

## Continuous Improvement : A way of life

By P. R Balakrishnan  
GM Corporate  
e-mail : [balakrishnan\\_puthucode@hst.satyam.com](mailto:balakrishnan_puthucode@hst.satyam.com)

### ***Background :***

'Continuous improvement' is not a buzz word any more nor is it a new management paradigm. However, it is as relevant in today's networked economies and changing scenarios as it was in the 1960's, if not more. No other area or industry reflects this phenomenon as significantly as the IT industry, where 'change' or 'continuous improvement' in the application and usage of Technology is the only constant.

It is a down to earth philosophy that enables the achievement of today's requirements of organizations and the marketplace – healthier bottomlines and operational excellence. It is down to earth in its approach but will seek a firm feet on ground for organizations to succeed in making it a way of life. It is applicable to every individual in all walks of life as much as it applies to corporations.

'Learning organizations' reflect this concept more dynamically in that they continuously dazzle their competitors and customers alike. They place upon every individual, in the organization, the onus of keeping the larger picture in mind and to continuously learn and work upon improving the existing methods of executing a task. This is done through skill identification, task requirements and related training provided to enhance the skill levels besides bringing in goal orientation, organizational focus and customer/market perspective.

The concept of Knowledge Management is a gradual extension of the Learning organization. It seeks to integrate the knowledge existing in an organization - through interactions both within and outside of it - to such a level that it is available at the right time, to the right people, for taking the right decisions.

What we are talking here is the need for planning and sustaining knowledge creation, identifying and capturing practices and making the tacit knowledge available in an implied form to all in the organization in the least possible time frame. And to create a system that will keep this cycle alive 24 hours a day and 364 days in a year.

The fundamental concept behind both a Learning Organization and Knowledge Management is 'Continuous Improvement' except that depending upon the industry that an organization operates in, the market/customer and technology based focus is being reinforced now. The means of achieving continuous improvement may be numerous and what is covered in this section is one such possibility.

Strategic planning has many elements to it, one of them being initiatives that will help an organization to achieve its long term and short term goals towards shareholders, customers, society at large and employees. Each initiative normally aims at translating a strategy into an operational term, clarifying its objectives. Some examples of such strategies can be customer orientation, market leadership, growth, operational efficiency, etc. One of the most critical responsibilities of the top management is to create an environment where the strategies and resultant initiatives map to each other in a way that enables achievement of overall objectives.

Continuous Improvement is relatively simple in approach but has proved very elusive, if the data available on its implementation is any indication. In 15% of cases, such initiatives fail to even take off,

while another 50% give it up midway through. Lack of clear ROI from the initiative is seen as a problem in the latter case, resulting in Managements to turn their backs on the potential winner in the long term.

What is heartening, however, is that ~20% of organizations have seen the light of taking Continuous Improvement through to conclusion. Level of success of all these organizations may be debatable but none seems to have lost out on the contrary. The highlight is that 50% (out of 20%) of them, who have weaved the concept into their organizational fabric, are seen as World Class players in today's marketplace. Every one these organizations boast of more than a decade of implementing the concept, have redefined ways to implement them and have mastered the art of making it a way of life!

### ***Pre-requisites for 'Continuous Improvement':***

As in the case of any cultural shift, the concept of Continuous Improvement also requires certain favorable conditions to prevail in an organization for it to succeed. First of it all, is the requirement of a plan suggesting the changes, gains and type of environment that the management wants to create. The plans must show linkages among all crucial initiatives running in the organization and their complementarity or otherwise, supporting the overall organizational game plan.

One of the top customer oriented organizations in the world clearly aligned such initiatives to its changing goals, year after year, thereby making them directly contribute to issues of criticality today. This enabled its resources to see their contribution in real terms vis-à-vis the requirements. Reward mechanisms linked to such transparent goals helped it to sustain high momentum for more than a decade now. This process is institutionalized in this organization in a manner that it complements the roles and structure supporting it.

Channeling the intellect of resources in the direction of matters of criticality to the organization is among the first requirements. Keeping initiatives relevant to business critical matters, at any time, is one of the most challenging of top management's jobs. This is a pre-condition to success while initiating and sustaining the Continuous Improvement initiative. Planning for success is crucial here as what we seek to do is the inculcation of a 'habit' in every individual for seeking out, day in and day out, what they can improve. It is all the more important in today's environment of constant changes, given the multiplicity of technologies involved. Complexity is simplified through Continuous Improvement in as much that the marriage of technologies is enabled better through practice and application.

Besides there is need for visible display of Management commitment, participation, conviction and recognition of efforts on the front. Other requirements include availability of expertise for running the initiative, a Champion to demonstrate initial success and plans for sustaining it and a clear focus on top management's part to provide all resource and skill support.

Availability of performance baselines is required for Continuous Improvement to be measured. Having minimum set of processes in place for at least a year is a requirement for being able to see improvements in the organization. Minimum set of processes is to be complemented with a similar level of training to resources, providing them inputs on measures, data collection and analysis. It is presumed that during the one year of process implementation, the system has generated adequate and relevant data that can be used for measuring the improvement.

A methodology or a process may do very little to bring in results, if these are not lead by an environment conducive to change. History is proof to the fact that continuous reinforcement and perseverance needs to be exercised for affecting 'change'. ***Perseverance in this case would mean single minded focus on making every single project a success – ushering in a culture that will seek and positively change,***

*continuously, the organizational response to the marketplace.* This understanding and approach is fundamental to taking up 'Kaizen' or Continuous Improvement that we are attempting to discuss here.

***Precautions to be taken :***

Process Improvement (PI) tools provide a method to analyze problems and trends in order to enable improvement or solutions. These are one of the means to the end, which is Continuous Improvements and Business Excellence. Management needs to display care in the use and application of PI tools to situations that the organization will encounter in its day to day operations.

This is not an alternative to management decisions and actions that are crucial to Business existence, but are tools that can help in identifying actionables and in their prioritization, wherever necessary.

Management needs to take caution of situations where people may substitute this to 'action' required immediately and such instances need to be done away with.

To begin with, wherever the cause is apparent or a solution has been arrived at the management level, the PI tools must not be used. PI process comes into being only in cases where a problem or an opportunity for improvement is encountered, supported by data but the cause or method to pursue resolution is not clear owing to multiple issues involved.

***Suggested Approach to Continuous Improvements (CI):***

Usage of the tools and techniques for PI requires hands on training and subsequent on-line facilitation. All PI projects will necessarily need guidance and facilitation in order to experience the rigor and approach to improvement. Such hand-holding and experiencing successes is essential for the PI initiative to yield results in the initial years and till it is institutionalized.

It is suggested, where such improvements are being initiated for the first time, that a few critical areas are taken up for resolution initially. Focusing on the top 3 or 4 issues, at any time, is seen to effectively work in providing the best resources to find a solution. It provides crucial hands-on training to a select few, who can be the trainers for the second set of project initiators. In the second instance, the number of projects may be increased marginally. A planned approach greatly helps in providing successful formulae to all in the organization and prioritization for selection of areas for PI are also adhered to.

The criticality of staggered implementation should not be undermined as it helps the Middle Management and Supervisors to wet their hands on the requirements and implementation of a successful PI project. Subsequently, they are likely to be in a position to guide their peers and colleagues in avoiding pitfalls in successful PI. Management needs to display the commitment to such an initiative and ensure buy-in from every individual to the same. Taking up a few critical projects and their successful implementation helps the Management in displaying their commitment to the concept and willingness to see through to success, providing the critical mass for every individual to take up enthusiastically.

This can be used as a pre-cursor by the Management to chalk out a reward program commensurate with benefits derived for subsequent projects.

***Pre-cursor to CI:***

The stated process here has two sections, one dealing with the Process Improvement` and the other with the Improvement Methodology.

- # Process Improvement` provides the method to pursue improvement and problem solving. It supports the requirements of organizations, where such an initiative is being launched.
- # Improvement methodology is based on the PDCA cycle proposed by Dr Deming. Tools and techniques for solving problems and effecting improvements derives inputs from the Juran and Crosby system.

*`Process Improvement and CI are used complementarily from now on*

The requirements of both problem solving (corrective and preventive actions) and process improvement (quality improvement and cycle time reduction) are addressed by the above. Wherever the words Process Improvement (PI) or Improvement Methodology (IM) is used in this document, it may be prudent to read them in a complementing manner, unless stated otherwise.

PI primarily uses the Statistical Quality Control tools, apart from using relevant Business Management tools as and when necessary. The process provides with a method to approach a business or process issue in a logical manner that enables permanent solutions, if the rigor of the methodology is maintained.

*The tools and approach used for every project will, however, differ to suit the criticality, impact, size, duration, relevance and resource availability.*

### ***Who can initiate CI & sample situations:***

PI takes into account the fact that improvements shall be initiated at the individual, team or group level. Therefore, the projects (Process Improvement Projects (PIPs)) that are derived for effecting improvement in the process or for problem solving can be at any of the levels.

PI needs to be owned by the person or a set of people in the process, where the need for improvement is felt. PI then is need driven rather than being a 'push'. To that extent, creation of awareness, imparting training, monitoring measures and carving out successful PIPs is the responsibility of those who seek the solution.

An example set of situations that may trigger a PIP are as follows :

- Individual/Team/Group level initiatives to measure process parameters that result in identification of areas for improvements
- instances where certain problems recur and in the view of concerned teams need to be addressed
- corrective and preventive actions highlighted through an internal or external audit report
- inputs from customers (internal or external) – appreciation or complaints
- specific projects identified by the Group/Senior Management to affect process improvement, reengineering or cycle time reduction
- specific customer requirements which may seek a team to look for new practices to be built into the existing system (through usage of tools, etc.)

It is important that all initiatives at an individual level are apprised at the time of start by the next level supervisor in order to provide adequate focus and support to the same. For all critical projects to be initiated at the Group level or higher (needing cross-functional teams), participation from the senior management is preferred. This not only confirms the requirement for the PI project, but also helps in obtaining commitment and assistance from supervisors to support the project requirements.

### ***Forming a PI Team :***

In the case of an individual taking up a project, he/she should have been trained on the PI methodology. If not trained already, training must be provided at the earliest. In case of cross-functional teams, there are certain guidelines, which will help in optimizing the results. These are –

- (i) A Senior person close to the area of action and capable of guiding the team to a solution is chosen as a Team Leader.
- (ii) The rest of the team may consist of 4 to 7 people in number, depending upon the complexity and scope of the project (team size of more than 8 is considered counter-productive)
- (iii) The team members may be selected on the basis of –
  - (a) their being part of the process
  - (b) possessing complementary skills required
  - (c) knowledgeable about the process area, or
  - (d) is an outsider to immediate process but can contribute meaningfully to the resolution.

