from our processes is extremely low, resulting in minimal regulatory demands.

We are ISO 9001 certified, non-union, and currently have approximately 27 employees with an average of 25 years of experience at our facility. Our quality system has also been approved by aircraft engine manufacturers General Electric, Pratt & Whitney, and Honeywell. As a smaller company, employees wear many hats and have multiple shared responsibilities. Therefore, there is significant cross training and shared knowledge.

The scope applies only to those parts that, by customer request, require a certificate of conformance for the provided service. COMPANY does perform other services outside of the ISO scope such as, field support and on-site repair.

Don't be surprised if auditors want to schedule time with executive management outside the opening and closing meeting

- Understand context or strategic direction if not documented.
- See if management is tuned in with internal and external factors affecting the business and see how they react.
- Is there evidence management is aware of any poor performance or customer dissatisfaction?
- Determine whether executive management is supporting ISO or AS, or whether they rely and dump everything on the quality manager with little support.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Quality Policy
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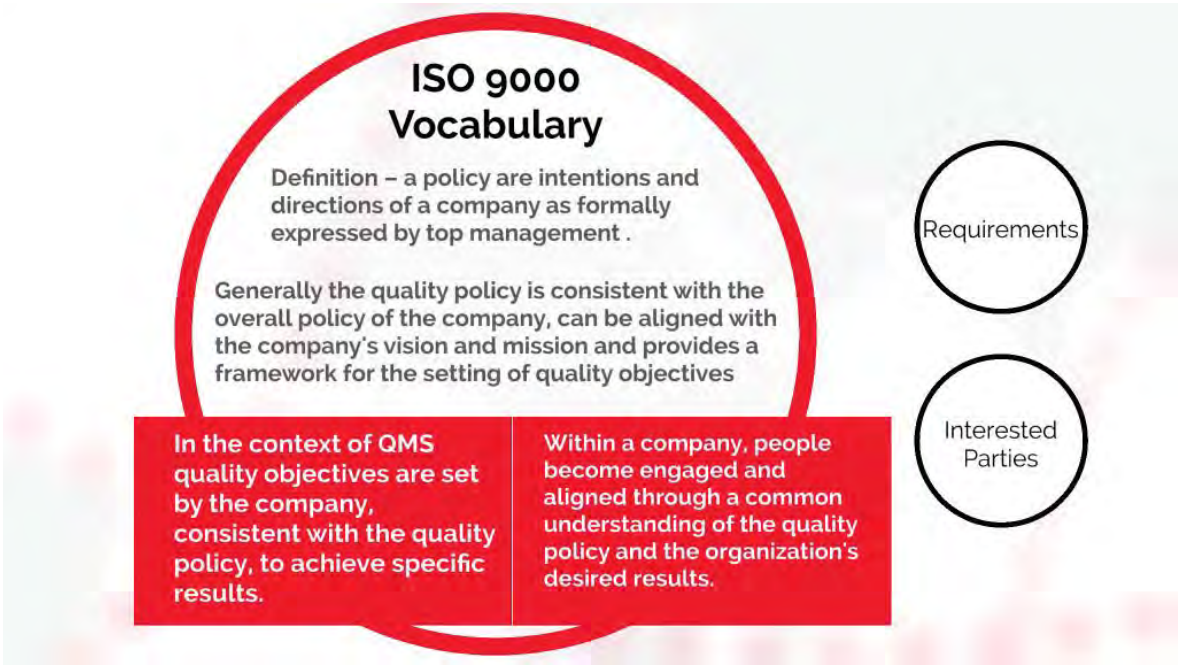
ISO 9000 Vocabulary
Definition – a policy are intentions and directions of a company as formally expressed by top management .
Generally the quality policy is consistent with the overall policy of the company, can be aligned with the company's vision and mission and provides a framework for the setting of quality objectives
In the context of QMS quality objectives are set by the company, consistent with the quality policy, to achieve specific results.
Within a company, people become engaged and aligned through a common understanding of the quality policy and the organization's desired results.
Requirements
Interested Parties

In The Standards (ISO and AS)

Top management shall establish, implement and maintain a quality policy that:

a) is appropriate to the purpose and context of the organization and supports its strategic direction;
b) provides a framework for setting quality objectives;
c) includes a commitment to satisfy applicable requirements;
d) includes a commitment to continual improvement of the quality management system.

Quality Policy Requirements:

- Is compatible with the strategic direction and context of the company
- Is communicated, understood and applied within the company
- Is established, reviewed and maintained by top management

Quality Policy Must Include:

- A commitment to satisfy applicable requirements;
- A commitment to continual improvement of the QMS.

Completeness and appropriateness of the Policy statement?

What is the relationship between Quality Policy and Quality Objectives?

"Provides a framework for setting quality objectives."
"Quality objectives shall be consistent with the Quality Policy."

- Do quality objectives have to be in the quality policy statement?
- Do these statements above need to be stated in the quality policy or just demonstrated?
  - How demonstrated?

Quality Policy Critique

<Company> will continually improve the effectiveness of our quality system to ensure compliance to our customer's requirements and specifications.

Quality Policy Critique

At <Company>, we are accountable for delivery of our Products and Services right the first time, on time, every-time. We will satisfy customers, comply with requirements and continually improve our processes and capabilities."

Quality Policy Critique

<Company> is committed to providing customers with product sourcing, accurately, and on time. <Company> works to ensure customer satisfaction through continuous improvement of our processes and quality system, and adherence to all applicable requirements.

