

KEY DEFINITIONS AND MEASURES

Category 2.0 Develop and Manage Products and Services

APQC's Process Classification Framework (PCF)® is a reliable and robust framework used by hundreds of leading companies worldwide. The PCF is made up of 13 categories, as seen in Figure 1. This article highlights the definitions for each element and suggested key performance indicators (KPIs) for category **2.0 Develop and Manage Products and Services**, specifically. If you're looking to learn more about the PCF, or download the PCF itself, please visit www.apqc.org/process-frameworks.

APQC's Process Classification Framework (PCF)®



Figure 1

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STRUCTURE OF THE ARTICLE

Throughout this article, you will see multiple tables, with different colored headers. They relate to the levels of the PCF (Figure 2).

PCF Levels

LEVEL 1 CATEGORY	11.0 Manage Enterprise Risk, Compliance, Remediation and Resiliency (16437) Represents the highest level of process in the enterprise in general groupings such as manage customer service, supply chain, finance, and human capital.
LEVEL 2 PROCESS GROUP	11.1 Manage Enterprise Risk (17060) Groups of processes that are part of executing a category. Examples include perform after sales repairs, procurement, accounts payable, recruit/source, and develop sales strategy.
LEVEL 3 PROCESS	11.1.3 Manage Business Unit and Function Risk (17462) A single process that may include elements related to variants and rework in addition to the core elements needed to accomplish the process. Examples include invoice customer and develop and manage IT security, privacy, and data protection.
LEVEL 4 ACTIVITY	11.1.3.3 Develop Mitigation Plans for Risks (16458) A key step performed to execute a process. Examples include maintain chart of accounts and develop salary/compensation structure and plan.
LEVEL 5 TASK	11.1.3.3.1 Assess Adequacy of Insurance Coverage (18129) An element of work that goes into executing an activity. They are generally much more fine-grained and may vary widely across industries. Examples include create a business case and obtain funding, and design recognition and reward approaches.

Figure 2

Where applicable, additional rows will be added to the tables with suggested KPIs and metric IDs. Below is a definition of the different elements and numbers you will see throughout the article.

Element Name

This is the name of the element within the PCF. For example, “Manage supply chain for physical products,” as seen in Figure 3.

4.0 Manage supply chain for physical products (20022)
Performing supply chain activities include planning supply chain, procuring materials and services, and managing logistics.

Figure 3

Hierarchy ID

In the PCF, there are identifying numbers to the left of each process element. These numbers are called hierarchy ID numbers and are used by people to help quickly locate a specific process element. Figure 4 has an example of “4.0.”

4.0 Manage supply chain for physical products (20022)
Performing supply chain activities include planning supply chain, procuring materials and services, and managing logistics.

Figure 4

Element ID

The numbers to the right of the process elements (20022 in Figure 5) are called process element identification numbers. Each process element in the PCF has a unique five-digit reference number.

4.0 Manage supply chain for physical products (20022)
Performing supply chain activities include planning supply chain, procuring materials and services, and managing logistics.

Figure 5

Element Definition

Each element in the cross-industry PCF has a definition associated with it. The definition is designed to provide detail and information around what type of work the element consists of.

In Figure 6, and for all elements in this article, you’ll find the definition directly under the colored heading that contains the name of the process element.

4.0 Manage supply chain for physical products (20022)
Performing supply chain activities include planning supply chain, procuring materials and services, and managing logistics.

Figure 6

Outside of the Key Definitions and Measures articles (like this one), element definitions can be found in the [Excel version](#) of the PCF, which includes a tab that has definitions for each element.

Key Performance Indicators (KPIs)

A KPI is a specific measure used to gauge a quantifiable component of an organization’s performance at the functional, process, or activity level.

KPIs typically correspond to the organization’s critical success factors and business goals.

Throughout this article, KPIs (when available) will show up in a table underneath the element definition (Figure 7). The KPIs will be listed in the right column and the metric IDs will be listed in the left column.

