

Project Quality Management

PROJECT MANAGEMENT FOR DEVELOPMENT ORGANIZATIONS

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A methodology to manage development projects for international humanitarian assistance and relief organizations

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PROJECT QUALITY MANAGEMENT

Quality management is the process for ensuring that all project activities necessary to design, plan and implement a project are effective and efficient with respect to the purpose of the objective and its performance.

Project quality management (QM) is not a separate, independent process that occurs at the end of an activity to measure the level of quality of the output. It is not purchasing the most expensive material or services available on the market. Quality and grade are not the same, grade are characteristics of a material or service such as additional features. A product may be of good quality (no defects) and be of low grade (few or no extra features).

Quality management is a continuous process that starts and ends with the project. It is more about preventing and avoiding than measuring and fixing poor quality outputs. It is part of every project management processes from the moment the project initiates to the final steps in the project closure phase.

QM focuses on improving stakeholder's satisfaction through continuous and incremental improvements to processes, including removing unnecessary activities; it achieves that by the continuous improvement of the quality of material and services provided to the beneficiaries. It is not about finding and fixing errors after the fact, quality management is the continuous monitoring and application of quality processes in all aspects of the project.

Definition of Quality

Quality has been defined as "the totality of characteristics of an entity that bear on its ability to satisfy stated or implied needs." The stated and implied quality needs are the inputs used in defining project requirements from the donor and the beneficiaries. It is also defined as the "Conformance to requirements or fitness for use" which means that the product or services must meet the intended objectives

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¹ International Organization for Standardization (ISO), Quality Management and Quality Assurance (Geneva, Switzerland: ISO Press, 1994).

² Joseph M. Duran, Quality Control Handbook (1951)

of the project and have a value to the donor and beneficiaries and that the beneficiaries can use the material or service as it was originally intended. The central focus of quality management is meeting or exceeding stakeholder's expectations and conforming to the project design and specifications.

The ultimate judge for quality is the beneficiary, and represents how close the project outputs and deliverables come to meeting the beneficiaries' requirements and expectations. How a beneficiary defines quality may be completely subjective, but there are many ways to make quality objective; by defining the individual characteristics and determine one or more metrics that can be collected to mirror the characteristic. For instance, one of the features of a quality product may be that it has a minimum amount of errors. This characteristic can be measured by counting errors and defects after the product is used.

Quality management is not an event - it is a process, a consistently high quality product or service cannot be produced by a defective process. Quality management is a repetitive cycle of measuring quality, updating processes, measuring, updating processes until the desired quality is achieved.

The Purpose of Management of Quality

The main principle of project quality management is to ensure the project will meet or exceed stakeholder's needs and expectations. The project team must develop a good relationship with key stakeholders, specially the donor and the beneficiaries of the project, to understand what quality means to them. One of the causes for poor project evaluations is the project focuses only in meeting the written requirements for the main outputs and ignores other stakeholder needs and expectations for the project.

Quality must be viewed on an equal level with scope, schedule and budget. If a project donor is not satisfied with the quality of how the project is delivering the outcomes, the project team will need to make adjustments to scope, schedule and budget to satisfy the donor's needs and expectations. To deliver the project scope on time and on budget is not enough, to achieve stakeholder satisfaction the project must develop a good working relationship with all stakeholders and understand their stated or implied needs.

Project Quality Management

Project management consists of four main processes:

- Quality Definition
- Quality Assurance
- Quality Control
- Quality Improvements

Inputs	Process	Outputs
WBS	 Plan - Define the standards for Quality 	 Quality Standards
 Scope Statement 	 Do – Assurance that quality is 	 Quality Plan
 Policies 	followed	•
	 Check –Quality control 	
	 Adapt – Quality improvements 	

QUALITY DEFINITION

The first step on the quality management is to define quality, the project manager and the team must identify what quality standards will be used in the project, it will look at what the donor, beneficiaries, the organization and other key stakeholders to come up with a good definition of quality. In some instances the organization or the area of specialization of the project (health, water or education) may have some standard definitions of quality that can be used by the project.

Identifying quality standards is a key component of quality definition that will help identify the key characteristics that will govern project activities and ensure the beneficiaries and donor will accept the project outcomes.