The Quality Policy is documented and available to relevant interested parties

- Which interested parties need to know the Quality Policy? All interested parties?
- Who are relevant? Who are appropriate?
- Persons doing work under the company's control are aware of the Quality Policy

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ISO 9000
Vocabulary

Quality Objectives are results to be achieved related to quality.

What about business objectives?

Quality Objectives

Good Objectives

Other Requirements

Good or Bad Objectives ?

Quality Objectives:

- Established at relevant functions, levels and processes
- Established for the QMS
- Compatible with the strategic direction and the context of the company
- Are consistent with the quality policy
- Are measurable
- Take into account applicable requirements for the products and services (customers may dictate quality objectives)
- Are relevant to conformity of products and services and the enhancement of customer satisfaction
- Are monitored
- Are communicated
- Are updated as appropriate
- Drive improvement of the QMS

Quality Objective Planning Shall Determine:

a. what will be done;
b. what resources will be required;
c. who will be responsible;
d. when it will be completed;
e. how the results will be evaluated.

What Quality Objectives Must Exist?

- Quality performance ("product or service conformity")
- Delivery performance
- Perception of customer satisfaction
- Supplier quality performance
- Supplier delivery performance

- "Determine and apply the criteria and methods (including monitoring, measurements and related performance indicators) needed to ensure the effective operation and control of the QMS processes."

Do companies need more?

Quality Objectives Versus KPI's (Key Performance Indicators)

Can a quality objective be a KPI for a QMS process?
Can a business objective be a KPI for a QMS process?

- Top management is supposed to "ensure the integration of the quality management system requirements into the organization's business processes."
- "The company shall establish quality objectives at relevant functions, levels, and processes needed for the quality management system."

Can goals be shared among multiple QMS processes?

How many goals or KPI's are expected per QMS process?
What's too many? What are the risks of too many goals or KPI's?

Not everything that is monitored and measured is a Quality Objective or KPI

Some companies measure and monitor lots of data.

Some companies struggle to pull together enough quality objectives.

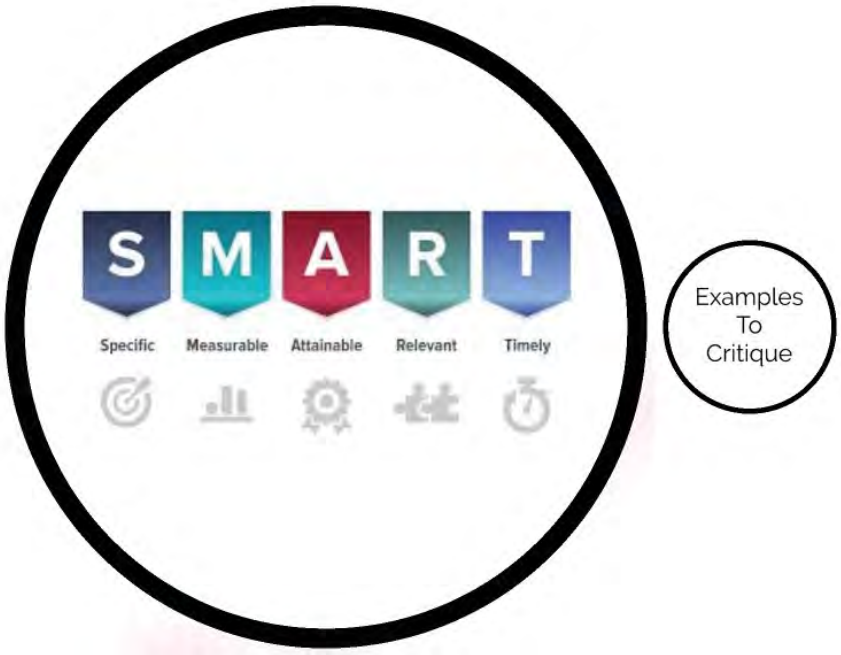
Weak Quality Objectives ?

How many of you never formally monitored anything prior to ISO or AS certification?

Who had to mine historical data to figure out what you could measure?

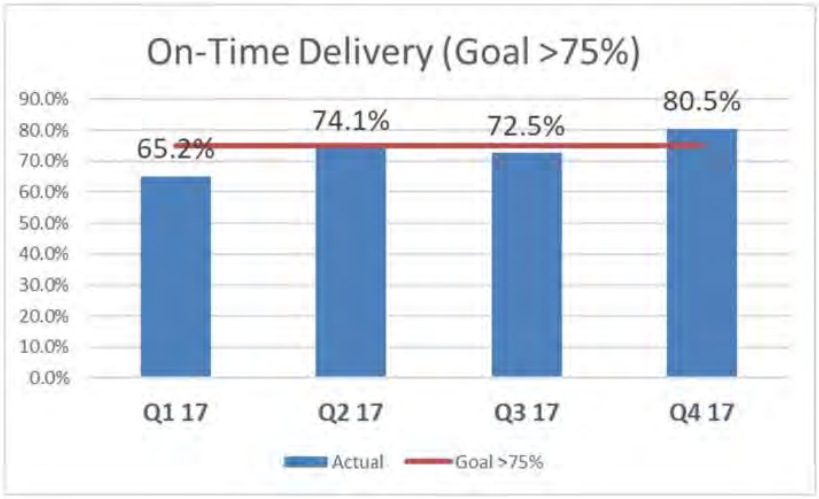
Is it okay to evolve and change objectives over time?

What are the minimum objectives?



Comments?

Comments?