It is advisable to involve a person from the relevant area in Management having powers to take decisions on actions and cost implications involved as part of the project.

Wherever the area of concern is spread across more than one unit, it is recommended to have a cross functional team working on this, with participation from all involved groups. In such a case, a senior level person may be chosen as the Team Leader to ensure group converge on crucial matters.

### ***Step-wise approach to PI :***

In any organization, there is likely to be a group that is responsible for process adherence and improvement. This requirement is taken as satisfied in the subsequent sections. Wherever, such a specialized group does not exist, one may substitute the Quality Group with ‘Expert’ or ‘Coordinator’ for the project.

The Improvement Process has four distinct phases viz.

1. The identification of an area for Improvement and initiation of PIP (individual or team based)
2. Fix and Cause Analysis
3. Implementation of derived actions and its monitoring, and
4. Closure of the PI Project & integration of learning into explicit fora

In the process of improvement, at any level – individual, team or group – there are three entities involved at the minimum. They are – the identifier of the Improvement opportunity, the Supervisor who needs to play a critical role in guiding and providing resources and the Quality group that has a handle on the Improvement Methodology (involves tools and techniques, etc.).

This presumes that the organization has evolved a system for cultivating and leveraging the Continuous Improvement culture through empowerment for taking up and completing such projects at any level.

The following table captures the responsibilities of the three entities involved in ***Identification of an area for Improvement and initiation of PIP :***

Identifier(s) of PI Opportunity	Supervisor	Quality Group
<ul style="list-style-type: none"> <li>- Fill up the PIP registration form* completely</li> <li>- Define scope of PIP</li> <li>- Support relevant details in form with measurements</li> <li>- Send it to supervisor for approval with training needs in problem solving, if reqd</li> <li>- Ensure that form is returned with signature of supervisor</li> <li>- Incorporate inputs into PIP and initiate</li> </ul>	<ul style="list-style-type: none"> <li>- Discuss PIP with the identifier in detail</li> <li>- Evaluate requirement(s) &amp; viability of PIP, validate the measurements and the fix</li> <li>- If it is a PIP at a team level, vet the Cost Benefit Analysis</li> <li>- Get identifier to correct any details, if necessary</li> <li>- Ensure PIP Database is updated and assigned a #</li> </ul>	<ul style="list-style-type: none"> <li>- Provide training on methodology</li> <li>- Facilitate the PIP, if required</li> <li>- Confirm that PIP form is filled properly</li> <li>- Look at PIP cost and effort estimates and problem scope</li> <li>- Ensure that rigor is maintained</li> </ul>

\*refer to template

While defining a situation identified (or the problem), impact on other projects or processes in the organization need to be thought through and identified upfront. One of the requirements may be to estimate the efforts (person hours) required to successfully resolve the situation or area identified.

Details of the improvement project, including the objective, may be communicated to all concerned in the process/area of job where the project is being undertaken. This enables the project to draw upon required assistance and participation from all concerned.

Once the project is initiated, each one of the entities remain transferred to the next stage of the Improvement process, which is *identifying a fix to the situation and deriving root causes of the problem*

Identifier(s) of PI Opportunity	Supervisor	Quality Group
<ul style="list-style-type: none"> <li>- Implement the fix*</li> <li>- Identify measures that convey effect of fix &amp; monitor regularly</li> <li>- Assess availability of data for doing cause analysis</li> <li>- Involve others in brainstorming on probable causes</li> <li>- Plot causes on the fishbone diagram</li> <li>- Support causes with data (if data not available, bring team together to capture impact)</li> <li>- Construct pareto diagram for issues to be prioritized for action</li> <li>- Discuss the cause analysis and pareto with data with supervisor to arrive at CA</li> </ul>	<ul style="list-style-type: none"> <li>- Monitor fix regularly for impact</li> <li>- Seek to change fix if required</li> <li>- Guide and verify data compiled for use in cause analysis</li> <li>- Verify Pareto for its data correctness</li> <li>- Check correlation of causes being identified for actions with problem area &amp; validate with data</li> <li>- Do Cost Benefit analysis of actions being taken up for implementation</li> <li>- Provide organizational perspective of impact of the causes identified/taken up</li> </ul>	<ul style="list-style-type: none"> <li>- Facilitate the PIP</li> <li>- Ensure that rigor is maintained</li> <li>- Help Head of initiating Group &amp; PIP team in deriving right understanding of cost involved and benefits expected</li> <li>- Assist supervisor in validating Cause Effect Diagram and Pareto</li> </ul>

\*Fix = A quick solution to the problem that prevents defective work from being passed on to the customer, while work on identifying a permanent solution is on. The fix needs to be in place till the Improvement actions for a permanent solution are implemented.

At the end of each phase in Improvement Process, it is important to revisit the project scope and objective as these may have been derived upfront without an explicit understanding of the phenomenon through data. Based on what the data suggests during such reviews, one may need to refine or modify the scope and objective of the project.

Cost Benefit Analysis will include all costs that are likely to be incurred (including the resource time estimated to be spent on the project) and benefits that are likely to accrue (including direct and indirect benefits) to the organization/process(es).

In stage 2, the improvement project would have gone through brainstorming to capture all likely causes, their grouping under homogenous groups (which are later used as bones in the Cause Affect diagram), and then captured in the Cause Affect diagram. Subsequently, the causes need to be prioritized on the basis of data (causes with maximum number of occurrences) and then work towards creating a detailed action plan. This brings us to the next stage in the process of Improvement.

The conclusion of prioritization of causes for action brings us to the next stage - *Derive detailed actions to offset the causes, their implementation and monitoring:*

<b>Identifier(s) of PI Opportunity</b>	<b>Supervisor</b>	<b>Quality Group</b>
<ul style="list-style-type: none"> <li>- Derive detailed actions for each cause identified</li> <li>- Capture action plan in the format proposed below</li> <li>- Derive measures for each action &amp; major activity planned</li> <li>- Get the Corrective Actions approved by supervisor</li> <li>- Fix timelines for monitoring of actions (with what measures)</li> <li>- See if results derived are as per the objectives set for the PIP</li> <li>- Revisit the cause analysis if results are not as predicted</li> </ul>	<ul style="list-style-type: none"> <li>- Approve the proposed actions</li> <li>- Validate the measurements</li> <li>- Define timelines for monitoring progress and effect of PIP</li> <li>- Meet PIP team at defined intervals</li> <li>- If actions are not resulting in projected benefits, revisit the cause analysis</li> <li>- Enlist Quality Group's help &amp; participation in all meetings</li> <li>- Facilitate action plan implementation through Management support</li> </ul>	<ul style="list-style-type: none"> <li>- Facilitate the PIP</li> <li>- Ensure that rigor is maintained</li> <li>- Help Head of initiating Group &amp; PIP in monitoring and highlighting issues for immediate correction</li> <li>- Assist in drawing up Corrective Actions with measurements</li> </ul>

The actions derived are detailed to a working level for clarity and understanding. Management's focus on implementation akin to any other project - implement all recommended actions as per the time plan and as intended is crucial. Management, the Head of Initiating Group and the Supervisor need to monitor the impact closely and intervene to avoid any deviation.

This is a crucial stage for a team based PIP as this validates the objective and the very selection of the problem for resolution. Implementation is carried through and monitored as closely as necessary. Measurements are captured and analyzed at frequent intervals for assessing the trend and impact. Based on the trend, if necessary, revisit the cause analysis and rework on some of the actions.

Prior to implementation of proposed actions, the Head of initiating Group and the PIP leader may chart out a communication and awareness plan to inform all people in the process of the project and its actions. Such a plan ensures the buy-in from people in the process prior to implementation. The communication may explain the objectives, criticality of the PIP and the expectations from people in unambiguous terms.

The final stage in a Process Improvement Project is its *closure and integration of learnings or impactful changes into existing systems i.e. explicit fora.*

This comprises of -

- Evaluating the outcome of the PIP with reference to its objective(s) and documenting it as per guidelines (including measurements at start and closure stage of PIP),
- Validating the improvements and incorporate the experiential learnings into existing process(s),
- Communicate, educate and implement the new process, and
- Recognize and reward the individual/team

Identifier(s) of Problem/QI Opportunity	Supervisor/Head of initiating GROUP	Quality Group
<ul style="list-style-type: none"> <li>- Provide trend chart, with comparison at start &amp; end of PIP, highlighting impact of the actions</li> <li>- If actions do not produce projected results, consult supervisor and rework on corrective actions/causes identified with Quality Group</li> <li>- Document the PIP as per guidelines</li> <li>- Do gap analysis with existing process and highlight improvement areas</li> <li>- Assist in communicating and educating all in the process of the PIP</li> <li>- Continue measurements for a defined period after closure of PIP &amp; report trends on sustainment</li> </ul>	<ul style="list-style-type: none"> <li>- Monitor and ensure actions have yielded desired results</li> <li>- Revisit actions and causes identified for action, if necessary</li> <li>- Plan for closure, subsequent measurements &amp; standardization of improvements</li> <li>- Database is updated and Best practices are captured</li> <li>- Evaluate need for recognition and recommend</li> <li>- Key process measures are continued for a defined time</li> <li>- PIP not closed until the learnings are integrated into the existing system</li> </ul>	<ul style="list-style-type: none"> <li>- Facilitate measurement of success</li> <li>- Assist in rework, if necessary</li> <li>- Validate the process and confirm stability</li> <li>- Assist in decisions pertaining to integration of learnings</li> <li>- Update database to compare PIP results and yield</li> <li>- Provide inputs to Head of initiating Group on recognition needs</li> </ul>

While contemplating closure of a PIP, it is important to match the results achieved with its objectives set. Objectives may be referred to with reference to scope of the project. In those cases, where a section of causes were not acted upon, a new PIP may be considered depending upon their criticality. It may be prudent to identify measures for the resolved area, capture and monitor them routinely to ensure non-recurrence of the problem.

A meeting for closure of the PIP (only if it is a team PIP) needs to be held with the team, Head of initiating Group and the Quality Group present where the team presents PIP from initiation until closure with all measurements and various actions taken. This may be used to validate the PIP results and also decide on what part of the PIP actions, results and recommendations need to be made available on database and repository management system.