Quality management implies the ability to anticipate situations and prepare actions that will help bring the desired outcomes. The goal is the prevention of defects through the creation of actions that will ensure that the project team understands what is defined as quality.

Sources of Quality Definition

One source for definition of quality comes from the donor; the project must establish conversations with the donor to be familiar with and

come to a common understanding of what the donor defines as quality. The donor may have certain standards of what is expected from the project, and how the project delivers the expected benefits to the beneficiaries. This is in line with the project's ultimate objective that the project outcomes have the ability to satisfy the stated or implied needs.

Another source for quality definition comes from the beneficiaries; the project team must be able to understand how the beneficiaries define quality from their perspective, a perspective that is more focused on fitness for use, the project outcomes must be relevant to the current needs of the beneficiaries and must result in improvements to their lives. The team can create, as part of the baseline data collection, questions that seek to understand how the beneficiaries define the project will meet their needs, and a question that also helps define what project success looks like from the perspective of a beneficiary.

The development organization may have its own quality standards that can reflect technical and managerial nature of the project. The organization may require from the project timely and accurate delivery of project information needed for decision making, or compliance to international or locally recognized quality standards that define specific technical areas of the project, this is quite often in health, water and nutrition projects.

A worldwide recognized standard for project is the Sphere Standard (www.sphereproject.org), used for emergency projects whose aim is to improve the quality of assistance provided to people affected by disasters. This guideline defines the minimum standards for water, sanitation, health, shelter, food security, nutrition, shelter and settlement.

Quality Characteristics

All material or services have characteristics that facilitate the identification of its quality. The characteristics are part of the conditions of how the material, equipment and services are able to meet the requirements of the project and are fit for use by the beneficiaries. Quality characteristics relate to the attributes, measures and methods attached to that particular product or service.

- **Functionality** is the degree, by which equipment performs its intended function, this is important especially for clinical equipment, that the operation should be behave as expected.
- **Performance**, its how well a product or service performs the beneficiaries intended use. A water system should be designed to support extreme conditions and require little maintenance to reduce the cost to the community and increase its sustainability.
- Reliability, it's the ability of the service or product to perform as intended under normal conditions without unacceptable failures. Material used for blood testing should be able to provide the information in a consistent and dependable manner that will help identify critical diseases. The trust of the beneficiaries depend on the quality of the tests
- **Relevance**, it's the characteristic of how a product or service meets the actual needs of the beneficiaries, it should be pertinent, applicable, and appropriate to its intended use or application
- **Timeliness**, how the product or service is delivered in time to solve the problems when its needed and not after, this is a crucial characteristic for health and emergency relief work
- **Suitability**, defines the fitness of its use, it appropriateness and correctness, the agriculture equipment must be designed to operate on the soul conditions the beneficiaries will use it on.
- Completeness, the quality that the service is complete and includes all the entire scope of services. Training sessions should be complete and include all the material needed to build a desired skill or knowledge
- **Consistency**, services are delivered in the same way for every beneficiary. Clinical tests need to be done using the same procedure for every patient.

Quality characteristics are not limited to the material, equipment or service delivered to the beneficiaries, but also applies to the material, equipment and services the project staff uses to deliver the project outputs. These include the vehicles, computers, various equipment and tools and consulting services the project purchases and uses to carry out its activities.

Quality characteristics must be included in all material, equipment and services the project will purchase, the procurement officers must have a complete description of what is required by the project, otherwise a procurement office may purchase the goods or services based on her or his information of the product.

What went wrong - A project requested the purchase of 1000 tents for a community displaced by floods, the purchase request had no specifications for its intended use (suitability), and resistance (performance). The procurement officer only knew that the tents were needed as soon as possible(timeliness), so he purchased, based on his knowledge of what a tent looks like, 1000 camping tents, they were delivered to the refugee camps on the requested timeframe, and the project manager was happy. But the next day all families that received the tents were complaining that they were not good for the cold nights and too small to accommodate their extended families. The project purchased the tents under budget and within the specified timeframe but the beneficiaries rejected them because they did not meet their needs (quality)

Quality plan

Part of defining quality involves developing a quality plan and a quality checklist that will be used during the project implementation phase. This check list will ensure the project team and other actors are delivering the project outputs according to the quality requirements.