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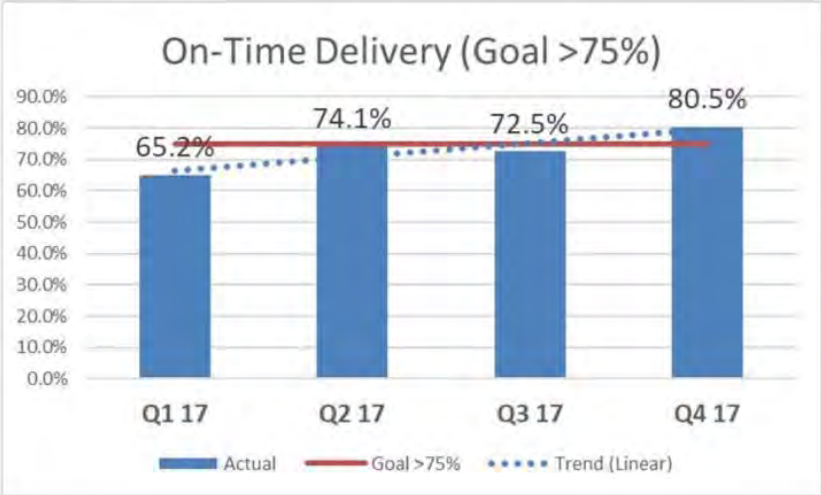
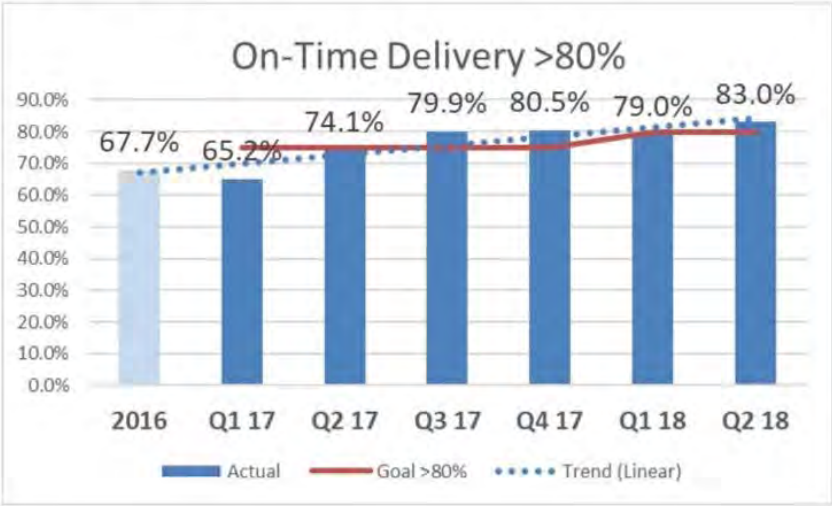


Comments?



Comments?

Comments?

	# Jobs	# CARS
2015	389	3
2016	519 (up 33%)	2
2017	659 (up 27%)	7

Good or Bad Objectives?

- Sales > $10 Million for 2018
- 100% Quality, Zero Customer Issues for 2018
- Outgoing Quality Level <1000 ppm or 0.1% rejects or 99.9% quality.
    - What if scrap rate is $1.5M or >15%
- On-Time-Delivery 100% to promise date for 2018
- On-Time-Delivery >60% to customer desire date for 2018

Good or Bad Objectives?

- Be mindful of the context and strategic direction
- Be careful of bad goals that drive bad behavior
- Understand the trends from historical data

Good or Bad Objectives?

- Be mindful of the context and strategic direction
- Be careful of bad goals that drive bad behavior
- Understand the trends from historical data

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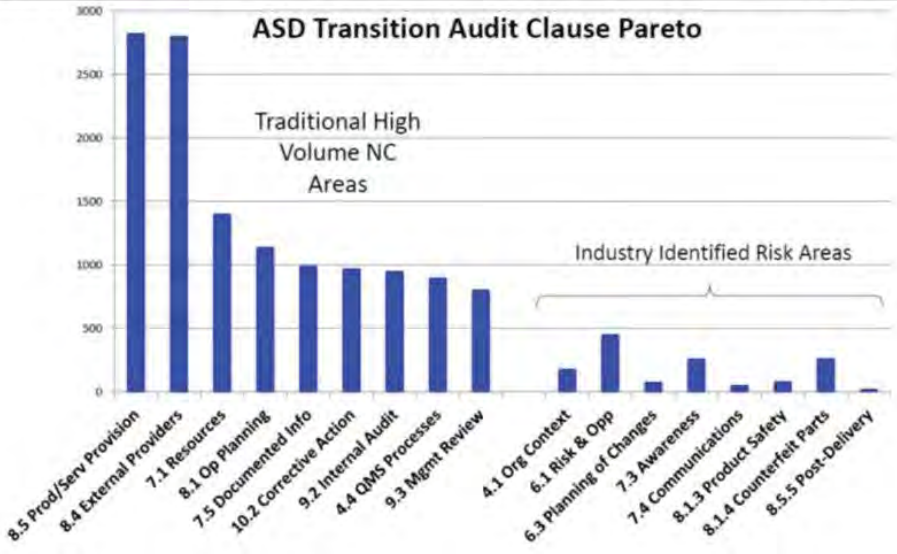
89.

IAQG Awareness - Outcomes Matter



90.

IAQG Broader Focus on "Outcomes Matter"

When viewing QMS Performance, Does Any One Metric Tell The Whole Story?

- Cross metric comparative analysis use in QMS risk based thinking

AS9100 Categorizes Various Monitoring & Measurement Inputs

- Customer, Product, Process, Internal Audits
- Others (Industry Benchmarks?)