4.1 Plan for and align supply chain resources (10215)	
Creating strategies for production and materials. Handle the demand for the products of the organization. Develop plans for handling materials. Develop and administer the schedule for master production. Plan for distribution requirements and its constraints by reviewing and assessing distribution policies and performance and by establishing quality standards and procedures.	
Suggested KPIs for Process Group 4.1 Plan for and align supply chain resources (10215)	
Metric ID	KPI
100395	Cash-to-cash cycle time in days
100654	Demand/supply planning costs per \$1,000 revenue

Figure 7

Metric ID

Where KPIs are available, there is a metric ID included for KPIs that can be found in [APQC’s Benchmarks on Demand portal](#). The metric ID can be utilized by organizations to search for data related to that metric, such as top, bottom, and median performers.

Throughout this article, metric IDs (when available) will show up as a table underneath the element definition (Figure 8) in the left column.

4.1 Plan for and align supply chain resources (10215)	
Creating strategies for production and materials. Handle the demand for the products of the organization. Develop plans for handling materials. Develop and administer the schedule for master production. Plan for distribution requirements and its constraints by reviewing and assessing distribution policies and performance and by establishing quality standards and procedures.	
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Metric ID	KPI
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Figure 8

DEFINITIONS AND SUGGESTED KEY PERFORMANCE INDICATORS (KPIs)

2.0 Develop and Manage Products and Services (10003)

Detailing practices and procedures related to the concept of developing and managing products and services. These are reflected in the process groups Govern and manage product/service development program [19696], Generate and define new product/service ideas [19698], and Develop products and services [10062].

2.1 Govern and manage product/service development program (19696)

Supervising the complete product/service program from innovation until its commercial success. Meeting the customer demand and expectations. Conduct further development and innovation pertaining to business goals.

2.1.1 Manage product and service portfolio (10061)

Managing a portfolio of product/service offerings to take advantage of shifts in the market expectations, all the while coordinating with the overall business strategy. Revisit the product/service portfolio in light of market opportunities, and overhaul it to capture value created by these opportunities. Identify gaps between current offerings and the market expectations to direct the organization's R&D activity. Create new solutions, and revise or retire existing ones so that the revamped portfolio aligns with Develop a business strategy [10015].

Suggested KPI

Metric ID	KPI
103683	Total cost of the phase 'generate new product/service ideas' per \$1,000 revenue

2.1.1.1 Evaluate performance of existing products/services against market opportunities (10063)

Assessing the capabilities and performance of existing products/services, in light of market opportunities. Examine performance of the existing line of products/services, including measures of profitability, penetration, and value delivered. Identify gaps between existing solutions' portfolio or their performance levels, on the one hand, and the current market demand, available technologies, and/or customer expectations, on the other. Consider opportunities in the present market environment and any relation with the performance. Consider input from professional services providers.

2.1.1.2 Confirm alignment of product/service concepts with business strategy (10066)

Checking the alignment of product/service portfolio, and its individual offerings, with the organization's overall strategy and planning for the development of new or revised solutions. Conduct reality checks on new product/service concepts prior to committing significant investment to ensure that the revamped solutions' portfolio is in line with the overall business strategy, aligns organizational processes for their development, and creates a plan for assimilating these changes in the organization's offerings. Enlist senior management executives.

2.1.1.3 Prioritize and select new product/service concepts (10074)

Selecting from among the potential new/revised solutions and capitalizing on market opportunities so that they meet the cost and quality prerequisites. Create an index of product/service concepts, and arrange them in order of preference. Base prioritization on adherence to Plan and develop cost and quality targets [10073], and choose options that would comprise the revised solution portfolio.

2.1.1.4 Plan and develop cost and quality targets (10073)

Setting prerequisites for the cost of development and quality standards for the new solutions' portfolio and/or its individual offerings. Set targets for the budget and quality standards for the revamped portfolio of solution offerings. Prepare a plan for the outlay required for revising and adding new product/services. Identify intended levels of quality for these, bearing in mind the existing standards of solutions offered by the organization and its competitors. Enlist senior management executives, particularly those responsible for finance and budgeting, product/service design, manufacturing/processing, delivery, and quality control.