It will be beneficial to the organization if all PIPs, either individual or team based, are to be verified for their criticality to the process and selected for inclusion in the repository. This may be applicable to the extent where actions, analysis and solutions of a PIP is found to be extraordinary and/or applicable/usable in similar or other situations.

Most individual PIPs, given their scope and span of control, should not take more than a week to complete, leave alone exceptions. Large, cross functional team projects bear the complexities relating to data and information besides the availability of team members for long periods. However, these are likely to take about a month to three from the initiation to final action implementation stage. Implementation is likely to account for about two months and subsequent measurement another two months. All this will, however, vary according to the criticality, size and time availability for the PIP and can not be construed as applicable to all.

### ***Improvement Methodology***

The Improvement Methodology (IM), in its form here, is based on the 7 tools of Statistical Quality Control. Necessarily, each one of these tools have not been addressed as relevant for every type of situation or issue. Relevance and usage of the tools are the portfolio of the solution seeker, with the help of an expert in the area.

### ***Pre-requisites for IM***

IM is a set of tools available as a means for deriving solutions. Application of tools are to be done on a case to case basis. Effective implementation of IM requires the following in shape –

- a) The organization has a history of minimum set of process implementation for atleast an year and resources are tuned towards such method of working.
- b) Training of resources on basic understanding of measurements, their purpose and usage is expected. Where not done, introduction to measurements is to be conducted.
- c) Hands-on expertise is available within the organization for facilitating a training on IM and PIP.
- d) A conducive mindset and mechanism exists for IM usage and deployment in all aspects of the organization.
- e) Top Management insists and leads by example in IM usage in practice

### ***How does IM work?***

IM suggests a logical approach to solution seeking, but the steps need not necessarily be applied sequentially. As far as the requirements of, and output from each step is understood, one may undertake work on two steps at the same time. Also, there is no time limits specified for arriving at solutions as this

is a derivative of the extent of relevant data being available, apart from the right resources. Level of complexity of a project may be another constraint that may determine the length.

In some cases, one may need to backtrack to the previous stage and redefine the plan or objective of a project. Let us take the case of a project that has started on the basis of a 'gut feel' of certain affected resources. While the feel of the members is right, no data exists to support the extent or type of problem. Subsequently, during the observation stage if the data collected seeks redefinition of the improvement statement or the scope, one may need to do that. A similar situation may present itself at any stage of a project and may call for a move back or forth, according to the needs of the situation.

### ***IM – The Approach***

The overall framework of the Improvement Methodology is adapted from the PDCA (Plan, Do, Check, Act) cycle of Deming. It borrows from Dr Juran's Improvement Methodology as well as from that of Philip Crosby to the extent of simplifying the manner in which the process is carried through. Needless to say, tools introduced by Prof K Ishikawa (fishbone, etc.) are prominent whichever methodology we choose.

The approach is likely to work effectively when organizations seek to inculcate and create a culture of Continuous Improvement with contributions from every individual in it. Necessary ingredients in the form of training on SQC, etc., empowerment to affect such improvements on a day to day basis, creating a mechanism to support such dynamism is provided to all concerned. Supported by a creditable award mechanism for excellence, this is likely to create an environment where knowledge creation and sharing is encouraged across the organization. And none benefits more than the customers and marketplace and in turn ,the organization as a whole.

### ***Step 1 : Define the Situation***

First step in the Improvement Methodology is '*Define the Situation*' – situation here needs to be read as an Area for Improvement or a Problem.

**Tools used :** Process Flow Chart and Critical Activity Chart, Gantt chart

This step involves defining the situation (the problem or the area of improvement) and planning for a solution. Describing the current situation or charting out a future action/result should be done on the basis of data/information available on clear measurement of a process or occurrence in question.

- **Clearly describe the problem**

The objective of this step is to precisely define the undesirable situation in a process or its output so that it is easily communicated and understood by everyone in the same manner.

- *State the non-conformance*

Specify the current state, in terms of non-conformance, and the desired state. If the non-conformance is spread over a period, specify (a) the number of non-conformances, (b) the total number of observations and (c) the period to which the data belongs to.

- *Specify the process*

Where the problem was discovered and the potential scope of the process (a flow chart indicating the place of improvement scope may be helpful here).

- *State the consequences*  
Consequences of current situation must be translated and stated in terms of impact on process, customers, productivity, other processes, employees, etc.
- *Plan for the Solution*  
The objective of this step is to draw a preliminary or initial plan to guide the efforts and to help everyone where the problem solving efforts are headed.
- *Determine measure of completion*  
The measure of completion is a brief, specific statement that describes in advance how the team or individuals will know when the problem is solved. It describes the measures which will confirm whether the action(s) taken have been effective.
- *Estimate Resolution Date*  
Resolution refers to the date when the corrective/preventive action(s) will have completed their objective and become part of operational part of the process
- *Plan the timeline for resolution of problem*  
Based on the type of problem, type of complexity, resource requirement and management participation required, prepare a plan indicating timelines for stage-wise completion.

The above provides everyone involved in the process with a uniform understanding of the situation. It assists in planning for the resource availability, management attention and participation from people in the process and those affected by it.

***This step is complete when the supervisor/Head of Initiating Group –***

- Identifies the team or individual to work on resolution
- communicates to those, who are part of the team, on the likely start and end date of the project (thus relieving them from other responsibilities, if required)
- communicates to all those in process and affected by it about the launch of the project, its objective and measure of completion (wherever necessary, also indicate the contribution or participation expected)
- provides budgetary, training and other support required by the identified team to initiate work, and
- accepts the problem definition statement, the measure of completion and the plan for problem (where necessary, provide inputs to the initiator to redefine or clarify other points and then approve)

***Step 2 : Fix the Situation***

Fix refers to a situation where a temporary solution for the issue at hand needs to be meted out immediately to stop further damage from occurring. While the fix is in place, an observation of the situation is undertaken to facilitate a better definition – if it was done earlier in the absence of live data

Evolving a fix to the issue at hand provides the team with necessary time required to get to the root of the actual cause and remove it. *This ensures that a defective product or service is not shipped to the customer but at a cost that is avoidable.*

Fix(es) are arrived at within the team involved on the basis of the collective wisdom and experience in the process. While designing the fix(es), it is important to document the actions being planned with results expected. Basis for arrival at a fix(es) is also to be documented. These are then monitored for effectiveness or otherwise. New fix(es) are identified and applied whenever a previous fix is found to be ineffective. Process and other relevant measures are captured to gauge the effectiveness of a fix, e.g.

(a) that they are minimizing the consequences

(b) that they are not creating any additional problems

The fix(es) are to be in place till the time a solution of the actual cause is identified, implemented and found effective. It is important to note that till such time the actual cause is not removed, fix(es) should not be withdrawn.

### ***Step 3: Identify the Cause(s) & prioritize***

After having identified an area for improvement and defined it, we now move on to identifying the real cause(s) that contribute to the situation.

#### ***(i) Identify the cause(s)***

**Tools used :** Brainstorming, Cause Effect diagram, Scatter diagram, histogram

It is important that all possible data on the process critical aspects, including the situation defined earlier on, are identified and captured by the time the team approaches this Step.

Brainstorming is the technique suggested for putting together all likely causes that are contributing to the problem or situation defined. Participants in the brainstorming session may include apart from the team working on the project, people affected by the problem, people from the process where the problem is reported from and those who are not directly related to the subject but are capable of contributing.

All causes identified in brainstorming are formed into homogenous groups and are categorized under 3 or 4 major heads. Each one of these heads are then the collection of a set of cause(s) that are similar in nature.

Transfer the contents onto the Cause Effect Diagram with each major head being reflected as a bone. CED helps us to see a situation in its full perspective i.e. in terms of all possible causes contributing to a given effect. While plotting the causes on a fishbone, the sub-causes also need to be captured, if relevant.

During the cause analysis, however, a few issues that need substantiation through data may arise. In either case, it is important to ensure that what, when and how to collect the data or information required is planned.

Answering the following questions and follow through on them will help in this respect.

- a. what process(es) to measure
- b. what requirement(s) to measure
- c. where will the data be collected
- d. when will the data be collected
- e. who will be responsible for collecting data
- f. how will the data be collected, and
- g. how will the data be documented

All cause(s) plotted on the diagram need to be supported by data from the system. The availability of data will enable in identification of the cause(s) that contribute most to the problem or situation defined.

**(b) Prioritization**

**Tools used :** Histogram, Pareto Chart

At any time, there are a number of issues that seeks the attention of an organization and prioritization is one of the key activities of the management. Here too, one is faced with a number of cause(s) that contribute to the situation, which needs to be prioritized for action. Prioritization helps us to –

- focus on the vital few, rather than the trivial many
- see results faster as the focus is on what is critical
- assign scarce resources more effectively
- sustains motivation on such initiatives as Continuous Improvement

Pareto chart helps us in plotting the most critical cause(s) with their impacts measured, highlighting the expected impact of any combination of such cause(s) on the overall situation. This enables us to set the right objectives for the project.

It is important to revisit ‘Define the Situation’ at this point, as the decision to focus on certain cause(s) for resolution may have an impact on the final objective. A refinement in the objective for the project may be realistic at this juncture, if it is in variance with what is being taken up as cause(s) for resolution.

While data based prioritization is preferable, there may be situations when such data to support the cause(s) to be taken up are not available. It is suggested, at these times, that the team that participated in the brainstorming is brought together to select the cause(s) that need to be addressed first. Each individual may be asked to select the top 5 cause(s) to be put in the following format :

S.No.	Cause identified	Impact of improvement/on problem	Easy to implement	Complexity of solution
		<i>(Rate on a scale of 1 to 5, where 5 is High and 1 is Low)</i>		
1.				
2.				
3.				
4.				
5.				

The inputs of all the members may be put together to see the collective view and cause(s) prioritized. In such a case, where this method is used the team may need to earmark a date by which it will reinforce this decision through data from the system. It is critical to note that such validation alone can ensure that the cause(s) identified for action are indeed the deserving ones.

**Step 4: Derive Actions, Implement & Monitor**

The objective of this step is to generate, select and implement actions that will eliminate the identified cause(s). We shall look at this in two parts, the first dealing with Action recommendations and the second addressing the implementation part of the same.

**Tools used :** PDCA Cycle approach, Cause Effect diagram and Pareto analysis

**(a) Derive Action recommendations**

Having identified the cause(s) to be addressed, it is time to derive the actions to be implemented. A format similar to the one provided below may be helpful in capturing the recommendations.