Cross Metric Comparative Analysis Theory

- Do metrics align around common issue points?
- Do metrics not align around common issue points?
  - If not Why? What do you do about it?

What Outcomes Seen From the ASD Industry

What the IAQG knows and what they notice

Inputs

- Industry leadership surveys & working groups
- OASIS data
- Certification Body top-tier audits

Observances

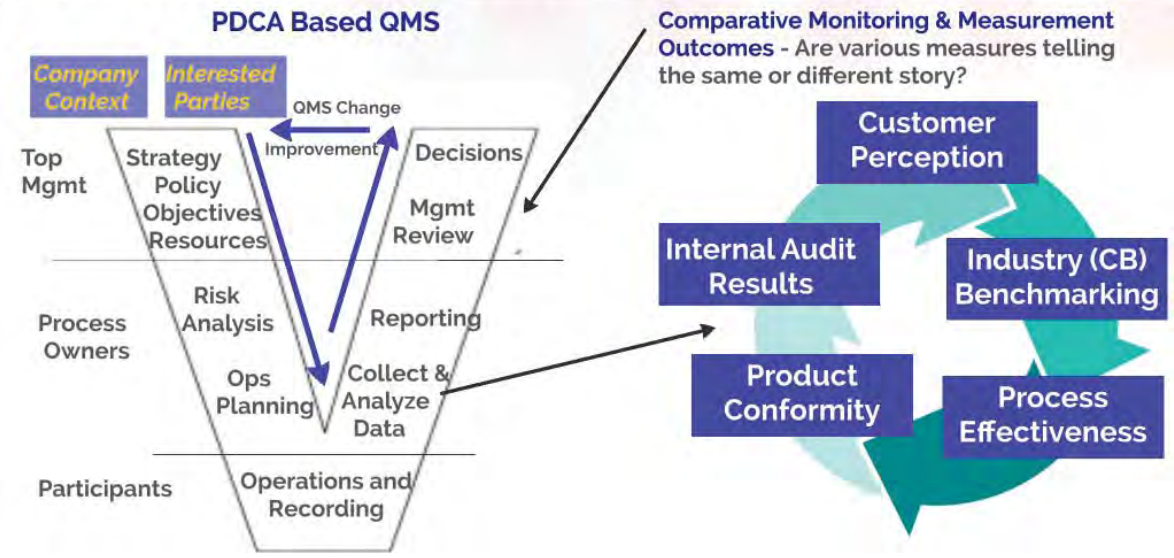
- Good in-depth industry audits
- Audits to manage customer audit outcomes
- Misaligned to auditing to manage industry supply chain outcomes

Companies should evaluate their own outcomes to get a sense of level of alignment

	Industry Identified Supply Chain & Mfg Issues	Certification Body Audits (OASIS)	Top Tier Internal Audits	Govt Audits
Prevent	Supply Chain Escape, Product Nonconformances, Change Control, Risk & Product Safety	Some risk/safety		
Detect		Documented Info, Calibration	Preservation/ FOD, with items to left	Preservation/ FOD, with items to left
Prevent		Operations Plan & Control, PO Information	Operations Plan & Control only	Operations Plan & Control only

IAQG Broader Focus of QMS Audits

Aligned Industry & Supply Chain Focus



IAQG Broader Focus of QMS Audits

Metrics Impact on QMS Effectiveness

- QMS effectiveness, change & improvement driven from QMS outcome information
- When internal/external audit information is based on a narrow component of the QMS focus, narrow decisions will follow

Optimize Your Company's QMS Effectiveness Determination

- Maintain strength in current audit focus
- Understand any alignment challenges
- Ensure internal audit understanding of supply chain outcomes and incorporate risks in audit planning and priorities
- Expand focus on new areas of standard that are focused on industry challenges:
  - Supply Chain Escape
  - Product Nonconformances
  - Change Control
  - Risk & Product Safety

IAQG Key Performance Indicators (KPI's)