2.1.1.5 Specify development timing targets (10075)

Determining the individual and collective timeframe for realizing new/revised solutions. Create a schedule that clearly demarcates the timeframes designated for the development of every new solution and/or revising each of the existing ones. Create a timetable by setting deadlines for each step in overhauling the product/service portfolio.

2.1.1.6 Plan for product/service offering modifications (10076)

Developing a programmatic procedure for changing products/services while paying heed to all stakeholders involved and the prerequisites identified. Create a plan for changing the existing portfolio of solution offerings. Develop a systematic program for the design, processing, and delivery of the new product/service concepts. Construct project-flow diagrams. Identify the stakeholders involved and personnel responsible for each stage, as well as the necessary decisions. Earmark the budgetary outlay, and conduct any strategic planning required.

2.1.2 Manage product and service life cycle (10067)

Manage the introduction and withdrawal of products/services. Administer associated changes, namely measuring the performance of new solution offerings and the revision of master files in the archives.

2.1.2.1 Develop plan for new product/service development and introduction/launch (16824)

Developing a program and managing a perspective for new product/service introduction and launch.

2.1.2.2 Introduce new products/services (10077)

Launching revamped product/service portfolio in to the market. Introduction in to the marketplace is done by deploying effective channels for marketing, sales, delivery, and after-sales servicing. Introduce new/revised solution offerings in a concerted effort. Coordinate a cross-functional effort.

2.1.2.3 Retire outdated products/services (10078)

Removing nonconforming products and services. Withdraw those products/services that do not conform to market realities and are not positioned to take advantage of prevailing opportunities. Coordinate with processing/delivery teams within the organization and key stakeholders in the supply chain. Create mechanisms for continued after-sales servicing, as well as deploy effective public relations efforts in order to preserve the image and goodwill of the organization through the process.

2.1.2.4 Identify and refine performance indicators (10079)

Attuning the performance measures of products/services to better reflect the revamped portfolio of solution offerings. Revise the parameters used to measure performance, apropos the organization's product/service offerings. (Modify these standards in consideration of the changes made to the portfolio by Introduce new products/services [10077] and Retire outdated products/services [10078].)

2.1.2.5 Conduct post launch review (11423)

Learning from either a test or a full production run within the consumer market. Companies use this as an opportunity to both test and react to new products, ideas, or innovations based on the initial reaction of consumers on an individual level. Within this process, analytics are used to determine the relative success of a new product offering. Within this process, companies will launch key analytics to test a products acceptance. They will also review market performance and compare to similar products and against the business case or the financial plan. Companies can also measure the effectiveness of their supply chain network, and can apply what is learned from the post launch review to other new products, processes, and procedures to ensure and enhance the product quality.

2.1.2.5.1 Carry out post launch analytics to test the acceptability in the market (19646)

Measuring the performance of marketing once the product/services are launched. This broadly covers measuring user engagement and product's/service's performance in the market.

2.1.2.5.2 Review market performance (11424)

Conducting customer and market analysis to review progress and identify opportunities for increasing market position. Track and review product/service response through sales reports, website statistics, direct response from customers, and survey reports.

2.1.2.5.3 Review effectiveness of supply chain and distribution network (11425)

Determining the performance of supply chain to all departments and logistics from input to shop floor. Seeking performance reviews at each intersection and communication channels. Review effectiveness of supply chain and distribution to check if it is meeting the demands of the various groups and organizations that are concerned with its activities (groups might include customers, partners, suppliers, and vendors).

2.1.2.5.4 Apply data and analytics to review supply chain methodologies (19647)

Collecting and examining raw data with the purpose of drawing conclusions about that information and correlate gaps and efficiencies to the existing supply chain channels. Apply the information to make better business decisions to the related supply chain methodologies to meet efficiency.

2.1.2.5.5 Review quality and performance of the product/service (11426)

Identifying the quality and performance of the product/service delivered to customers. Analyze data from the customer feedback, audits, measures of customer satisfaction (such as product quality complaints and recalls), and organizational policies on delivery.

2.1.2.5.6 Conduct financial review (11427)

Evaluating organization's financial reports and financial reporting processes. Review and document the ROI catered by the product/service delivery to the customer in the market.