S #	Cause(s) Identified	Solution(s) identified	Action(s) Planned	Responsi- bility	Timeline	Measure- ments
1.	1.	1.1	1.1.1			
		1.2	1.1.2			
			1.1.3			

The '*measurements*' column in the above points to the measures to be defined that will confirm whether the results of a given solution are as expected or not. Dates when the measures will need to be looked at to be determined.

'*Timeline*' is for the date by which the action planned will be implemented.

'*Responsibility*' is to capture the name of the person who is responsible for the completion of a particular action planned.

'*Action(s) Planned*' : There may be a set of actions that may help implement one 'solution'.

'*Solution(s) identified*' : There may be a combination of solutions that will collectively address a 'cause'.

'*Cause(s) identified*' : Prioritized cause(s) identified for action.

Action implementation may be done either in a pilot mode or across a given group or organization. In any case, the scope and approach to implementation needs to be streamlined, in line with organizational functioning. This will enable in introducing 'change' in a systematic way and in pockets which are conducive to success.

Prior to implementation of the actions, an exercise to communicate the same to people in the process is to be done by the Management. This communication may spell out in clear terms the objective of the initiative and the results expected with timelines. A one-to-one address of all resources is suggested for a hands on feel of the response. This will help in gauging the mindset and approach of the resources to 'change' and Management may take appropriate measures to counter any issues.

### ***(b) Implementation***

Until the stage of deriving actions, the team identified for the purpose has worked along with those in the process. In order to operationalize the outcome of the project, the responsibility needs to be transferred to a set of resources in the process where the implementation is planned. This is a crucial period when the team that has worked on the requirement is passing on the mantle to another for effective implementation. Following inputs may be of help in selecting the implementation team :

- (i) One of key resources, who has been part of the project team may be taken up as a member of the implementation team.
- (ii) If the person selected at (i) above is senior enough with authority to get things done, he/she may be made the Leader of the implementation team. Otherwise, a new Team Leader from the area may be chosen.
- (iii) Rest of the team members (of the size of 4 to 6), depending upon the spread of the implementation area, may be chosen like –
  - one member from the area of Quality
  - rest of the members from the process area
- (iv) Management is required to allot a champion, who will be responsible to work with the Team Leader closely in ensuring that proper monitoring and progress is maintained. Besides he/she will be responsible for providing all support from Management.

In order to facilitate a smooth monitoring and implementing, it is suggested that the implementing team works on this on a full time basis till the initial success is tasted. In any case, the implementation plans needs to be integrated into the daily working routines of everyone in the team as well as in the process. A conscious effort to make this happen is to be undertaken by the implementing team.

The timelines indicated in the implementation plan may need to adhered to, if results are to be seen fairly fast. This is one of the weakest areas of implementation and Managements tend to close projects when these are handed over for implementation. Implementation is by far the challenging task as it practically brings in 'change'.

### ***(c) Monitoring***

This is the Check stage in the PDCA cycle of Deming and normally lasts for a period of 1 to 3 months at the minimum. One month in case the problem or improvement being addressed is at an individual level and around three months if it is done in a team mode. This is to allow the actions to take place as planned and allowing time for the results to be seen. Such a 'check' period needs to be defined at the time of recommendations to enable preventive measures to be taken.

The team that has worked on deriving the solutions needs to be involved in the implementation on a ad-hoc basis. Participating in the monitoring meetings, discussing the results of implementation, comparing with results expected vis-à-vis actuals, refining actions and revisiting any solutions that are not yielding results are some of the responsibilities that the team will work on along with the implementation team. The team will be completely disbanded only after the pilot or phase-I implementation is successful and solutions have been proved for results expected.

### ***Step 4: Closure of the Project***

Closure of the project is the last stage of the improvement aspect - this acts as a 'A' in the PDCA cycle. The primary responsibility here would be to evaluate the project on whether it has achieved the objective(s) or not. This presents us with two possible scenarios, one that the project has met its objective(s) or two, it has not (yet). Let us look at both these below :

#### ***Scenario 1: Project met the objective(s)***

A careful study of the causes identified for action and the updated action plan with measures from the process should tell the impact of the solutions. In the event of the solutions being impactful, the next step is to sustain the benefits and spread the learnings across the organizations quickly. Besides, there is a need for archiving the project documentation for future reference or usage.

Pointers that help us in sustaining the benefits are –

- While the project has achieved its objective(s), how long do I need to maintain focus for the improvement(s) to become practice.
- If I need to know whether the improvement(s) have sustained after the project is closed, what measurements are required to be put in place and for what duration do these need to be monitored.
- In the new, improved process(s), who or what role(s) should be made responsible for capturing, monitoring and acting on the measures?

Documenting the improvement(s) or learning out of the project and making them part of the practice is a hard task. The project team, alongwith the management, needs to come out with a plan for educating related resources in the organization on the learning, training them on the specifics of the improvements and introduce these as part of the practice(s). One of the means of doing it is incorporating these in the

existing process set of the organization. Education and Training on such learning is crucial for the knowledge to be practiced across the organization.

Whenever a change is affected, be it improvement or a bottleneck removed, it has ripple effects on a set of processes that are indirectly connected to the impacted one. In the normal run, these are encountered only when one treads on to it rather than identifying these and providing connects appropriately. This exercise needs to be in-built into the closure stage in order to bring to a conclusion everything that is connected to the project.

### ***Scenario 2 : The Project did not meet Objective(s)***

If and when any action is not seen to be delivering the results, it needs to be relooked at or redefined again in the light of facts. At this stage, it is important to gauge through the measurements the overall impact of the Corrective Actions. In case where the actions are not yielding results, one may need to revert to relooking at the most probable causes identified.

There are likely to be instances when despite the best efforts and methodologies a project may not meet its set objective(s). Some of the factors leading to a situation of this kind can be –

- (i) *Improvement area identified was not supported by facts through data (either at the beginning or subsequently);* it has been highlighted sufficiently earlier in this paper that while decisions may not wait for data always, it is critical that the needful is done to collect such data to validate decisions or actions at the earliest opportunity.
- (ii) *The team that was working on the project was not competent* – in terms of skills, exposure to the process, level of contribution required, hands-on feel of the situation, etc.; Selecting the right mix of people is a requirement.
- (iii) *Resource allocation was not adequate* – human or other resources, including management support, participating, etc. could not be spared as per requirements of the project. This might prolong a solution to an extent that by the time it is available, it may not be valid.
- (iv) *A technology development made available during the project* may make the solutions derived obsolete. It is imperative that both the projects, which are technology sensitive, as well as Management keep abreast of such developments.
- (v) *Data collected or made available for prioritizing the causes for action are not genuine.* This is a common cause in most cases and care must be taken to analyse all data and its source(s) for correctness.
- (vi) *Actions decided upon are not optimal* and could have been more pointed, incisive and drastic. This is a situation which is normally caused owing to lack of senior people not being part of action planning or vetting/validation. Organizational competency to commit for such actions are normally the forte of senior management without which others can only visualize what is within their control.
- (vii) *Implementation of actions was disoriented and defocused:* This is one of the most common factors for the failure of a improvement project. For implementation to be successful, reorientation of resources and systems on a continuous basis is a must. Monitoring of the progress vis-à-vis its plan, revisiting decisions if necessary, modifying actions in face of new realities not reflected, etc. needs to be dynamic in implementation plan. These are specific to an organization and the environment that it operates in. No action plan can work effectively if they are not continually validated, monitored and corrected.
- (viii) *Resources connected with the project are absent in implementation:* This has been explained in sufficient detail earlier.

There may be many other instances that may cause a project to be unsuccessful. Those listed above are the most common and can be planned for mitigation at the time of planning itself. It may be crucial for the organization to make a note of and appreciate the causes for failure of projects as they throw up unrecognized characteristics of the culture or nature of the organization/industry. A learning organization may put such an experience into use by planning for remedial measures in future projects.

***Documentation :***

Documentation is a means of making an inventory of all knowledge gained in the process improvements affected in the system. While the person or set of people involved with the project directly gain from it, organizational benefits are seen only when these are documented, communicated and integrated into common knowledge repository. The repository must comprise of information on both successful and the failed projects. Some other benefits of documentation are –

- make the improvement process available for future reference
- track the process improvement record of a given process/task over a period of time
- make the process person independent. By making documentation available, assigning responsibilities of a PIP or process to a new person is made hassle free
- capture the best PIP practices available to other projects, centers and organizations, as required

The team/individual will benefit by documenting the PIP on-line. Given an understanding of what is required to be documented, the same may be done at the end of each major step described above.

While in the case of a individual PIP, the documentation responsibility rests with the individual, in a PIP(T) the team may decide and allocate the responsibility among its members on phase to phase basis. This provides an opportunity for all team members to have a look at the documentation and plug gaps, if any, and also to get acquainted with such documentation requirements.

The documentation of a PIP may be completed and vetted with the supervisor prior to closure of the project. An organization, group or individual will stand to gain significantly if documentation is taken as a pre-requisite for closure of such projects.

Provided below is a suggested set of contents for documentation :

- (i) Project definition, scope, benefits planned for and details of project team in solution planning
- (ii) Details of fix and its measures across the time period
- (iii) Causes identified along with Cause Affect Diagram
- (iv) Prioritized causes along with Pareto, with substantiation for causes selected with data
- (v) Action Plan with all details and supporting measures till closure with details of implementation team
- (vi) Closure status and action on sustenance and integration into process(s)
- (vii) Final Cost Benefit Analysis of the project
- (viii) Further action suggested, if any, on causes not addressed in the project
- (ix) Learning of both the solution drawing and implementation from the project

It is beneficial if a detailed presentation providing salient features of the above document is made to the Management for further action to be taken up, if any.

### ***Reward Mechanism(s)***

Prior to initiating a journey of this sort, organizations must put together a blue print for their success. One of the prime factors therein is the recognition or reward mechanism that one may want to adopt. These should complement the success factors of the initiative in order for them to become a way of life in the organization. Understanding the extent and type of 'change' being sought from individuals and aligning the objectives to it will determine the level of success.

### ***Conclusion :***

Continuous Improvement is an area where there is no dearth for theoretical inputs including tools and techniques. Given the complexity of technologies of today and their application, there must be no doubt about the capability of resources or Managements in their ability to achieve success. It is, however, the mind sets of the collective organization that produces the miracle output, irrespective of a technology area or otherwise. It is the mindset that plays a significant role in believing that 'while breakthroughs are welcome, continuous improvement is the order of the day'.