Supply Chain Management Handbook

- Examples of commonly used KPI's and metrics
- Handout

Key Performance Indicator (KPI)	KPI Description	What the KPI Measures	Indicator Expressed in;	Remarks
1. Customer Metrics				
Item Escape Rate (IER)	Number of non-conforming items under company liability vs.. Number of items delivered by the company during the period.	Number of items delivered to the customer and subsequently identified by this customer as not compliant to the applicable definition or specfication. It excludes non conformities that are not under liability of the organization (e.g. parts damaged by the customer during installation).	Parts per million (PPM) or %	See SCMH section 5.1.2 . 'Delivery Metrics Definition Guidance'.
Defects per Unit (DPU	Number of system defects, under company liability vs.. Number of systems delivered by the company during the period.	Number of sytem defects, anomalies or non-conformities detected on a delivered sytem or assembly by the customer to whom it was delivered. It excludes defects or non conformities that are not under liability of the organization (e.g. systems or assemblies damaged by the customer during installation, parts removed with no defect fault because of incorrect trouble shooting by the customer, etc.).	Unit per system or assembly	See SCMH section 5.1.2 . 'Delivery Metrics Definition Guidance'.
Concession Rate (CR) or Concession Number (CN)	Number of concessed items delivered vs.. Number of items delivered by the company during the period.	Number of items delivered by the organization to its customer covered by a concession accepted by the customer vs. total Number of items delivered by the company to its customer during the period. May also be the total number of items delivered by the organization to its customer covered by a concession accepted by the customer during the period.	PPM, % or Unit	See SCMH section 5.1.2 . 'Delivery Metrics Definition Guidance'.
Concession per System (CPS)	Number of concessions raised on systems (or assemblies) vs. Number of systems or assemblies delivered by the company during the period.	Number of concessions accepted by the customer on systems (or assemblies) delivered by the organization divided by the number of systems (or assemblies) delivered by the organization to this supplier during the period.	Unit	See SCMH section 5.1.2 . 'Delivery Metrics Definition Guidance'.
On Time Delivery to Customer	Punctuality Metrics (On Time Delivery/Delay Average): - delivered punctuality level of items (at the customer) - degree of performance related to the late delivered items (at the supplier)	On Time Delivery (OTD): Number of Purchase Order lines/items delivered on time in the period by the company vs. Number of Purchase Order lines/items due in the period. Delay Average (DV): Cumulative number of days for all late deliveries in the period vs. Number of late deliveries in the period.	% Unit	Note: Transportation is to be taken into account according to the PO clauses. That means: “Departure date” + “transportation duration” ≤ “Supplier Promised Date”. Parameters may vary from one customer to another (e.g. counting working days or calendar days, on time = -5 days/+2 days, or = -3 days, +0 day). See SCMH section 5.1.2 . 'Delivery Metrics Definition Guidance'.
2. Engineering and Product Development				
Quality of Engineering Release (Design Right First Time)	Reworks on engineering drawings, Number of published drawings which require a rework for correction.	Measures the corrections that are requested internally (by Design Engineering, Manufacturing Engineering)-after the design deliverable has been released and the design activity (tool/process) failed to prevent the error. Out of scope: - Drawing changes due to new customer demand - Improvement requests	count or %	Scope of study (all product life cycle, during development only, origin of the issue detection -internal, by the customer…) must be clearly defined as targets and possible actions might differ depending on the context.
Engineering Escapes	A measure of missed execution to the design requirement or lack of knowledge and capability to meet the design requirement.	An Engineering or Design escape occurs when components, products, or other deliverable products or services do not meet technical specifications or technical requirements/expectations, as identifed by the producer or customer and root cause determines the event is a result of: - a noncompliance to standard work in place at the time the hardware was designed or service was provided, and/or - a failure to meet reasonable engineering design practices at the time the hardware was designed or service was provided.	count or % per designated frequency for a program or project	This is a Pareto analysis of products nonconformity having their origin in engineering process weaknesses. Scope of study must be defined (all product life cycle, during development only, after delivery only …).
On Time Internal Engineering Release	It is a measure of the adherence to the release requirements as developed in the original Product Development Plan.	Schedule Performance Index - Actual release date relative to planned release.	Non-dimensional ratio or percentage	
Engineering Capacity (need vs. available resources + forecast)	A measure of the business' engineering capacity (engineering man-hours to meet customer "demand").	Estimate resource needs based on complexity scale. Measure estimated resource needs versus actual.	% of Headcount in FTEs (Full Time Equivalents) or hours vs. total need	Total needs to include customer demand + internal needs.
Classification of Changes	Measures the basic nature/reason of engineering design/product definition changes.	1. Product/Component Performance Improvement: Modification or iteration of products or services made to improve performance. These modifications may be internally or externally driven and are not the result of an engineering customer escape. 2. Administrative changes - any update or correction that does not affect engineering or design intent (form, fit, function). 3. Major change (design correction) - a change to engineering or design intent (form, fit, function) that also affects downstream customer usage, tracking, or other requirements. 4. Minor change (design correction) - a change to engineering or design intent (form, fit, function) that does not affect downstream customer usage, tracking, or other requirements. 5. Others, as applicable to business Note: Classifications 2 to 4 may be the result of an engineering or design customer escape.	Count per designated frequency by nature/reason category or %	This is an analysis pareto of design change categories.
Design Changes Completed	Number of design changes completed per month or year.	Measures the quantity of engineering design/product definition changes. Depending on the nature of the business it may be more suitable to measure by program or product family.	Count of total changes over the prescribed period of time	Count per designated frequency for a program or project Note: This KPI can also be measured in term of design changes completed vs. design changes opened.
Design Changes Requested	Number of requests for design changes per month or year.	Measures the quantity of requested engineering design/product definition changes. Depending on the nature of the business it may be more suitable to measure by program or product family.	Count of total requested changes over the prescribed period of time	Count per designated frequency for a program or project.
Design Change Cycle Time	Engineering cycle time for implementing design change to correct an issue.	Engineering Cycle and lead-time to execute design changes to correct an issue.	Time (days, weeks, months…)	Summation of time spent by engineering labor obtaining development hardware and running tests.
Design Quality at Design Review	Number of design issues raised during a design review that require engineering action.	Measure of design quality at a specific design review. Exact scope (customer review and/or internal peer review) must be defined as objectives and targets are different.	Count per designated frequency for a program or project	Review outcomes: Count design issues & track reasons or classification of issues (missed requirements, criticality of missed or poor execution, results of risk assessments (severity/impact, likelihood of occurrence, detectability), other impact to program milestones, etc.).
Engineering Cost of Poor/Non-Quality	Cost of Poor/Non-Quality	Engineering post certification (or post qualification as applicable) non-recurring costs to fix internal or external escapes.	Summation of costs of engineering labor, development hardware and tests	
Technology Readiness Level (TRL)	Technology Readiness Level (TRL) at a specific design review.	An attribute scale to show technology capabilities relative to application in full-scale product design and development activities.	numerical value (1 - 9)	
TRL Adherence	TRL adherence	Measure the TRL achieved vs. the TRL required at specific milestone for a specific program.	% or average delay	