2.1.2.5.7 Conduct new product development process assessment (11428)

Analyzing the steps involved in the development of new product, its effect on existing product, resources, and functions related to the development of the new product until its sale in the competitive market place.

2.1.3 Manage patents, copyrights, and regulatory requirements (19985)

Determining the attributes necessary to protect and safeguard intellectual assets, maximize the value of IP assets through streamlined process, and collaboration between departments. Focus on needs to safeguard, critical assets, and assets' value.

2.1.3.1 Conduct mandatory and elective reviews (19941)

Conducting necessary performance reviews on enforcement of processes and steps to ensure protection. Determine policies and reviews for Manage patents, copyrights, and regulatory requirements [19985].

2.1.3.2 Review infringement of patents and copyrights (16826)

Reviewing activities in regards to patentability and infringement. The usage of Open Source in commercial product development will be reviewed in regard to licensing, community development, etc.

2.1.3.3 Determine patent and copyright needs (16827)

Determining the business need for patents and copyrights. The patents and copyrights are managed by Manage copyrights and patents [11062].

2.1.3.4 Define product technical documentation management requirements (19697)

Defining sourcing and procurement requirements for new product technical documentation management. Make sourcing-based decisions that identify the capabilities that will be required in order to launch the new product. This documentation will be used to support the product following entry into service. It is compiled and managed in Manage product and process related data [12082], but the capability to manage and maintain this documentation must be defined and established.

2.1.3.5 Manage regulatory requirements (12771)

Aligning regulatory activities related to managing industry requirements. Train employees on regulatory requirements. Records for the appropriate regulatory agencies must be maintained and the new product process must be approved by the appropriate regulatory body before it is published to the organization. The submission lifecycle - i.e. creation, review, and approval of the submission and its components must be managed in a collaborative fashion.

2.1.3.5.1 Train employees on appropriate regulatory requirements (12772)

Conducting training and impart learning to existing and new employees. Training will relate to the most recent/enforced regulations of the business to meet Manage regulatory requirements [12771].

2.1.3.5.2 Maintain records for regulatory agencies (12773)

Identifying steps and procedures to manage and regularly update the records for regulatory agencies. Updates will be made to safety procedures, identity and access management, software tools and applications, internal accessibility policies, internal quality parameters, etc.

2.1.3.5.3 Manage regulatory submission life cycle (12776)

Determine and follow the timely input and update of regulatory information by assessing reforms, regulatory policies, and guidelines.

2.1.4 Manage product and service master data (11740)

Controlling/authorizing to enable services' and products' data and other critical data of these functions through a well secured storage and accessibility processes backed by siloed applications/IT systems.

2.1.4.1 Manage materials master lists (11741)

Controlling the details of materials' storage and utilization, supplier details linked to materials, in a defined sequential manner and ensuring regular updates with permissible accessibility.

2.1.4.2 Manage bills of material (11742)

Managing the purchase details/bills through regular and error free updates to applications. Create manual entries wherever necessary and ensure timely review of the laid processes and systems.

2.1.4.3 Manage routings (11743)

Controlling and executing the flow of operations from raw form to finished product in a defined format using industry applications/routing sheets for the specific product/service layout.

2.1.4.4 Manage specifications (11744)

Direct, supervise, and control the product/service details necessary to execute the process. Adhere to details and descriptions for product/service through identified or guided parameters towards final outcome in the market with due critical analysis formed on organizational objectives.

2.1.4.5 Manage drawings (11745)

Administering the specifications of the product/service and ensure accessibility for product alteration/new product development.

2.1.4.6 Manage product/material classification (11746)

Controlling the details of the product and the input materials. Manage classification throughout the production process, and for future accessibility to new product development or product enrichment.

2.1.4.7 Develop and maintain quality/inspection documents (11747)

Determining procedures required to assess the sustainability of defined criterion for product/service delivery to customers. Retain results for further review as a procedural practice.

2.1.4.8 Maintain process specification data (11748)

Directing and handling data with respect to the procedures followed across different functions and mission critical applications.