Today's competitive advantages are not built on technology alone, which is common and available to everyone across the globe. Continuous Improvement provides with the advantage of putting the same technology to use, but better. And this keeps getting better, as we keep working on CI.

One limitation will remain, of course. That is our ability to bring in convergence among the strategy, technology, customer and organization related focus to Continuous Improvements. Once we have the right structure to support such goals and with CI in place, healthier bottomlines or Operational Efficiency will be natural derivatives of such an effort.

### ***Improvement Methodology***

The Improvement Methodology (IM), in its form here, is based on the 7 tools of Statistical Quality Control. Necessarily, each one of these tools have not been addressed as relevant for every type of situation or issue. Relevance and usage of the tools are the portfolio of the solution seeker, with the help of an expert in the area.

### ***Pre-requisites for IM***

IM is a set of tools available as a means for deriving solutions. Application of tools are to be done on a case to case basis. Effective implementation of IM requires the following in shape –

- f) The organization has a history of minimum set of process implementation for atleast an year and resources are tuned towards such method of working.
- g) Training of resources on basic understanding of measurements, their purpose and usage is expected. Where not done, introduction to measurements is to be conducted.
- h) Hands-on expertise is available within the organization for facilitating a training on IM and PIP.
- i) A conducive mindset and mechanism exists for IM usage and deployment in all aspects of the organization.
- j) Top Management insists and leads by example in IM usage in practice

### ***How does IM work?***

IM suggests a logical approach to solution seeking, but the steps need not necessarily be applied sequentially. As far as the requirements of, and output from each step is understood, one may undertake work on two steps at the same time. Also, there is no time limits specified for arriving at solutions as this is a derivative of the extent of relevant data being available, apart from the right resources. Level of complexity of a project may be another constraint that may determine the length.

In some cases, one may need to backtrack to the previous stage and redefine the plan or objective of a project. Let us take the case of a project that has started on the basis of a 'gut feel' of certain affected resources. While the feel of the members is right, no data exists to support the extent or type of problem. Subsequently, during the observation stage if the data collected seeks redefinition of the improvement statement or the scope, one may need to do that. A similar situation may present itself at any stage of a project and may call for a move back or forth, according to the needs of the situation.

### ***IM – The Approach***

The overall framework of the Improvement Methodology is adapted from the PDCA (Plan, Do, Check, Act) cycle of Deming. It borrows from Dr Juran's Improvement Methodology as well as from that of Philip Crosby to the extent of simplifying the manner in which the process is carried through. Needless to say, tools introduced by Prof K Ishikawa (fishbone, etc.) are prominent whichever methodology we choose.

The approach is likely to work effectively when organizations seek to inculcate and create a culture of Continuous Improvement with contributions from every individual in it. Necessary ingredients in the form of training on SQC, etc., empowerment to affect such improvements on a day to day basis, creating a mechanism to support such dynamism is provided to all concerned. Supported by a creditable award mechanism for excellence, this is likely to create an environment where knowledge creation and sharing is encouraged across the organization. And none benefits more than the customers and marketplace and in turn ,the organization as a whole.

### ***Step 1 : Define the Situation***

First step in the Improvement Methodology is '*Define the Situation*' – situation here needs to be read as an Area for Improvement or a Problem.

**Tools used :** Process Flow Chart and Critical Activity Chart, Gantt chart

This step involves defining the situation (the problem or the area of improvement) and planning for a solution. Describing the current situation or charting out a future action/result should be done on the basis of data/information available on clear measurement of a process or occurrence in question.

- **Clearly describe the problem**

The objective of this step is to precisely define the undesirable situation in a process or its output so that it is easily communicated and understood by everyone in the same manner.

- *State the non-conformance*

Specify the current state, in terms of non-conformance, and the desired state. If the non-conformance is spread over a period, specify (a) the number of non-conformances, (b) the total number of observations and (c) the period to which the data belongs to.

- *Specify the process*  
Where the problem was discovered and the potential scope of the process (a flow chart indicating the place of improvement scope may be helpful here).
- *State the consequences*  
Consequences of current situation must be translated and stated in terms of impact on process, customers, productivity, other processes, employees, etc.
- *Plan for the Solution*  
The objective of this step is to draw a preliminary or initial plan to guide the efforts and to help everyone where the problem solving efforts are headed.
- *Determine measure of completion*  
The measure of completion is a brief, specific statement that describes in advance how the team or individuals will know when the problem is solved. It describes the measures which will confirm whether the action(s) taken have been effective.
- *Estimate Resolution Date*  
Resolution refers to the date when the corrective/preventive action(s) will have completed their objective and become part of operational part of the process
- *Plan the timeline for resolution of problem*  
Based on the type of problem, type of complexity, resource requirement and management participation required, prepare a plan indicating timelines for stage-wise completion.

The above provides everyone involved in the process with a uniform understanding of the situation. It assists in planning for the resource availability, management attention and participation from people in the process and those affected by it.

***This step is complete when the supervisor/Head of Initiating Group –***

- Identifies the team or individual to work on resolution
- communicates to those, who are part of the team, on the likely start and end date of the project (thus relieving them from other responsibilities, if required)
- communicates to all those in process and affected by it about the launch of the project, its objective and measure of completion (wherever necessary, also indicate the contribution or participation expected)
- provides budgetary, training and other support required by the identified team to initiate work, and
- accepts the problem definition statement, the measure of completion and the plan for problem (where necessary, provide inputs to the initiator to redefine or clarify other points and then approve)

***Step 2 : Fix the Situation***

Fix refers to a situation where a temporary solution for the issue at hand needs to be meted out immediately to stop further damage from occurring. While the fix is in place, an observation of the situation is undertaken to facilitate a better definition – if it was done earlier in the absence of live data

Evolving a fix to the issue at hand provides the team with necessary time required to get to the root of the actual cause and remove it. *This ensures that a defective product or service is not shipped to the customer but at a cost that is avoidable.*

Fix(es) are arrived at within the team involved on the basis of the collective wisdom and experience in the process. While designing the fix(es), it is important to document the actions being planned with results expected. Basis for arrival at a fix(es) is also to be documented. These are then monitored for

effectiveness or otherwise. New fix(es) are identified and applied whenever a previous fix is found to be ineffective. Process and other relevant measures are captured to gauge the effectiveness of a fix, e.g.

- (a) that they are minimizing the consequences
- (b) that they are not creating any additional problems

The fix(es) are to be in place till the time a solution of the actual cause is identified, implemented and found effective. It is important to note that till such time the actual cause is not removed, fix(es) should not be withdrawn.

### ***Step 3: Identify the Cause(s) & prioritize***

After having identified an area for improvement and defined it, we now move on to identifying the real cause(s) that contribute to the situation.

#### ***(i) Identify the cause(s)***

**Tools used :** Brainstorming, Cause Effect diagram, Scatter diagram, histogram

It is important that all possible data on the process critical aspects, including the situation defined earlier on, are identified and captured by the time the team approaches this Step.

Brainstorming is the technique suggested for putting together all likely causes that are contributing to the problem or situation defined. Participants in the brainstorming session may include apart from the team working on the project, people affected by the problem, people from the process where the problem is reported from and those who are not directly related to the subject but are capable of contributing.

All causes identified in brainstorming are formed into homogenous groups and are categorized under 3 or 4 major heads. Each one of these heads are then the collection of a set of cause(s) that are similar in nature.

Transfer the contents onto the Cause Effect Diagram with each major head being reflected as a bone. CED helps us to see a situation in its full perspective i.e. in terms of all possible causes contributing to a given effect. While plotting the causes on a fishbone, the sub-causes also need to be captured, if relevant.

During the cause analysis, however, a few issues that need substantiation through data may arise. In either case, it is important to ensure that what, when and how to collect the data or information required is planned.

Answering the following questions and follow through on them will help in this respect.

- a. what process(es) to measure
- b. what requirement(s) to measure
- c. where will the data be collected
- d. when will the data be collected
- e. who will be responsible for collecting data
- f. how will the data be collected, and
- g. how will the data be documented

All cause(s) plotted on the diagram need to be supported by data from the system. The availability of data will enable in identification of the cause(s) that contribute most to the problem or situation defined.

**(c) Prioritization**

**Tools used :** Histogram, Pareto Chart

At any time, there are a number of issues that seeks the attention of an organization and prioritization is one of the key activities of the management. Here too, one is faced with a number of cause(s) that contribute to the situation, which needs to be prioritized for action. Prioritization helps us to –

- focus on the vital few, rather than the trivial many
- see results faster as the focus is on what is critical
- assign scarce resources more effectively
- sustains motivation on such initiatives as Continuous Improvement

Pareto chart helps us in plotting the most critical cause(s) with their impacts measured, highlighting the expected impact of any combination of such cause(s) on the overall situation. This enables us to set the right objectives for the project.

It is important to revisit ‘Define the Situation’ at this point, as the decision to focus on certain cause(s) for resolution may have an impact on the final objective. A refinement in the objective for the project may be realistic at this juncture, if it is in variance with what is being taken up as cause(s) for resolution.

While data based prioritization is preferable, there may be situations when such data to support the cause(s) to be taken up are not available. It is suggested, at these times, that the team that participated in the brainstorming is brought together to select the cause(s) that need to be addressed first. Each individual may be asked to select the top 5 cause(s) to be put in the following format :

S.No.	Cause identified	Impact of improvement/on problem	Easy to implement	Complexity of solution
<i>(Rate on a scale of 1 to 5, where 5 is High and 1 is Low)</i>				
1.				
2.				
3.				
4.				
5.				

The inputs of all the members may be put together to see the collective view and cause(s) prioritized. In such a case, where this method is used the team may need to earmark a date by which it will reinforce this decision through data from the system. It is critical to note that such validation alone can ensure that the cause(s) identified for action are indeed the deserving ones.

**Step 4: Derive Actions, Implement & Monitor**

The objective of this step is to generate, select and implement actions that will eliminate the identified cause(s). We shall look at this in two parts, the first dealing with Action recommendations and the second addressing the implementation part of the same.

**Tools used :** PDCA Cycle approach, Cause Effect diagram and Pareto analysis

**(c) Derive Action recommendations**

Having identified the cause(s) to be addressed, it is time to derive the actions to be implemented. A format similar to the one provided below may be helpful in capturing the recommendations.

S #	Cause(s) Identified	Solution(s) identified	Action(s) Planned	Responsi-bility	Timeline	Measure-ments
1.	1.	1.1	1.1.1			
		1.2	1.1.2			
			1.1.3			

The 'measurements' column in the above points to the measures to be defined that will confirm whether the results of a given solution are as expected or not. Dates when the measures will need to be looked at to be determined.