Manufacturing Readiness Level (MRL)	Manufacturing Readiness Level (MRL) at a specific Manufacturing Review during product development.	An attribute scale to show manufacturing capabilities relative to application in full-scale product design and development activities.	numerical value (1 - 9)	
MRL Adherence	MRL adherence	Measure the MRL achieved vs. the MRL required at specific milestone for a specific program.	% or average delay	
Qualification Tests Success Rate	Qualification tests success rate	Measure the Right First Time rate of qualification tests for a new product to prove compliance of the manufactured products with their design specifications.	%	
3. Program Management				
Adherence to Program Gates	Adherence of program gates versus Program planning.	Measure the number of program milestones successfully passed on time.	%	
Program NRC Follow Up	Measure of Non Recurring Costs of a dedicated program.	Measure the Non Recurring Costs vs.. program target. This is generally measured at some specific program milestones.	%	This kind of KPI remains internal.
Program RC Follow Up	Measure of Recurring Costs of a dedicated program.	Measure the Recurring Costs vs.. program target. This may be done at the end of a program at specific program milestones to regularly verify Reccurring Costs evolution versus time.	%	This kind of KPI remains internal.
4. Manufacturing and Production				
A selection of the KPIs below should be deployed at several steps of each manufacturing process (e.g. first, middle and final steps). The use of the KPIs will allow for the detection of possible issues as soon as they occur in order to anticipate mitigation and improvement actions and reduce the probability of poor On TIme On Quality performance originated in production.				
First Pass Yield on Production Operations or Top Level Testing	Number of units coming out of a process divided by the number of units going into that process over a specified period of time. Only good units with no rework or scrap are counted as coming out of an individual process.	Measures the ability of a process to produce first time right.	%	First pass yield is only used for an individual sub-process.
FAI Success Rate	Number of FAI (First Article Inspection) passed first time.	Measure the number of FAI passed first time versus number of FAI performed.	%	
FAI Accuracy	Number of errors during FAI (First Article Inspection) review.	Measure the number of errors, their type and severety (pareto) that have been detected during an FAI review.	count or %	
Inventory Accuracy	Ratio between the actual count of items in stock divided by theoretical stock.	Measures the accuracy of an inventory by taking a actual count of items in stock, and comparing it to what is recorded in the database.	%	
Staffing Levels	Ratio between the work load and the capacity of existing work forces (personnel) for a work center (present and forecast).	Measure the number of working hours required to perfom the job vs. the total number of available working hours (number of persons multiplied by number of working hours per person). May be done for global activities and/or only for those requiring specific skills.	%	Measures the margin/criticality of the available resources. Forecast can vary from weeks, months, years, … The horizon should correspond to at least twice the time needed to increase the capacity.
Internal & External Transportation Lead Time	Number of days needed to transport a product from one location to the next one between 2 process steps or sum of all transporation times in a sequence of operations.	Measures the lead-time between two consecutive steps or sum of all transporation times in a sequence of operations.	Days	Days can be replaced by hours, weeks, …
Internal & External Lead Time	Number of days needed to cover the complete step of an operation or sum of all times needed to perform a sequence of operations.	Number of days needed to cover the complete step of an operation or sum of all times needed to perform a sequence of operations (including manufacturing, inspection, waiting time, bottlenecks, stops of production, shift change, etc.).	Days	Days can be replaced by hours, weeks, …
Buffer Stock Turn or Days of Buffer Stock	Number of parts or products reserved to safeguard against unforseen shortage or demand (also called strategic stock).	Number of finished parts/products currently produced and in stock (not yet used/sold) in relation with the number of parts/products manufactured/needed during a period of time (or number of days needed to consum all parts/products currently produced and in stock with current production rate).	Units or Ratio or number of days	Inventory will protect you against production delays and quality issues but will increase your costs and risks of obsolescence. This data is available in the ERP and often through visual management settings (e.g. kanban).
Inventory Turnover (or Days of Inventory)	Cost of goods sold (net sales) divided by the average inventory.	Measures number of times a company's inventory is sold and replaced over a period of time (generally one year) or number of days required to consum your entire inventory.	Number of occurences per year (or number or days, weeks, etc.)	Inventory includes all parts in process, in quarantine, ready for dispatch or delivery, consigned at customer location, to be scrapped or reworked, etc. Inventory turnover measures how fast a company is selling/using inventory. The days in the period can then be divided by the inventory turnover formula to calculate the days it takes to sell or use the inventory on hand. It is calculated as sales divided by average inventory.
Productivity	Ratio between the amount of goods and services produced during a given time, and the given time.	Measures the amount of goods and services produced by one hour of labor.	Unit/unit of time (hour, day, month, etc)	
Capacity Utilization Rates	Ratio between the productive time of a machine or equipment and the total time.	Ratio between the number of hours the machine or equipment is running to produce or test product in a day (or in a period) versus the total number of hours (24/365).	%	
Machine or Equipment Utilization Rates	Ratio between the productive time of a machine or equipment and the total planned operational time.	Ratio between the number of hours the machine or equipment is running to produce or test product in a day (or in a period) versus the number of planned hours (taking into account number of shifts per day and number of hours per shift).	%	The machine or equipment utilization rate shall take into account all planned activities (maintenance, calibration, change of tooling, etc.). This measure is often used as an input for Sales & Operation Planning (S&OP) settings.
Unscheduled / Unplanned Machine or Equipment Maintenance (breakdown) Ratio	Ratio between the down time resulting from a machine or equipment breakdown or unplanned maintenance versus the total planned operational time.	Measures the impact of machine or equipment breakdown on production or testing capacity.	%	
Frequency of Unscheduled / Unplanned Machine or Equipment Maintenance (breakdown)	Number of machine or equipment breakdowns or unplanned necessary maintenance over a period of time.	Measures how often a machine or equipment encounters breakdown or requires unplanned maintenance.	Unit per unit of time (hour, day, month, etc)	This KPI can be part of a global TPM (Total Productive Maintenance) approach.