2.1.4.9 Manage traceability data (11749)

Identifying and handling data accessed by the permitted touch points. Ensure that no data is accessible to any unnecessary recipient. Data flow should be controlled through secured access and free from unauthorized access.

2.1.4.10 Review and approve data access requests (11750)

Determining the requests pertaining to data accessibility. Review the requester details based on internal data security policies and permit data access only if internal policies and data access parameters are met.

2.2 Generate and define new product/service ideas (19698)

Identifying and describing new product or service thoughts based on organizational objectives/targets.

2.2.1 Perform discovery research (10065)

Coordinating R&D activity to identify new technologies to integrate into the revamped portfolio of products/services. Conduct early-stage R&D activity to close gaps between existing solution offerings and changing market expectations. Triangulate appropriate technologies that can support the development of a revised product/service portfolio.

2.2.1.1 Identify new technologies (10070)

Determining new technologies to revise the portfolio of solution offerings. Identify recently developed technological advances that can be leveraged in the development or advancement of the organization's product/service portfolio. Enlist senior management in conjunction with personnel responsible for the design, processing, and delivery of products/services. Have the organization's research division(s) carry out the process.

2.2.1.2 Develop new technologies (10071)

Developing new technologies from scratch to integrate into a revised portfolio of solutions. Develop new technological processes, models, and/or implements in-house, with the objective of improving existing solutions or creating new ones. Consider market realities, as well as the portfolio of products/services. Assess the results in conjunction with senior executives and personnel responsible for the design, processing, and delivery of these solutions. Engage the R&D function, and consider external sources such as offshore providers, specialized research agencies, and crowdsourcing communities.

2.2.1.3 Assess feasibility of integrating new leading technologies into product/service concepts (10072)

Appraising the feasibility of integrating new technologies, whether developed as a custom solution or adopted from an external source, into revised portfolio of solution offerings. Examine recently developed technological advances for suitability to incorporate them into the concept of revised and/or new solution offerings. Enlist senior management, in consultation with in-house personnel responsible for the design, processing, and delivery of these solutions, as well as key supply-chain stakeholders.

2.2.2 Generate new product/service concepts (19669)

Producing and defining ideologies for new product/service offerings.

2.2.2.1 Gather new product/service ideas and requirements (19986)

Collecting necessary items, documents, regulatory requirements, etc., based on Generate and define new product/service ideas [19698]

2.2.2.2 Analyze new product/service ideas and requirements (19987)

Assessing and reviewing the concepts and requirements of Generate and define new product/service ideas [19698]

2.2.2.3 Evaluate new product/service inputs and requirements (19988)

Assessing and reviewing the required inputs and necessary elements such as automation, technology, hardware installation, regulatory requirements, certifications, etc., for new products/services through defined process and analysis.

2.2.2.4 Formulate new product/service concepts (19989)

Devising ideas and elements necessary for thoughts on new product/service development.

2.2.2.5 Identify potential improvements to existing products and services (10068)

Defining potential enhancements to current products/services in order to take advantage of a shift in market expectations. Identify how the existing line of products/services may be revised--through enhancements to individual solutions or across-the-board renovations--in order to capitalize on present opportunities in the market.

2.2.3 Define product/service development requirements (19990)

Encompassing the identification and capture of new product/service requirements or potential improvements to current products/services. Collaborating with members of the supply chain to ensure the feasibility of what is being defined in the requirements. For example, a product with manufacturing requirements that supply chain cannot currently fulfill requires a corporate decision to either upgrade manufacturing capabilities or abandon the new product. Enterprise-level effects and needs must be considered. Depending on the nature of the final product or service, these requirements are often defined as a set of abilities, such as availability or reliability, that influence product development decisions.

2.2.3.1 Define product/service requirements (11331)

Determining requirements related to the creation of the product/service. Explain potential achievements that could be made.

2.2.3.1.1 Define basic functional requirements (19991)

Determining the operations of functions related to the product/service in the marketing environment.

2.2.3.1.2 Derive interoperability requirements for products and services (16808)

Determining the ability of products and services to work together, exchange and use information in a multi-vendor, multi-network, and multi-service environment.