'Timeline' is for the date by which the action planned will be implemented.

'Responsibility' is to capture the name of the person who is responsible for the completion of a particular action planned.

'Action(s) Planned' : There may be a set of actions that may help implement one 'solution'.

'Solution(s) identified' : There may be a combination of solutions that will collectively address a 'cause'.

'Cause(s) identified' : Prioritized cause(s) identified for action.

Action implementation may be done either in a pilot mode or across a given group or organization. In any case, the scope and approach to implementation needs to be streamlined, in line with organizational functioning. This will enable in introducing 'change' in a systematic way and in pockets which are conducive to success.

Prior to implementation of the actions, an exercise to communicate the same to people in the process is to be done by the Management. This communication may spell out in clear terms the objective of the initiative and the results expected with timelines. A one-to-one address of all resources is suggested for a hands on feel of the response. This will help in gauging the mindset and approach of the resources to 'change' and Management may take appropriate measures to counter any issues.

**(d) Implementation**

Until the stage of deriving actions, the team identified for the purpose has worked along with those in the process. In order to operationalize the outcome of the project, the responsibility needs to be transferred to a set of resources in the process where the implementation is planned. This is a crucial period when the team that has worked on the requirement is passing on the mantle to another for effective implementation. Following inputs may be of help in selecting the implementation team :

- (v) One of key resources, who has been part of the project team may be taken up as a member of the implementation team.
- (vi) If the person selected at (i) above is senior enough with authority to get things done, he/she may be made the Leader of the implementation team. Otherwise, a new Team Leader from the area may be chosen.
- (vii) Rest of the team members (of the size of 4 to 6), depending upon the spread of the implementation area, may be chosen like –
  - one member from the area of Quality
  - rest of the members from the process area

- (viii) Management is required to allot a champion, who will be responsible to work with the Team Leader closely in ensuring that proper monitoring and progress is maintained. Besides he/she will be responsible for providing all support from Management.

In order to facilitate a smooth monitoring and implementing, it is suggested that the implementing team works on this on a full time basis till the initial success is tasted. In any case, the implementation plans needs to be integrated into the daily working routines of everyone in the team as well as in the process. A conscious effort to make this happen is to be undertaken by the implementing team.

The timelines indicated in the implementation plan may need to adhered to, if results are to be seen fairly fast. This is one of the weakest areas of implementation and Managements tend to close projects when these are handed over for implementation. Implementation is by far the challenging task as it practically brings in 'change'.

### ***(c) Monitoring***

This is the Check stage in the PDCA cycle of Deming and normally lasts for a period of 1 to 3 months at the minimum. One month in case the problem or improvement being addressed is at an individual level and around three months if it is done in a team mode. This is to allow the actions to take place as planned and allowing time for the results to be seen. Such a 'check' period needs to be defined at the time of recommendations to enable preventive measures to be taken.

The team that has worked on deriving the solutions needs to be involved in the implementation on a ad-hoc basis. Participating in the monitoring meetings, discussing the results of implementation, comparing with results expected vis-à-vis actuals, refining actions and revisiting any solutions that are not yielding results are some of the responsibilities that the team will work on along with the implementation team. The team will be completely disbanded only after the pilot or phase-I implementation is successful and solutions have been proved for results expected.

### ***Step 4: Closure of the Project***

Closure of the project is the last stage of the improvement aspect - this acts as a 'A' in the PDCA cycle. The primary responsibility here would be to evaluate the project on whether it has achieved the objective(s) or not. This presents us with two possible scenarios, one that the project has met its objective(s) or two, it has not (yet). Let us look at both these below :

#### ***Scenario 1: Project met the objective(s)***

A careful study of the causes identified for action and the updated action plan with measures from the process should tell the impact of the solutions. In the event of the solutions being impactful, the next step is to sustain the benefits and spread the learnings across the organizations quickly. Besides, there is a need for archiving the project documentation for future reference or usage.

Pointers that help us in sustaining the benefits are –

- While the project has achieved its objective(s), how long do I need to maintain focus for the improvement(s) to become practice.
- If I need to know whether the improvement(s) have sustained after the project is closed, what measurements are required to be put in place and for what duration do these need to be monitored.
- In the new, improved process(s), who or what role(s) should be made responsible for capturing, monitoring and acting on the measures?

Documenting the improvement(s) or learning out of the project and making them part of the practice is a hard task. The project team, along with the management, needs to come out with a plan for educating related resources in the organization on the learning, training them on the specifics of the improvements and introduce these as part of the practice(s). One of the means of doing it is incorporating these in the existing process set of the organization. Education and Training on such learning is crucial for the knowledge to be practiced across the organization.

Whenever a change is affected, be it improvement or a bottleneck removed, it has ripple effects on a set of processes that are indirectly connected to the impacted one. In the normal run, these are encountered only when one treads on to it rather than identifying these and providing connects appropriately. This exercise needs to be in-built into the closure stage in order to bring to a conclusion everything that is connected to the project.

### ***Scenario 2 : The Project did not meet Objective(s)***

If and when any action is not seen to be delivering the results, it needs to be relooked at or redefined again in the light of facts. At this stage, it is important to gauge through the measurements the overall impact of the Corrective Actions. In case where the actions are not yielding results, one may need to revert to relooking at the most probable causes identified.

There are likely to be instances when despite the best efforts and methodologies a project may not meet its set objective(s). Some of the factors leading to a situation of this kind can be –

- (ix) *Improvement area identified was not supported by facts through data (either at the beginning or subsequently);* it has been highlighted sufficiently earlier in this paper that while decisions may not wait for data always, it is critical that the needful is done to collect such data to validate decisions or actions at the earliest opportunity.
- (x) *The team that was working on the project was not competent* – in terms of skills, exposure to the process, level of contribution required, hands-on feel of the situation, etc.; Selecting the right mix of people is a requirement.
- (xi) *Resource allocation was not adequate* – human or other resources, including management support, participating, etc. could not be spared as per requirements of the project. This might prolong a solution to an extent that by the time it is available, it may not be valid.
- (xii) *A technology development made available during the project* may make the solutions derived obsolete. It is imperative that both the projects, which are technology sensitive, as well as Management keep abreast of such developments.
- (xiii) *Data collected or made available for prioritizing the causes for action are not genuine.* This is a common cause in most cases and care must be taken to analyse all data and its source(s) for correctness.
- (xiv) *Actions decided upon are not optimal* and could have been more pointed, incisive and drastic. This is a situation which is normally caused owing to lack of senior people not being part of action planning or vetting/validation. Organizational competency to commit for such actions are normally the forte of senior management without which others can only visualize what is within their control.
- (xv) *Implementation of actions was disoriented and defocused:* This is one of the most common factors for the failure of an improvement project. For implementation to be successful, reorientation of resources and systems on a continuous basis is a must. Monitoring of the progress vis-à-vis its plan, revisiting decisions if necessary, modifying actions in face of new realities not reflected, etc. needs to be dynamic in implementation plan. These are specific to an organization and the environment that it operates in. No action plan can work effectively if they are not continually validated, monitored and corrected.

- (xvi) *Resources connected with the project are absent in implementation:* This has been explained in sufficient detail earlier.

There may be many other instances that may cause a project to be unsuccessful. Those listed above are the most common and can be planned for mitigation at the time of planning itself. It may be crucial for the organization to make a note of and appreciate the causes for failure of projects as they throw up unrecognized characteristics of the culture or nature of the organization/industry. A learning organization may put such an experience into use by planning for remedial measures in future projects.

### ***Documentation :***

Documentation is a means of making an inventory of all knowledge gained in the process improvements affected in the system. While the person or set of people involved with the project directly gain from it, organizational benefits are seen only when these are documented, communicated and integrated into common knowledge repository. The repository must comprise of information on both successful and the failed projects. Some other benefits of documentation are –

- make the improvement process available for future reference
- track the process improvement record of a given process/task over a period of time
- make the process person independent. By making documentation available, assigning responsibilities of a PIP or process to a new person is made hassle free
- capture the best PIP practices available to other projects, centers and organizations, as required

The team/individual will benefit by documenting the PIP on-line. Given an understanding of what is required to be documented, the same may be done at the end of each major step described above.

While in the case of a individual PIP, the documentation responsibility rests with the individual, in a PIP(T) the team may decide and allocate the responsibility among its members on phase to phase basis. This provides an opportunity for all team members to have a look at the documentation and plug gaps, if any, and also to get acquainted with such documentation requirements.

The documentation of a PIP may be completed and vetted with the supervisor prior to closure of the project. An organization, group or individual will stand to gain significantly if documentation is taken as a pre-requisite for closure of such projects.

Provided below is a suggested set of contents for documentation :

- (x) Project definition, scope, benefits planned for and details of project team in solution planning
- (xi) Details of fix and its measures across the time period
- (xii) Causes identified along with Cause Affect Diagram
- (xiii) Prioritized causes along with Pareto, with substantiation for causes selected with data
- (xiv) Action Plan with all details and supporting measures till closure with details of implementation team
- (xv) Closure status and action on sustenance and integration into process(s)
- (xvi) Final Cost Benefit Analysis of the project
- (xvii) Further action suggested, if any, on causes not addressed in the project
- (xviii) Learning of both the solution drawing and implementation from the project

It is beneficial if a detailed presentation providing salient features of the above document is made to the Management for further action to be taken up, if any.

### ***Reward Mechanism(s)***

Prior to initiating a journey of this sort, organizations must put together a blue print for their success. One of the prime factors therein is the recognition or reward mechanism that one may want to adopt. These should complement the success factors of the initiative in order for them to become a way of life in the organization. Understanding the extent and type of 'change' being sought from individuals and aligning the objectives to it will determine the level of success.

### ***Conclusion :***

Continuous Improvement is an area where there is no dearth for theoretical inputs including tools and techniques. Given the complexity of technologies of today and their application, there must be no doubt about the capability of resources or Managements in their ability to achieve success. It is, however, the mind sets of the collective organization that produces the miracle output, irrespective of a technology area or otherwise. It is the mindset that plays a significant role in believing that 'while breakthroughs are welcome, continuous improvement is the order of the day'.

Today's competitive advantages are not built on technology alone, which is common and available to everyone across the globe. Continuous Improvement provides with the advantage of putting the same technology to use, but better. And this keeps getting better, as we keep working on CI.

