**Part 1:**

The importance of quality in a project cannot be overstated. Client satisfaction leads to increased organizational productivity as a result of project excellence. As a result, organizations are particularly concerned about the project's quality, and a concept of project quality management is used. Quality management refers to the process of ensuring that all project activities required to develop, plan, and implement a project are effective and efficient in terms of the goal and results. The procedures are as follows:

**Quality planning:**

This step entails determining the project's and product's quality requirements and standards. All stakeholders should be aware of the project quality management aim, and appropriate tasks should be assigned to those in charge.

The formulation of quality measurements is one of the most crucial components of quality planning. Beyond the usual measures of scope, time, and money, project managers must think beyond the box.

The project manager must understand the processes that his or her project will affect as part of quality planning. The project manager must then construct project-wide process measures to assess the impact of recommended changes to the impacted processes.

The formulation of quality measurements is the most significant component of quality planning. To improve project outcomes, six sigma methodologies can be applied. One technique to put strategic planning into action is to describe the present project procedures, the project team should create flowcharts. Now look for bottlenecks, restrictions, workarounds, or issue areas in the phases. Next, figure out what the logical project intervals are. Intervals between departments, stamps, milestones, or any other logical process break could all be examples. Collect and graph data on these intervals or process measures. Lastly, connect each process metric to the project's ultimate goal of improving the customer or company metric. These are the process measures with the strongest connections that the project team should enhance.

**Quality Assurance:**

This step entails assessing the quality criteria and quality control results to ensure that the correct quality standards are being applied. The quality assurance process is linked to process analysis and continuous improvement. When standards aren't reached or goals aren't accomplished, the appropriate procedures and corrective actions should be taken to rectify the situation.

Quality assurance is related with process analysis and continuous improvement. There should be correct statistics. The following are quality assurance components:

* Accuracy – Data accurately reflects the value that is being measured
* Precision – Data is precisely measuring what it was meant to measure
* Repeatability – Successive measurements by the same appraiser should be the same always.
* Reproducibility - Different appraisers measuring the same item get the same results,

**Quality control:**

Quality control is the final step in the project quality management process. This step entails tracking and recording the outcomes of quality operations in order to evaluate performance and make required improvements.

The creation of well-defined controls is an important part of quality control. These controls aid in the standardization of both production and quality-control responses. By limiting the margin for error by identifying which production activities are to be accomplished by which employees, team members are less likely to be involved in tasks for which they are unprepared.

The monitoring of project metrics created during the planning phase is dealt with by quality control. This is done to guarantee that the metrics' performance standards are maintained. Variations and effective data exchange are also addressed by quality control.

An organization must first identify which precise criteria the product or service must follow in order to develop a successful QC (Quality control) program. The scope of QC operations, for example, the proportion of units to be examined from each lot, must then be established.

After that, real-world data must be gathered, such as the proportion of units that fail, and the results must be communicated to management. Following that, corrective action must be determined on and implemented. Defective units, for example, must be fixed or rejected, and bad service must be repeated until the consumer is happy. If there are too many unit failures or instances of poor service, a strategy to enhance the manufacturing or service process must be designed and implemented.

Finally, the QC process must be continuing to ensure that corrective actions, if necessary, have yielded satisfactory outcomes and to spot recurrences or new instances of difficulty as soon as possible.

**Part 2:**

DMAIC (define, measure, analyze, improve, and control) is a data-driven quality improvement technique. The letters in the acronym stand for the five stages of the procedure, as well as the tools needed to accomplish them (see Figure 1). It is a key component of the Six Sigma project, but it may also be used as a stand-alone quality improvement approach or as part of other process improvement initiatives like lean.

**Define:**

The issue, the improvement activity, the improvement opportunity, the project goals, and the customer (internal and external) needs. The improvement team's emphasis, scope, direction, and incentive will be defined by the project charter. To comprehend input from existing and potential consumers suggesting offers that please, delight, and dissatisfy them, use the voice of the customer. A value stream map shows the complete process from start to finish, beginning and ending with the client, and analyzes what is necessary to satisfy their demands.

**Measure:**

Performance of the procedure; a process map is a visual representation of the actions that occur throughout a process. Capability analysis is used to evaluate a process's capacity to satisfy specifications. Another option is to analyze the frequency of issues or causes with a Pareto graphic.

**Analyze:**

The procedure for determining the origins of variance and poor performance (defects). Root cause analysis (RCA) is a technique for determining the root of a problem. FMEA stands for failure mode and effects analysis, and it is used to identify potential product, service, and process problems. To detect multiple forms of variation inside a process, use a multi-variable chart.

**Improve:**

By identifying and removing the fundamental causes, you may improve the efficiency of your processes. Design of experiments (DOE) is a method for resolving problems arising from complicated processes or systems in which many variables influence the result and it is hard to isolate one aspect or variable from the others. Kaizen events are used to bring about quick change by focusing on a specific project and utilizing the ideas and motivation of those who do the task.

**Control:**

The enhanced process and the performance of the process in the future To record what is required to maintain an improved process at its present level, create a quality control plan. Process behavior is monitored using statistical process control (SPC). To design a workplace that is conducive to visual control, use the 5S method. To make errors difficult or instantly apparent, use mistake proofing (poka-yoke).

Every day Verizon (largest nearby telephone operator) gets an average of 2000 new connection client application forms. After cross-checking the CAF with Identity Proof information, 40 operators enter the application forms into a database. 15 Quality Assessors double-check the inputs against the Identify Proof information, and three Quality Supervisors examine a 5% sample. The resellers guarantee that the connection will be activated within 48 hours of receiving the CAF. The link is normally activated within 30 hours, according to Verizon. Following a big marketing campaign, they began getting over 3500 CAF, prompting the organization to raise the number of operators ranging in age from 40 to 80. However, when the number of operators expanded, the percentage of flaws in the CAF climbed significantly more than the allowable 10% of total possibilities for mistake, and the CAF processing time increased as well.

The parts of Customer Applications are as follows:

* Title and Gender of the customer
* Name of the customer
* Address of the customer
* Date
* Identity Proof #
* Reseller Code
* Email Address

The telecom operator is losing $3750 per day due to rework and fines, thus it will be a six-sigma project. Customers are also disappointed since connection activation takes longer than expected. The management team chooses to start a Six Sigma project to minimize defects and Connection Activation time in light of the present business condition.

Now let’s make up a scenario for the sake of a solution:

Adam is named project leader by the management team. To form a task force for the project, the project leader picks team members. He also forecasted the number of hours for each resource and proposed a $50000 budget for technological upgrades, if necessary. After the project, the project manager intends to lose no more than $800 per day in rework and penalties. The financial gains are expected to be quantified 180 working days after the project is completed, according to management.

We may work on a variety of DMAIC techniques tools here, such as project charter preparation. We can work on measuring the current situations and what we expect from this project, then we can prepare Root cause analysis, hypothesis testing, control charts, and ensuring the improvement brought, and finally we can close the project by preparing CTQ's or critical to quality, voice of various stakeholders.