OTD (On Time Delivery)	Number of items due and delivered on time in the period/Number of items due in the period.	Measures the percentage of items delivered on time.	%	
OTM (On Time Manufacturing)	Number of items manufactured on time in the period/Number of items to be manufactured in the period.	Measures the percentage of items manufactured on time.	%	
Manufacturing Schedule Adherence	Actual production as a percentage of the scheduled production.	The number of units that have been effectively produced or tested over a period of time versus the total of parts that should have been produced or tested by a machine or production line or inspection line over the period of time as per initial plan.	%	This KPI is another way to measure On-Time Manufacturing.
Unproduced Units per Schedule	Number of items due and not produced during the planned period.	Measures the quantity of items missed per schedule.	Unit	
MFI (Manufacturing Flow Interrupter)	Number of times Production is stopped or interrupted by a missing part or component part or material.	Measures how often Production is stopped or interrupted due to missing or defective part, component or material.	Unit	Sometimes called 'Manufacturing Flow Inhibitor'.
Buffer Stock (parts)	For a production step, Number of items available and ready to be consumed or processed in next manufacturing phase.	Measures the stock, expressed in number of items available at a given time.	unit	The data is available the ERP and often also through visual management setting (e.g. kanban).
Buffer Stock (days)	For a production step, Number of items available and ready to be consumed or processed in next manufacturing phase divided by the Number of items processed or consumed per day.	Measures the stock, expressed in Days of items available.	Days	Depending on the context, days can be substituted by any other timing unit (hour, week, …). The data is available in the ERP and often also through visual management setting (e.g. kanban).
Backlog (parts)	For a production step, Number of orders that need to be processed at a given time.	Measures the orders expressed in number of items that need to be processed at a given time.	unit	It can be measured either for the entire manufacturing cycle or for a specific plant, one or several specific families of manufacturing activities (e.g. drilling, surface trearment, machining, etc.), specific operations, manufacturing equipement, etc.
Backlog (days)	For a production step, Number of orders that need to be processed at a given time divided by the Number of items that can be processed per day.	Measures the orders expressed in number of days of production, that need to be processed at a given time to deliver the quantity expected/ordered by the customer.	Days	It can be measured either for the entire manufacturing cycle or for a specific plant, one or several specific families of manufacturing activities (e.g. drilling, surface trearment, machining, etc.), specific operations, manufacturing equipement, etc.. Depending on the context, days can be substituted by any other timing unit (hour, week, …).
WIP (Work in Progress)	For a manufacturing step (or combination of several steps), Number of items being processed.	Measures the work in progress.	Unit	It can be measured either by item or by MO (manufacturing order), and either for the entire manufacturing cycle or for a specific plant, one or several specific families of manufacturing activities (e.g. drilling, surface trearment, machining, etc.), specific operations, manufacturing equipement, etc.
Scrap Rate	Number of scrapped items divided by the number of items produced during a period of time.	The scrap rate indicates the percentage of parts that were destroyed or mutilated because of non-conformities or defects were produced during manufacturing cycle (or a specific manufacturing operation) and reworks allowing to restaure conformity were not possible or would have been too costly considering the value of the parts.	%	It can be measured either for the entire manufacturing cycle or for a specific plant, one or several specific families of manufacturing activities (e.g. drilling, surface trearment, machining, etc.), specific operations, manufacturing equipement, etc.
Rework Rate	Number of items to be reworked divided by number of items manufactured in a period of time.	The rework rate indicates the percentage of parts that were reworked or re-processed to restore an acceptable condition after non-conformities or defects were produced during manufacturing cycle (or a specific manufacturing operation).	%	It can be measured either for the entire manufacturing cycle or for a specific plant, one or several specific families of manufacturing activities (e.g. drilling, surface trearment, machining, etc.), specific operations, manufacturing equipement, etc.
Item Escape Rate (IER)	Item Escape Rate	Item Escape Rate (IER) : Number of non-conforming items vs. Number of items produced by the company during the period.	IPM or %	Maybe used to measure failure rate during testing activities. See SCMH section 5.1.2 . 'Delivery Metrics Definition Guidance'.
Item Concession Rate (or number)	Item Concession Rate (or number)	. Concession Rate (CR): Number of concessed items vs. Number of items produced by the company during the period. . Concession per System (CPS): Number of concessions raised on systems vs. Number of systems produced by the company during the period.	% or units per week, month, or year	See SCMH section 5.1.2 . 'Delivery Metrics Definition Guidance'.
RCCA Process Deployment Rate	Percentage of Non-Conformities and Non-Conformances being subject of formal RCCA plans (RCCA = Root Cause Analysis and Corrective Action).	Number of Non-Conformities and Non-Conformances having been subject of formal RCCA plans divided by total number of Non-Conformities and Non-Conformances.	%	This can be done for all NC or by categories of NC (e.g. by type of machines, by type of NC, by department or function, by category of NC criticality, etc.) or on a specific scope (e.g. on customer complaints, safety issues, high level criticality only, etc.).
RCCA Effectiveness	Number of RCCA (Root Cause Analysis and Corrective Action) plans which prevented recurrence of the related non-conformity or non-conformance divided by total number of RCCA plans executed during a period of time.	Measure the effectiveness of root cause analysis and corrective action process.	%	This can be done for all NC or by categories of NC (e.g. by type of machines, by type of NC, by department or function, by category of NC criticality, etc.).
Time to Root Cause	Number of days between detection of an issue and defining the root cause.	Measures how long the Organization needs to define root cause from the the detection of an issue.	Days	Days can be replaced by hours, weeks, …
Corrective Action Response Time Average	Average time required to resolve issues from initiation of the RCCA process to closure.	Measures the average time to process RCCAs, including containment action, root cause analysis, corrective action implementation and verification (9S).	Days or weeks	This can be done for all NC or by categories of NC (e.g. by type of machines, by type of NC, by department or function, by category of NC criticality, etc.).
Corrective Action Timeliness	Ratio of issues resolved within the customer and/or internal target time.	Number of issues resolved within the customer and/or internal target time (from initiation of the RCCA process to closure) divided by total number of issues resolved.	%	
Equipment Calibration Rate	Number of items calibrated on time divided by Number of items requiring calibration during a period of time.	Measure the percentage of items calibrated on time.	%	
Productivity (Direct Labor Efficiency)	Measures efficiency of the direct labor force.	Measure number of hours spent to manufacture a product vs. number of hours forecasted.	%	This KPI remains internal.