One limitation will remain, ofcourse. That is our ability to bring in convergence among the strategy, technology, customer and organization related focus to Continuous Improvements. Once we have the right structure to support such goals and with CI in place, healthier bottomlines or Operational Efficiency will be natural derivatives of such an effort.

### ***Improvement Methodology***

The Improvement Methodology (IM), in its form here, is based on the 7 tools of Statistical Quality Control. Necessarily, each one of these tools have not been addressed as relevant for every type of situation or issue. Relevance and usage of the tools are the portfolio of the solution seeker, with the help of an expert in the area.

### ***Pre-requisites for IM***

IM is a set of tools available as a means for deriving solutions. Application of tools are to be done on a case to case basis. Effective implementation of IM requires the following in shape –

- k) The organization has a history of minimum set of process implementation for atleast an year and resources are tuned towards such method of working.
- l) Training of resources on basic understanding of measurements, their purpose and usage is expected. Where not done, introduction to measurements is to be conducted.
- m) Hands-on expertise is available within the organization for facilitating a training on IM and PIP.
- n) A conducive mindset and mechanism exists for IM usage and deployment in all aspects of the organization.

o) Top Management insists and leads by example in IM usage in practice

### ***How does IM work?***

IM suggests a logical approach to solution seeking, but the steps need not necessarily be applied sequentially. As far as the requirements of, and output from each step is understood, one may undertake work on two steps at the same time. Also, there is no time limits specified for arriving at solutions as this is a derivative of the extent of relevant data being available, apart from the right resources. Level of complexity of a project may be another constraint that may determine the length.

In some cases, one may need to backtrack to the previous stage and redefine the plan or objective of a project. Let us take the case of a project that has started on the basis of a 'gut feel' of certain affected resources. While the feel of the members is right, no data exists to support the extent or type of problem. Subsequently, during the observation stage if the data collected seeks redefinition of the improvement statement or the scope, one may need to do that. A similar situation may present itself at any stage of a project and may call for a move back or forth, according to the needs of the situation.

### ***IM – The Approach***

The overall framework of the Improvement Methodology is adapted from the PDCA (Plan, Do, Check, Act) cycle of Deming. It borrows from Dr Juran's Improvement Methodology as well as from that of Philip Crosby to the extent of simplifying the manner in which the process is carried through. Needless to say, tools introduced by Prof K Ishikawa (fishbone, etc.) are prominent whichever methodology we choose.

The approach is likely to work effectively when organizations seek to inculcate and create a culture of Continuous Improvement with contributions from every individual in it. Necessary ingredients in the form of training on SQC, etc., empowerment to affect such improvements on a day to day basis, creating a mechanism to support such dynamism is provided to all concerned. Supported by a creditable award mechanism for excellence, this is likely to create an environment where knowledge creation and sharing is encouraged across the organization. And none benefits more than the customers and marketplace and in turn ,the organization as a whole.

### ***Step 1 : Define the Situation***

First step in the Improvement Methodology is '*Define the Situation*' – situation here needs to be read as an Area for Improvement or a Problem.

**Tools used** : Process Flow Chart and Critical Activity Chart, Gantt chart

This step involves defining the situation (the problem or the area of improvement) and planning for a solution. Describing the current situation or charting out a future action/result should be done on the basis of data/information available on clear measurement of a process or occurrence in question.

- **Clearly describe the problem**

The objective of this step is to precisely define the undesirable situation in a process or its output so that it is easily communicated and understood by everyone in the same manner.

- *State the non-conformance*

Specify the current state, in terms of non-conformance, and the desired state. If the non-

conformance is spread over a period, specify (a) the number of non-conformances, (b) the total number of observations and (c) the period to which the data belongs to.

- *Specify the process*  
Where the problem was discovered and the potential scope of the process (a flow chart indicating the place of improvement scope may be helpful here).
- *State the consequences*  
Consequences of current situation must be translated and stated in terms of impact on process, customers, productivity, other processes, employees, etc.
- *Plan for the Solution*  
The objective of this step is to draw a preliminary or initial plan to guide the efforts and to help everyone where the problem solving efforts are headed.
- *Determine measure of completion*  
The measure of completion is a brief, specific statement that describes in advance how the team or individuals will know when the problem is solved. It describes the measures which will confirm whether the action(s) taken have been effective.
- *Estimate Resolution Date*  
Resolution refers to the date when the corrective/preventive action(s) will have completed their objective and become part of operational part of the process
- *Plan the timeline for resolution of problem*  
Based on the type of problem, type of complexity, resource requirement and management participation required, prepare a plan indicating timelines for stage-wise completion.

The above provides everyone involved in the process with a uniform understanding of the situation. It assists in planning for the resource availability, management attention and participation from people in the process and those affected by it.

***This step is complete when the supervisor/Head of Initiating Group –***

- Identifies the team or individual to work on resolution
- communicates to those, who are part of the team, on the likely start and end date of the project (thus relieving them from other responsibilities, if required)
- communicates to all those in process and affected by it about the launch of the project, its objective and measure of completion (wherever necessary, also indicate the contribution or participation expected)
- provides budgetary, training and other support required by the identified team to initiate work, and
- accepts the problem definition statement, the measure of completion and the plan for problem (where necessary, provide inputs to the initiator to redefine or clarify other points and then approve)

***Step 2 : Fix the Situation***

Fix refers to a situation where a temporary solution for the issue at hand needs to be meted out immediately to stop further damage from occurring. While the fix is in place, an observation of the situation is undertaken to facilitate a better definition – if it was done earlier in the absence of live data

Evolving a fix to the issue at hand provides the team with necessary time required to get to the root of the actual cause and remove it. *This ensures that a defective product or service is not shipped to the customer but at a cost that is avoidable.*

Fix(es) are arrived at within the team involved on the basis of the collective wisdom and experience in the process. While designing the fix(es), it is important to document the actions being planned with results

expected. Basis for arrival at a fix(es) is also to be documented. These are then monitored for effectiveness or otherwise. New fix(es) are identified and applied whenever a previous fix is found to be ineffective. Process and other relevant measures are captured to gauge the effectiveness of a fix, e.g.

- (a) that they are minimizing the consequences
- (b) that they are not creating any additional problems

The fix(es) are to be in place till the time a solution of the actual cause is identified, implemented and found effective. It is important to note that till such time the actual cause is not removed, fix(es) should not be withdrawn.

### ***Step 3: Identify the Cause(s) & prioritize***

After having identified an area for improvement and defined it, we now move on to identifying the real cause(s) that contribute to the situation.

#### ***(i) Identify the cause(s)***

**Tools used :** Brainstorming, Cause Effect diagram, Scatter diagram, histogram

It is important that all possible data on the process critical aspects, including the situation defined earlier on, are identified and captured by the time the team approaches this Step.

Brainstorming is the technique suggested for putting together all likely causes that are contributing to the problem or situation defined. Participants in the brainstorming session may include apart from the team working on the project, people affected by the problem, people from the process where the problem is reported from and those who are not directly related to the subject but are capable of contributing.

All causes identified in brainstorming are formed into homogenous groups and are categorized under 3 or 4 major heads. Each one of these heads are then the collection of a set of cause(s) that are similar in nature.

Transfer the contents onto the Cause Effect Diagram with each major head being reflected as a bone. CED helps us to see a situation in its full perspective i.e. in terms of all possible causes contributing to a given effect. While plotting the causes on a fishbone, the sub-causes also need to be captured, if relevant.

During the cause analysis, however, a few issues that need substantiation through data may arise. In either case, it is important to ensure that what, when and how to collect the data or information required is planned.

Answering the following questions and follow through on them will help in this respect.

- h. what process(es) to measure
- i. what requirement(s) to measure
- j. where will the data be collected
- k. when will the data be collected
- l. who will be responsible for collecting data
- m. how will the data be collected, and

n. how will the data be documented

All cause(s) plotted on the diagram need to be supported by data from the system. The availability of data will enable in identification of the cause(s) that contribute most to the problem or situation defined.

**(d) Prioritization**

**Tools used :** Histogram, Pareto Chart

At any time, there are a number of issues that seeks the attention of an organization and prioritization is one of the key activities of the management. Here too, one is faced with a number of cause(s) that contribute to the situation, which needs to be prioritized for action. Prioritization helps us to –

- focus on the vital few, rather than the trivial many
- see results faster as the focus is on what is critical
- assign scarce resources more effectively
- sustains motivation on such initiatives as Continuous Improvement

Pareto chart helps us in plotting the most critical cause(s) with their impacts measured, highlighting the expected impact of any combination of such cause(s) on the overall situation. This enables us to set the right objectives for the project.

It is important to revisit ‘Define the Situation’ at this point, as the decision to focus on certain cause(s) for resolution may have an impact on the final objective. A refinement in the objective for the project may be realistic at this juncture, if it is in variance with what is being taken up as cause(s) for resolution.

While data based prioritization is preferable, there may be situations when such data to support the cause(s) to be taken up are not available. It is suggested, at these times, that the team that participated in the brainstorming is brought together to select the cause(s) that need to be addressed first. Each individual may be asked to select the top 5 cause(s) to be put in the following format :

S.No.	Cause identified	Impact of improvement/on problem	Easy to implement	Complexity of solution
		<i>(Rate on a scale of 1 to 5, where 5 is High and 1 is Low)</i>		
1.				
2.				
3.				
4.				
5.				

The inputs of all the members may be put together to see the collective view and cause(s) prioritized. In such a case, where this method is used the team may need to earmark a date by which it will reinforce this decision through data from the system. It is critical to note that such validation alone can ensure that the cause(s) identified for action are indeed the deserving ones.

**Step 4: Derive Actions, Implement & Monitor**

The objective of this step is to generate, select and implement actions that will eliminate the identified cause(s). We shall look at this in two parts, the first dealing with Action recommendations and the second addressing the implementation part of the same.

**Tools used** : PDCA Cycle approach, Cause Effect diagram and Pareto analysis

**(e) Derive Action recommendations**

Having identified the cause(s) to be addressed, it is time to derive the actions to be implemented. A format similar to the one provided below may be helpful in capturing the recommendations.

S #	Cause(s) Identified	Solution(s) identified	Action(s) Planned	Responsibility	Timeline	Measurements
1.	1.	1.1	1.1.1			
		1.2	1.1.2			
			1.1.3			

The 'measurements' column in the above points to the measures to be defined that will confirm whether the results of a given solution are as expected or not. Dates when the measures will need to be looked at to be determined.

'Timeline' is for the date by which the action planned will be implemented.

'Responsibility' is to capture the name of the person who is responsible for the completion of a particular action planned.