Once the project has defined the quality standards and quality characteristics, it will create a project quality plan that describes all the quality definitions and standards relevant to the project, it will highlight the standards that must be followed to comply to regulatory requirements setup by the donor, the organization and external agencies such a the local government and professional organizations (health, nutrition, etc)

The quality plan also describes the conditions that the services and materials must posses in order to satisfy the needs and expectations of the project stakeholders, it describes the situations or conditions that make an output fall below quality standards, this information is used to gain a common understanding among the project team to help them identify what is above and what is below a quality standard.

The quality plan also includes the procedure to ensure that the quality standards are being followed by all project staff. The plan also includes the steps required to monitor and control quality and the approval process to make changes to the quality standards and the quality plan.

QUALITY ASSURANCE

Assurance is the activity of providing evidence to create confidence among all stakeholders that the quality-related activities are being performed effectively; and that all planned actions are being done to provide adequate confidence that a product or service will satisfy the stated requirements for quality.

Quality Assurance is a process to provide confirmation based on evidence to ensure to the donor, beneficiaries, organization management and other stakeholders that product meet needs, expectations, and other requirements. It assures the existence and effectiveness of process and procedures tools, and safeguards are in place to make sure that the expected levels of quality will be reached to produce quality outputs.

Quality assurance occurs during the implementation phase of the project and includes the evaluation of the overall performance of the project on a regular basis to provide confidence that the project will satisfy the quality standards defined by the project.

One of the purposes of quality management is to find errors and defects as early in the project as possible. Therefore, a good quality management process will end up taking more effort hours and cost upfront. The goal is to reduce the chances that products or services will be of poor quality after the project has been completed.

Quality assurance is done not only to the products and services delivered by the project but also to the process and procedures used to manage the project, that includes the way the project uses the tools, techniques and methodologies to manage scope, schedule, budget and quality. Quality assurance also includes the project meets any legal or regulatory standards.

Quality Audits

Quality audits are structured reviews of the quality management activities that help identify lessons learned that can improve the performance on current or future project activities. Audits are performed by project staff or consultants with expertise in specific areas. The purpose of quality audit is to review how the project is using its internal processes to produce the products and services it will deliver to the beneficiaries. Its goal is to find ways to improve the tools, techniques and processes that create the products and services.

If problems are detected during the quality audits, corrective action will be necessary to the tools, processes and procedures used to ensure quality is reestablished. Part of the audit may include a review of the project staff understanding of the quality parameters or metrics, and skills expertise and knowledge of the people in charge of producing or delivering the products or services.

If corrective actions are needed, these must be approved through the change control processes.

The PDCA Cycle

The most popular tool used to determine quality assurance is the Shewhart Cycle. This cycle for quality assurance consists of four steps: Plan, Do, Check, and Act. These steps are commonly abbreviated as PDCA.

The four quality assurance steps within the PDCA model stand for:

- Plan: Establish objectives and processes required to deliver the desired results.
- Do: Implement the process developed.
- Check: Monitor and evaluate the implemented process by testing the results against the predetermined objectives
- Act: Apply actions necessary for improvement if the results require changes.

The PDCA is an effective method for monitoring quality assurance because it analyzes existing conditions and methods used to provide the product or service to beneficiaries. The goal is to ensure that excellence is inherent in every component of the process. Quality assurance also helps determine whether the steps used to provide the product or service is appropriate for the time and conditions. In addition, if the PDCA cycle is repeated throughout the lifetime of the project helping improve internal efficiency.

The PDCA cycle is shown below as a never-ending cycle of improvement; this cycle is sometimes referred to as the

Shewart/Deming³ cycle since it originated with Shewart and was subsequently applied to management practices by Deming.

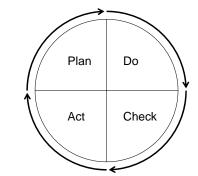


Figure x The Shewart/Deming Cycle

Quality assurance demands a degree of detail in order to be fully implemented at every step. Planning, for example, could include investigation into the quality of the raw materials used in manufacturing, the actual assembly, or the inspection processes used. The Checking step could include beneficiary feedback or surveys to determine if beneficiary needs are being met or exceeded and why they are or are not. Acting could mean a total revision in the delivery process in order to correct a technical flaw. The goal to exceed stakeholder expectations in a measurable and accountable process is provided by quality assurance.