2.2.3.1.3 Derive safety requirements for products and services (16809)

Developing safety requirements in line with environmental safety, occupational health and safety, and community health and safety guidelines.

2.2.3.1.4 Derive security requirements for products and services (16810)

Implementing security requirements through authentication and encryption of CE device data stream. Utilize security measures such as cryptographic protocols and hardware security (smart cards).

2.2.3.1.5 Derive regulatory compliance requirements (16811)

Meeting regulatory requirements set forth by such directives as RoHS, WEEE, ELV, and REACH.

2.2.3.1.6 Derive requirements from industry standards (16812)

Complying with consumer electronic industry standards developed by the Consumer Technology Association (CTA).

2.2.3.1.7 Develop user experience requirements (19992)

Identifying and creating steps and tools to develop the user experience.

2.2.3.1.8 Derive 'services-as-a-product' offering (16814)

Productizing the service by defining the scope of the service/cost. Target market for the service and make the service more tangible.

2.2.3.2 Define post launch support model (16815)

Defining SLAs (Service Level Agreement) and service level KPIs (Key Performance Indicator).

2.2.3.3 Identify product/service bundling opportunities (17389)

Establishing areas of growth and further development of product/service mix, customization, market based changes, etc., to further demonstrate value to the customer in the competition.

2.3 Develop products and services (10062)

Developing new products/services from scratch, including all activities associated with the design, prototyping, evaluation, and market testing of these planned offerings.

Suggested KPIs

Metric ID	KPI
103476	Average time-to-market in days for new product/ service development projects
100381	Average time-to profitability in months for existing product/service improvement projects
100383	Average time-to profitability in months for new product/service development projects
105466	Number of FTEs (including external) that perform the function "develop and manage products and services" per \$1 billion revenue
101979	Percentage of existing product/service extension projects launched on budget
101982	Percentage of existing product/service improvement and extension projects launched on time
102308	Percentage of new product/service development projects launched on budget
102310	Percentage of existing product/service improvement and extension projects launched on time
105461	Total cost to perform the function "develop and manage products and services" per \$1,000 revenue
103764	Total cost of the phase 'support product manufacturing or service delivery' per \$1,000 revenue
103616	Total cost of the phase 'support product manufacturing or service delivery' per \$1,000 revenue
103926	Total cost of the phase 'test market for new or revised products and services' per \$1,000 revenue

2.3.1 Design and prototype products and services (19993)

Sketching and standardizing product and service based on the market. Analyze the data market competitiveness and innovation attained for the product and service development.

2.3.1.1 Assign resources to product/service project (10083)

Allocating resources to the design, development, and evaluation of product/service concepts. Allocate funds, personnel, and time for developing the new and/or revised products/services. Begin to design the potential new product/service concepts that have been prioritized and selected for further development.

2.3.1.1.1 Identify requirements for product/service design/development partners (19994)

Determining essential elements for collaborators involved in blueprint/development of product/service.

2.3.1.2 Prepare high-level business case and technical assessment (10084)

Preparing a business-level business case and a technical feasibility assessment in order to move the product/service projects forward. Weigh the costs and benefits of designing, developing, and evaluating the shortlisted product/service concepts. Prepare a business case to justify the product/service projects. Conduct a technical appraisal to ensure that the organization has the technical know-how and resources to further develop these concepts.

2.3.1.3 Develop product/service design specifications (10085)

Creating design specifications. Create specifications for the design of new or revised product/service concepts as a measure to meet during development. Have the senior functional-level solutioning or design staff create a framework of compliance standards for these products/services.

2.3.1.4 Develop user experience design specifications (16813)

Determining the usability and user experience of products and the business impact it creates.

2.3.1.5 Provide warranty-related recommendations (16817)

Providing warranty plan and pricing specifications for recommendation.

2.3.1.6 Document design specifications (10086)

Documenting requirements to meet in the design of new or revised products/services. Specify technical, quality, and costing requirements, as well as ergonomic, safety, and servicing requirements for such products/services. Ensure the information presented can be understood by the personnel executing the design and includes examples, anecdotal references, and illustrations.