'Action(s) Planned' : There may be a set of actions that may help implement one 'solution'.

'Solution(s) identified' : There may be a combination of solutions that will collectively address a 'cause'.

'Cause(s) identified' : Prioritized cause(s) identified for action.

Action implementation may be done either in a pilot mode or across a given group or organization. In any case, the scope and approach to implementation needs to be streamlined, in line with organizational functioning. This will enable in introducing 'change' in a systematic way and in pockets which are conducive to success.

Prior to implementation of the actions, an exercise to communicate the same to people in the process is to be done by the Management. This communication may spell out in clear terms the objective of the initiative and the results expected with timelines. A one-to-one address of all resources is suggested for a hands on feel of the response. This will help in gauging the mindset and approach of the resources to 'change' and Management may take appropriate measures to counter any issues.

**(f) Implementation**

Until the stage of deriving actions, the team identified for the purpose has worked along with those in the process. In order to operationalize the outcome of the project, the responsibility needs to be transferred to a set of resources in the process where the implementation is planned. This is a crucial period when the team that has worked on the requirement is passing on the mantle to another for effective implementation. Following inputs may be of help in selecting the implementation team :

- (ix) One of key resources, who has been part of the project team may be taken up as a member of the implementation team.
- (x) If the person selected at (i) above is senior enough with authority to get things done, he/she may be made the Leader of the implementation team. Otherwise, a new Team Leader from the area may be chosen.
- (xi) Rest of the team members (of the size of 4 to 6), depending upon the spread of the implementation area, may be chosen like –
  - one member from the area of Quality

- rest of the members from the process area
- (xii) Management is required to allot a champion, who will be responsible to work with the Team Leader closely in ensuring that proper monitoring and progress is maintained. Besides he/she will be responsible for providing all support from Management.

In order to facilitate a smooth monitoring and implementing, it is suggested that the implementing team works on this on a full time basis till the initial success is tasted. In any case, the implementation plans needs to be integrated into the daily working routines of everyone in the team as well as in the process. A conscious effort to make this happen is to be undertaken by the implementing team.

The timelines indicated in the implementation plan may need to adhered to, if results are to be seen fairly fast. This is one of the weakest areas of implementation and Managements tend to close projects when these are handed over for implementation. Implementation is by far the challenging task as it practically brings in 'change'.

### ***(c) Monitoring***

This is the Check stage in the PDCA cycle of Deming and normally lasts for a period of 1 to 3 months at the minimum. One month in case the problem or improvement being addressed is at an individual level and around three months if it is done in a team mode. This is to allow the actions to take place as planned and allowing time for the results to be seen. Such a 'check' period needs to be defined at the time of recommendations to enable preventive measures to be taken.

The team that has worked on deriving the solutions needs to be involved in the implementation on a ad-hoc basis. Participating in the monitoring meetings, discussing the results of implementation, comparing with results expected vis-à-vis actuals, refining actions and revisiting any solutions that are not yielding results are some of the responsibilities that the team will work on along with the implementation team. The team will be completely disbanded only after the pilot or phase-I implementation is successful and solutions have been proved for results expected.

### ***Step 4: Closure of the Project***

Closure of the project is the last stage of the improvement aspect - this acts as a 'A' in the PDCA cycle. The primary responsibility here would be to evaluate the project on whether it has achieved the objective(s) or not. This presents us with two possible scenarios, one that the project has met its objective(s) or two, it has not (yet). Let us look at both these below :

#### ***Scenario 1: Project met the objective(s)***

A careful study of the causes identified for action and the updated action plan with measures from the process should tell the impact of the solutions. In the event of the solutions being impactful, the next step is to sustain the benefits and spread the learnings across the organizations quickly. Besides, there is a need for archiving the project documentation for future reference or usage.

Pointers that help us in sustaining the benefits are –

- While the project has achieved its objective(s), how long do I need to maintain focus for the improvement(s) to become practice.
- If I need to know whether the improvement(s) have sustained after the project is closed, what measurements are required to be put in place and for what duration do these need to be monitored.
- In the new, improved process(s), who or what role(s) should be made responsible for capturing, monitoring and acting on the measures?

Documenting the improvement(s) or learning out of the project and making them part of the practice is a hard task. The project team, along with the management, needs to come out with a plan for educating related resources in the organization on the learning, training them on the specifics of the improvements and introduce these as part of the practice(s). One of the means of doing it is incorporating these in the existing process set of the organization. Education and Training on such learning is crucial for the knowledge to be practiced across the organization.

Whenever a change is affected, be it improvement or a bottleneck removed, it has ripple effects on a set of processes that are indirectly connected to the impacted one. In the normal run, these are encountered only when one treads on to it rather than identifying these and providing connects appropriately. This exercise needs to be in-built into the closure stage in order to bring to a conclusion everything that is connected to the project.

### ***Scenario 2 : The Project did not meet Objective(s)***

If and when any action is not seen to be delivering the results, it needs to be relooked at or redefined again in the light of facts. At this stage, it is important to gauge through the measurements the overall impact of the Corrective Actions. In case where the actions are not yielding results, one may need to revert to relooking at the most probable causes identified.

There are likely to be instances when despite the best efforts and methodologies a project may not meet its set objective(s). Some of the factors leading to a situation of this kind can be –

- (xvii) *Improvement area identified was not supported by facts through data (either at the beginning or subsequently);* it has been highlighted sufficiently earlier in this paper that while decisions may not wait for data always, it is critical that the needful is done to collect such data to validate decisions or actions at the earliest opportunity.
- (xviii) *The team that was working on the project was not competent* – in terms of skills, exposure to the process, level of contribution required, hands-on feel of the situation, etc.; Selecting the right mix of people is a requirement.
- (xix) *Resource allocation was not adequate* – human or other resources, including management support, participating, etc. could not be spared as per requirements of the project. This might prolong a solution to an extent that by the time it is available, it may not be valid.
- (xx) *A technology development made available during the project* may make the solutions derived obsolete. It is imperative that both the projects, which are technology sensitive, as well as Management keep abreast of such developments.
- (xxi) *Data collected or made available for prioritizing the causes for action are not genuine.* This is a common cause in most cases and care must be taken to analyse all data and its source(s) for correctness.
- (xxii) *Actions decided upon are not optimal* and could have been more pointed, incisive and drastic. This is a situation which is normally caused owing to lack of senior people not being part of action planning or vetting/validation. Organizational competency to commit for such actions are normally the forte of senior management without which others can only visualize what is within their control.
- (xxiii) *Implementation of actions was disoriented and defocused:* This is one of the most common factors for the failure of an improvement project. For implementation to be successful, reorientation of resources and systems on a continuous basis is a must. Monitoring of the progress vis-à-vis its plan, revisiting decisions if necessary, modifying actions in face of new realities not reflected, etc. needs to be dynamic in implementation plan. These are specific to an organization and the environment that it operates in. No action plan can work effectively if they are not continually validated, monitored and corrected.

(xxiv) *Resources connected with the project are absent in implementation:* This has been explained in sufficient detail earlier.

There may be many other instances that may cause a project to be unsuccessful. Those listed above are the most common and can be planned for mitigation at the time of planning itself. It may be crucial for the organization to make a note of and appreciate the causes for failure of projects as they throw up unrecognized characteristics of the culture or nature of the organization/industry. A learning organization may put such an experience into use by planning for remedial measures in future projects.

### ***Documentation :***

Documentation is a means of making an inventory of all knowledge gained in the process improvements affected in the system. While the person or set of people involved with the project directly gain from it, organizational benefits are seen only when these are documented, communicated and integrated into common knowledge repository. The repository must comprise of information on both successful and the failed projects. Some other benefits of documentation are –

- make the improvement process available for future reference
- track the process improvement record of a given process/task over a period of time
- make the process person independent. By making documentation available, assigning responsibilities of a PIP or process to a new person is made hassle free
- capture the best PIP practices available to other projects, centers and organizations, as required

The team/individual will benefit by documenting the PIP on-line. Given an understanding of what is required to be documented, the same may be done at the end of each major step described above.

While in the case of a individual PIP, the documentation responsibility rests with the individual, in a PIP(T) the team may decide and allocate the responsibility among its members on phase to phase basis. This provides an opportunity for all team members to have a look at the documentation and plug gaps, if any, and also to get acquainted with such documentation requirements.

The documentation of a PIP may be completed and vetted with the supervisor prior to closure of the project. An organization, group or individual will stand to gain significantly if documentation is taken as a pre-requisite for closure of such projects.

Provided below is a suggested set of contents for documentation :

- (xix) Project definition, scope, benefits planned for and details of project team in solution planning
- (xx) Details of fix and its measures across the time period
- (xxi) Causes identified along with Cause Affect Diagram
- (xxii) Prioritized causes along with Pareto, with substantiation for causes selected with data
- (xxiii) Action Plan with all details and supporting measures till closure with details of implementation team
- (xxiv) Closure status and action on sustenance and integration into process(s)
- (xxv) Final Cost Benefit Analysis of the project
- (xxvi) Further action suggested, if any, on causes not addressed in the project
- (xxvii) Learning of both the solution drawing and implementation from the project

It is beneficial if a detailed presentation providing salient features of the above document is made to the Management for further action to be taken up, if any.

### ***Reward Mechanism(s)***

Prior to initiating a journey of this sort, organizations must put together a blue print for their success. One of the prime factors therein is the recognition or reward mechanism that one may want to adopt. These should complement the success factors of the initiative in order for them to become a way of life in the organization. Understanding the extent and type of 'change' being sought from individuals and aligning the objectives to it will determine the level of success.

### ***Conclusion :***

Continuous Improvement is an area where there is no dearth for theoretical inputs including tools and techniques. Given the complexity of technologies of today and their application, there must be no doubt about the capability of resources or Managements in their ability to achieve success. It is, however, the mind sets of the collective organization that produces the miracle output, irrespective of a technology area or otherwise. It is the mindset that plays a significant role in believing that 'while breakthroughs are welcome, continuous improvement is the order of the day'.

Today's competitive advantages are not built on technology alone, which is common and available to everyone across the globe. Continuous Improvement provides with the advantage of putting the same technology to use, but better. And this keeps getting better, as we keep working on CI.

One limitation will remain, ofcourse. That is our ability to bring in convergence among the strategy, technology, customer and organization related focus to Continuous Improvements. Once we have the right structure to support such goals and with CI in place, healththeir bottomlines or Operational Efficiency will be natural derivatives of such an effort.