Assurance vs. Control

Quality assurance is often confused with quality control; quality control is done at the end of a process or activity to verify that quality standards have been met. Quality control by itself does not provide quality, although it may identify problems and suggest ways to improving it. In contrast, quality assurance is a systematic approach to obtaining quality standards.

Quality assurance is something that must be planned for from the earliest stages of a project, with appropriate measures taken at every stage. Unfortunately far too many development projects are implemented with no quality assurance plan, and these projects often fail to meet quality expectations of the donor and beneficiaries. To

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³ Walter Shewhart "Statistical Method From the Viewpoint of Quality Control", 1939

avoid problem the project must be able to demonstrate the consistent compliance with the quality requirements for the project.

QUALITY CONTROL

Quality control is the use of techniques and activities that compare actual quality performance with goals and define appropriate action in response to a shortfall. It is the process that monitors specific project results to determine if they comply with relevant standards and identifies different approaches to eliminate the causes for the unsatisfactory performance.

The goal of quality control is to improve quality and involves monitoring the project outputs to determine if they meet the quality standards or definitions based on the project stakeholder's expectations. Quality control also includes how the project performs in its efforts to manage scope, budget and schedule

- Acceptance; The beneficiaries, the donor or other key project stakeholders accept or reject the product or service delivered.
 Acceptance occurs after the beneficiaries or donor has had a change to evaluate the product or service
- **Rework**; is the action taken to bring the rejected product or service into compliance with the requirements, quality specifications or stakeholder expectations. Rework is expensive that is why the project must make every effort to do a good job in quality planning and quality assurance to avoid the need for rework. Rework and all the costs associated with it may not refundable by the donor and the organization may end up covering those costs.
- Adjustments; correct or take the necessary steps to prevent further quality problems or defects based on quality control measurements.
 Adjustments are identified to the processes that produce the outputs and the decisions that were taken that lead to the defects and errors. Changes are taken to the Change Control processes of the project

Quality Control Tools

There are a couple of good tools that can be used to control quality on a project, these are cause and effect diagrams, Pareto charts and control charts:

• Cause and Effect Diagram, also known as fishbone diagrams or Ishikawa diagrams (named after Kaoru Ishikawa, a Japanese quality control statistician, who developed the concept in the 1960s, and is considered one of the seven basic tools of quality management) It is named fishbone diagram because of their fish-like appearance, it is an analysis tool that provides a systematic way of looking at effects and the causes that create or contribute to those effects. The Ishikawa Diagram is employed by a problem-solving team as a tool for assembling all inputs (as to what are the causes of the problem they're addressing) systematically and graphically, with the inputs usually coming from a brainstorming session. It enables the team to focus on why the problem occurs, and not on the history or symptoms of the problem, or other topics that digress from the intent of the session. It also displays a real-time 'snap-shot' of the collective inputs of the team as it is updated. The possible causes are presented at various levels of detail in connected branches, with the level of detail increasing as the branch goes outward, i.e., an outer branch is a cause of the inner branch it is attached to. Thus, the outermost branches usually indicate the root causes of the problem.

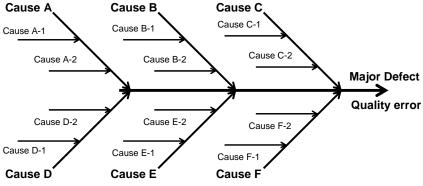


Figure x, Fishbone diagram

• Pareto Charts; based on Pareto's rule, which states that 80 percent of the problems are often due to 20 percent of the causes. The assumption is that most of the results in any situation are determined by a small number of causes and helps identify the vital few contributors that account for most quality problems. The chart is a form of histogram that orders the data by frequency of occurrence; it shows how many defects were generated by a type of category of

identified cause. For example to determine the errors in the collection of beneficiary data the project team identified five causes and for each cause the frequency they contained errors, the data is plotted as shown in the chart below, the bars represent each category and the line the cumulative percentage of the errors, the chart allows to identify that 80% of the errors could be reduced just by improving the collection of data in two categories instead of focusing efforts to correct all categories.