2.3.1.7 Conduct mandatory and elective external reviews (10087)

Conducting any mandatory and elective appraisals of the product/service design specifications in order to ensure compliance with external standards. Carry out external reviews of specifications created for the development of new product/service designs. Conduct mandatory appraisals such as legal and regulatory, as well as any optional assessments that, for instance, pitch the specifications against industrial benchmarks.

2.3.1.8 Design products/services (19995)

Creating a sketch of the customer focused product/service in Develop and Manage Products and Services [10003].

2.3.1.8.1 Design for manufacturing (16819)

Carrying out the steps necessary to appropriately manufacture correct parts. This includes designing application, product hardware, mold, casting, mechanical, and electrical aspects of the product.

2.3.1.8.2 Design for product servicing (16820)

Creating product application service view to allow for product servicing and refurbishing.

2.3.1.8.3 Design for re-manufacturing (16821)

Replacing core components and republishing.

2.3.1.8.4 Review product troubleshooting methodology (16822)

Reviewing the design and approach for troubleshooting the product.

2.3.1.8.5 Design and manage product data, design, and bill of materials (16818)

Designing the BOM-Bill of material, manufacturing BOM and Service BOMA bill of materials list for all the raw materials and components/parts used in the producing end product.

2.3.1.8.6 Design for product upgrades (16823)

Designing hardware and software upgrade techniques.

2.3.1.9 Build prototypes/proof of concepts (10088)

Building prototypes for shortlisted product/service concepts. Develop prototypes for those product/service concepts that have been identified for further development. Provide proof-of-concepts, and test any processes involved. Build prototypes in line with the design specifications already outlined. Enlist the solutioning and/or design staff.

2.3.1.10 Develop and test prototype production and/or service delivery process (10098)

Creating the new manufacturing/delivery processes for the new products/services, and testing them to ensure proper functioning. Create the production/delivery process for the prototypes that have been built for the new products/services. Conduct trial-runs to test these processes and their integration with the organization's other processes.

2.3.1.11 Eliminate quality and reliability problems (10089)

Eliminating any problems relating to utility of the product/service over the course of its expected lifetime. Tweak the prototype in order to comply with the required quality and reliability standards. Further refine the prototype, so it may be subjected to testing.

2.3.1.12 Conduct in-house product/service testing and evaluate feasibility (10090)

Carrying out an in-house appraisal of the prototypes in order to validate design and feasibility. Test the product/service prototypes to confirm their compliance with design and usability standards. Corroborate the viability of the design, and validate the feasibility of their production. Identify any areas for improvement.

2.3.1.13 Identify design/development performance indicators (10091)

Identifying performance parameters. Determine the parameters to measure performance of the design and development of the product/service concepts into prototypes.

2.3.1.14 Collaborate on design with suppliers and external partners (10092)

Interacting with suppliers and manufactures to determine design decisions. Collaborate with vendors, suppliers, contractors, and subcontractors to verify feasibility of co-producing the prototype's design. Ensure that efforts can be coordinated with other stakeholders in the organization's supply chain ecosystem at the time of manufacturing, producing, or packaging the finished product/service.

2.3.2 Test market for new or revised products and services (19996)

Expanding on the marketplace analysis that took place earlier in the product development lifecycle by testing the market against offerings. The results from this in-depth analysis will help the organization finalize product/service characteristics and technical requirements and also identify any needed changes in the manufacturing and delivery processes that support market delivery. To prepare a detailed market study that accounts for any changes in the global environment, the organization may want to conduct a series of interviews, workshops, and focus groups with potential and existing customers.

2.3.2.1 Prepare detailed market study (10093)

Composing a detailed study of the market ecosystem in light of new products/services. Conduct a detailed analysis of the targeted market(s) in order to Introduce new products/services [10077]. Examine the competition, market size and growth rate, market trends, customer segments and their characteristics, market influencers, distribution channels, and profitability. Enlist in-house marketing and/or solutioning teams, or outsource to specialized professional services agencies.