Material Variance/ Efficiency (cost and usage)	Measures ability to comply with standards in terms of volumes of material used for production.	Measure quantity or costs of materials/components/parts required to manufacture a product vs. the forecast.	+/- number or delta percentage	This KPI remains internal.
5. Supplier Management				
Purchase Order Launch Performance	Number of Purchase Orders that have been sent to suppliers in due time in line with business needs and supplier contractual leadtime divided by total number of Purchase Orders sent during a period of time.	Number of POs sent on time vs. total number of POs.	%	
Purchase Order Acknowledgment Rate	Number of POs acknowledged by the Supplier within due date.	Number of POs acknowledged by the Supplier within due date (acknowledgment received by the Customer within a fixed time limit) vs. the total number of Purchase Orders sent by the Customer.	%	
Supply Chain Performance (Global plus Key Supplier Quality and Delivery)	Measure the On Quality and On Time overall performance of the supply base (overall figures including all suppliers and individual figures for key suppliers, those being more critical and/or representing the highest business volume).	Same definition as Customer (OEM) metrics.	%	
VLD (Very late Delivery)	Number of PO lines (units) delivered with more than 10 days of delay (or a number of days as fixed by the customer).	Measures the potential high impact on customer production line and deliveries.	Units per week, month, or year, or %	
Supplier Capacity Analysis	Measure the level of supplier's forecasted workload for main actvities (production, assembly operations, manufacturing engineering, etc.) versus the total available suppliers' capacity in the period.	Measures the capacity of your suppliers to manufacture the forecasted workload (same definition as manufacturing KPI's above).	%	
Supplier Rating (Recommended dashboard related practice)	Indicates the overal satisfaction of your suppliers against pre-determined and mutually agreed criteria for some parameters.	Number or percentage of suppliers in each Level of satisfaction range (e.g; Gold/Silver/Bronze, etc. or A/B/C/D, Green/Amber/Red, Excellent/Good/Medium, Poor/Unsatifactory) and indication of trends vs. last measure.	% or figures and trends (improves/stable/ degrades)	This is generally included in a supplier scorcard showing main agreed performance KPIs and criteria.
Performances and Audits Results (pareto , repeat occurrence, evolution), (Recommended dashboard related practice)	Shows main non-conformities/findings/ weaknesses identified during supplier audits or operational monitoring, their percentage by categories of findings, main re-occurrences - repetitive issues - and associated evolution.	Percentage of non-conformities/issues per type of issues (defect code or root cause codes) and classification per number of occurrences/re-occurrences.	% (pareto diagram or pie chart)	Use of AS/EN/JISQ 9100 audit defect codes/root causes as defined in OASIS is recommended.
Supplier Corrective Action Management Plan Effectiveness plus Timeliness	Shows if corrective action plans launched by suppliers are effective to eradicate issues and if their implementation date was in line with cutstomer target dates.	Measure the effectiveness of root cause analysis and corrective action process. Same definition as above KPI's.	% effective/non effective % of late/on time or number of days before implementation	
6. In Service-(Feedback from Operations)				
In-Service Failures/Non Quality Issues	Number of product non-conformances (occurrences for a certain period of time or number of delivered products) that have not been detected before delivery to the final operator / final customer and have generated specific field actions after entry into service.	Number of part removals, reworks or returns, or number of complaints, or number of warranty claims, etc. originated by quality issues (non-conforming product) not detected / solved before delivery and identified by the operator or final customer during in service operations of the final product. It measures the non-quality that has been exported to the operator or final customer and all quality filters have failed to detect and contain.	Unit per week, month, or year, or % of delivered units or combination of both	This can be measured for a certain period of time of in-service operations or for a number of delivered products or combination of the two. The detailed scope (limited to non-conforming product vs. applicable design, or all failures originated by desgn issues, manufacturing error, etc.) must be clearly defined to ensure proper anaylis can be made and adequate action plans are launched.
Early In-Service Failures/Non Quality Issues	Same as OEM quality KPIs but this is measured during the first weeks or months of service.	Same as above, but the considered period is limited to a short time (generally few weeks or few months after entry into service of the final product.	PPM or Unit or %	Same comment as above.