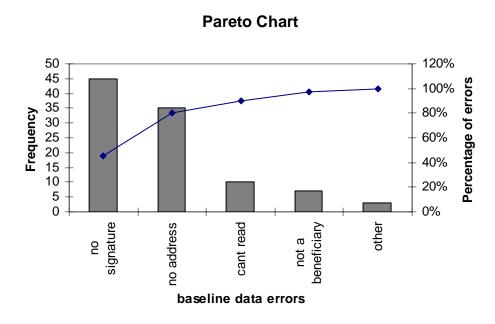


Figure x, Pareto Chart

• Control Charts; is a graphical display of data that illustrates the results of a process over time, the purpose of a control chart is to prevent defects, rather than detect them or reject them, the chart allows the determine whether a process is in control or out of control over specified length of time. Control charts are often used to monitor the production of large quantities of products, but can also be used to monitor the volume and frequency of errors in documents, cost an schedule variances and other items related to project quality management. The figure below illustrates an example of a control chart for the process of controlling the weight of products manufactured by the beneficiaries for sale in international markets. The customer has a limit tolerance for defects; these are the upper and lower control limits in the chart. Random examination of the products reveals data that once charted on the graph identifies the times when the production process created items that were

outside the control limits, this helps the project determine actions to help the beneficiaries improve the quality of their work.

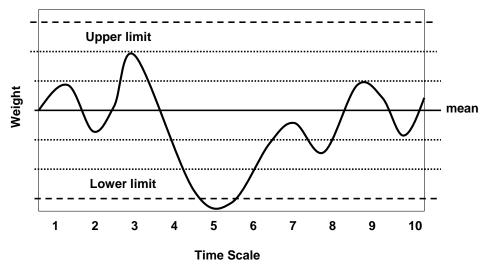


Figure x, control charts

Control charts can also be used to the project management areas, such as schedule and budget control, to determine whether the costs variances or schedule variances are outside the acceptable limits set by the donor.

QUALITY IMPROVEMENT

It is the systematic approach to the processes of work that looks to remove waste, loss, rework, frustration, etc. in order to make the processes of work more effective, efficient, and appropriate.

Quality improvement refers to the application of methods and tools to close the gap between current and expected levels of quality by understanding and addressing system deficiencies and strengths to improve, or in some cases, re-design project processes.

A variety of quality improvement approaches exists, ranging from individual performance improvement to redesign of entire project processes. These approaches differ in terms of time, resources, and complexity, but share the same four steps in quality improvement:

- Identify what you want to improve; the project using the data found in the quality control process identifies the areas that need improvement.
- **Analyze** the problem or system, the team then investigates the causes for the problem and its implications to the project, the causes may be internal or external to the project.
- Develop potential solutions or changes that appear likely to improve the problem or system, the team brainstorms ideas and potential solutions to the problem, taking in consideration its impact to the project schedule and budget. After careful considerations the team decides and chooses the best alternative.
- **Test** and implement the solutions. The team may decide to test the solution on a small scale to verify that it is capable of fixing the problem, it testes for the initial assumptions made about the problem and once it confirms that the solution is a viable alternative, it then proceeds to implement in a full scale the solution.

Cost of Quality

The cost of quality is the sum of costs a project will spend to prevent poor quality and any other costs incurred as a result of outputs of poor quality. Poor quality is the waste, errors, or failure to meet stakeholder needs and project requirements. The costs of poor quality can be broken down into the three categories of prevention, appraisal, and failure costs:

- **Prevention costs**: These are planned costs an organization incurs to ensure that errors are not made at any stage during the delivery process of that product or service to a beneficiary. Examples of prevention costs include quality planning costs, education and training costs, quality administration staff costs, process control costs, market research costs, field testing costs, and preventive maintenance costs. The cost of preventing mistakes are always much less than the costs of inspection and correction.
- Appraisal costs: These include the costs of verifying, checking, or evaluating a product or service during the delivery process.
 Examples of appraisal costs include receiving or incoming inspection costs, internal production audit costs, test and inspection costs, instrument maintenance costs, process measurement and control costs, supplier evaluation costs, and audit report costs.
- **Failure costs**: A project incurs these costs because the product or service did not meet the requirements and had to be fixed or replaced, or the service had to be repeated.