2.3.2.2 Conduct customer tests and interviews (10094)

Conducting both qualitative and quantitative studies to determine the fit between the newly developed products/services and the customers. Conduct external tests of the new product/service, and then refine them to maximize the customer uptake. Gather feedback from prospective customers and targeted populations by conducting surveys, focus groups, interviews, and detailed studies. Enlist professional services such as public relations or market research organizations.

2.3.2.3 Finalize product/service characteristics and business cases (10095)

Finalizing the characteristics of new products/services by appropriately weighing feedback from prospective customers against a cost-benefit analysis in order to produce a profitable business proposition. Refine the attributes of the newly developed products/services, in light of the feedback and insights collected during Conduct customer tests and interviews [10094]. Revisit the high-level business case to justify the resources assigned to the product/service project against the anticipated benefits.

2.3.2.4 Finalize technical requirements (10096)

Reassessing the technical requirements in light of the final product/service attributes. Revisit the technical assessment to revalidate the organization's capacity for progressing with new product/service projects, in light of the revised product/service characteristics.

2.3.3 Prepare for production/service delivery (19997)

Devising business plans and procedures for manufacturing/operations/production and delivery of services offered by the organization. Further in general terms the total amount of output that the manufacturing department is responsible to produce for each period.

2.3.3.1 Design and obtain necessary capabilities/materials and equipment (10099)

Developing and/or sourcing the essential machinery needed for creating purpose-built processes, as well as the raw materials, to produce the new products/services. Either design the equipment and materials needed internally, or source from external vendors. Obtain the feedstock or raw materials needed to prepare the finished products, as well as the machinery - hardware and software - needed to arrange production lines, factory operations, assemblies, and manufacturing processes. Revisit the technologies that underpin the new or revised products/services in order to source the right equipment and materials.

2.3.3.2 Identify requirements for changes to manufacturing/delivery processes (10097)

Identifying any changes that need to be effectuated in the organization's internal processes for manufacturing, and delivering the newly developed products/services. Determine if any changes need to be made to the production and distribution processes, in light of the new products/services. Begin production process planning. Prepare for factory layout planning. Generate shop-floor instructions and changes to the supply chain.

2.3.3.3 Request engineering/process change (11418)

Requesting changes in the production and/or delivery operations for processing the new or revised products/services. Rectify any problems identified in the manufacturing or delivery processes (through Monitor production runs [11417]). Seek changes in components, repair machinery, optimize production lines, and tweak factory assemblies through a formal notice to the concerned division, known as an engineering change order.

2.3.3.4 Install and validate production/service delivery process (10100)

Finalizing production process or methodology. Install and initiate the production process to manufacture the new products, using the equipment and machinery already assembled. In the case of new services, implement delivery processes and methodologies. Validate processes for the accuracy of their operation and proper functioning.

2.3.3.4.1 Monitor initial production runs (11417)

Regularly monitoring production runs of the production and/or delivery operations.

2.3.3.5 Validate launch procedures (19998)

Verifying the measures/processes/techniques through systems and tools involved in the introduction of products and services.

ABOUT APQC'S PROCESS CLASSIFICATION FRAMEWORK (PCF)[®]

The Framework for Process Improvement

Experience shows that benchmarking's potential to drive dramatic improvement lies squarely in making out-of-the-box comparisons and searching for insights not typically found within intra-industry paradigms. To enable this type of beneficial benchmarking, APQC's Process Classification Framework (PCF) serves as a high-level, industry-neutral enterprise model that allows organizations to see their activities from a cross-industry process viewpoint.

The PCF enables organizations to understand their inner workings from a horizontal process perspective, rather than a vertical functional viewpoint. The PCF does not list all processes within a specific organization, and every process listed in the framework is not present in every organization.

Originally created in 1992 by APQC and a group of members, the framework has experienced more than twenty years of creative use by thousands of organizations worldwide. The PCF is supported by APQC's Open Standards Benchmarking research. It is continuously enhanced as APQC's Open Standards Benchmarking team further develops definitions, processes, and measures. Please visit APQC's web site periodically for updates. The PCF is available for organizations of all industries and sizes at no charge by visiting <http://www.apqc.org/pcf>.

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