Leadership

Joseph M. Juran, one of the leading experts in Quality management said that "it is most important that management be quality-minded. In the absence of sincere manifestation of interest at the top, little will happen below" ⁴ What this means is the main cause of quality problems is a lack of leadership. In order to establish and implement effective quality projects, senior management must lead the way. A large percentage of quality problems are associated with management, not technical issues, it is the responsibility of the development organizations senior management to take responsibility for creating, supporting, and promoting quality programs.

Quality problems should be taken as an opportunity for improvement; problems can help identify more fundamental or systemic root causes and help develop ways to improve the process. Unfortunately projects do not have a culture that promotes the identification of problems for the fear that making improvements is an admission that the current way of doing things is flawed or that those responsible are poor performers. Improved performance cannot occur unless the project team feels comfortable that they can speak truthfully and are confident that their suggestions will be taken seriously.

Maturity Models

Another approach to improve quality is the use of maturity models, which are frameworks for helping organizations and projects improve their processes. The model includes a method for assessing the projects maturity levels as a first step to determine the improvements needed to increase the capacity of the project to deliver the project outputs as promised.

The use of the word "maturity" implies that capabilities must be grown over time in order to produce repeatable success in project management. The Random House College Dictionary defines "maturity" as full development or perfected condition. "Maturity" also indicates understanding or visibility into why success occurs and ways to correct or prevent common problems. "Model" implies change, a progression, or steps in a process.

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⁴ American Society for Quality (ASQ) www.asqc.org/about/history/juran.html

Project management maturity is the progressive development of an organizations project management approach, methodology, strategy, and decision-making process. The appropriate level of maturity can vary for each organization based on specific goals, strategies, resource capabilities, scope, and needs.

The proper level of maturity to which an organization should strive is determined during a detailed assessment conducted by a professional project management consulting team. The organization has achieved full project management maturity when it has met the requirements and standards for project management effectiveness and it is capable of demonstrating improvements such as on-time project delivery, cost reductions, organizational efficiency, and quality outcomes.

A project quality maturity usually consists of five levels:

- **Level 1.** Informal level, there is no defined processes for quality practices or standards. The organization may be in the initial stages of considering how projects should define quality, but most efforts are informal and had-oc.
- **Level 2.** Defined level, the organization has defines some basic quality standards and project quality policies that are being adopted. But not all projects are using it in a consistent manner.
- Level 3. Repeatable level, the quality process is well documented and is an organizational standard. All projects are using it and producing consistent and repeatable results.
- Level 4. Controlled level, all projects ire required to use quality planning standard processes. The organization has a unit or roles that coordinate quality standards and assurance and quality audits are done on a regular basis.
- Level 5. Optimized level, the quality process includes guidelines for feeding improvements back into the process. Metrics are used as key criteria for quality decisions and quality results are predictable.

The model helps an organization identify were they stand and were they should strive to reach, it is a simple way to determine the level of maturity required for a project or organization, some organizations may be comfortable with achieving a level 3 while others may be encouraged to reach a level 4 due to the need to comply with legal or regulatory standards.

Continuous Improvement

Quality is not something that is done at the end of a phase or at the end of the project, is a continuous process to ensure quality is performed in all aspects of the project. The goal is to continuously improve based on the lessons learned and new insights provided by the project. To be effective it should happen during all activities of the project.

Continuous improvement, in regard to project quality always focuses on improving stakeholder satisfaction through continuous and incremental improvements to processes, including the removal of any unnecessary activities. By applying a process that continuously improves every element of the project can achieve better results than trying to wait until the end of a phase or a mid term evaluation to start making adjustments and improvements to the work. It requires little effort and by doing small incremental improvements the project can reach significant levels of quality.

To implement continuous improvements, it necessary to have a culture of reflection that allows the project team to learn from mistakes and apply the lesson on the next phase or cycle and not spend time and effort trying to put blame, otherwise, the team will fear reporting any problems with quality and it will be too late to do anything once the donor or the beneficiaries find out.

Project Quality Management

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This Point of view provides a summary of themes, that in PM4DEV's experience, have proved critical in the successful implementation of project management methodologies.

It draws on the expertise of Project management professionals and provides a guide to deliver a methodology that increases the chances of project success.

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Paola L. Diaz paola.diaz@pm4dev.com The Millennium Development Goals aim by 2015 to reverse the grinding poverty, hunger and disease affecting billions of people.

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Project Management For Development Organizations

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