

MANAGING PRODUCT RELIABILITY IMPROVEMENT PROJECTS

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ABSTRACT

Product reliability improvement projects have shown promising results for industries to preserve customer satisfaction. Therefore, best practices on reliability improvement in industries that operate in high volume consumer product can be used as a reference toward managing product reliability improvement. In reliability improvement the method should not only focus on how to achieve the expected deliverable but also to sustain the improvement itself and to close the improvement loop. The importance of managing product reliability improvement is on how to ensure that the project moves to the right direction without losing its flexibility.

Keywords: reliability improvement, project.

1. INTRODUCTION

Alike other improvement projects, a reliability improvement project should also be managed in a structured way. Therefore to effectively manage reliability improvement projects, an appropriate strategy is needed. For this reason, this paper intends to demonstrate the importance of managing reliability improvement projects in practical context.

In a reliability improvement project, a checklist can be used to guide the project so that it can be completed in a structure and efficient way. In practice, initial success indicators of the project can be observed from the project plan. Therefore, developing a right project plan can ensure the success of the project. Moreover, to extend the success of the project requires a capability of managing the project. Managing a project requires an effort to understand the global view of the project. Also in managing a project includes the following activities: developing a model, setting goal and deliverable, planning, providing and motivating resource, identifying possible risks and traps, executing the project, controlling the project, solving conflict, and celebrating achievement.

Generally reliability improvement projects vary in term of duration, and complexity. To manage the project complexity, it is important to keep the focus, the energy, the momentum, and the excitement on the project. Moreover, it is also important to balance constraints e.g. project duration, deliverable, resource, budget, etc. Equally important is to seek compromise especially if the project involving many parties. It is because not surprisingly that each parties has their own interest on the project.

2. PROJECT CLASSIFICATION

It is important to understand the nature of the project and its boundary as a first step before designing a project. A project may or may not be interested by one, two, three, or more parties in

and/or outside the organization. Therefore it is possible that the interest from the parties can influence on the direction initially set for the project. To make a visualization, the interest can be defined as a vector as shown in Figure 1. It can be assumed that this vector of interest is changing over time, based on the focus of the interest itself (Figure 1). Therefore over time project should be reviewed to align the interests into the expected direction and goal (see also Figure 2).

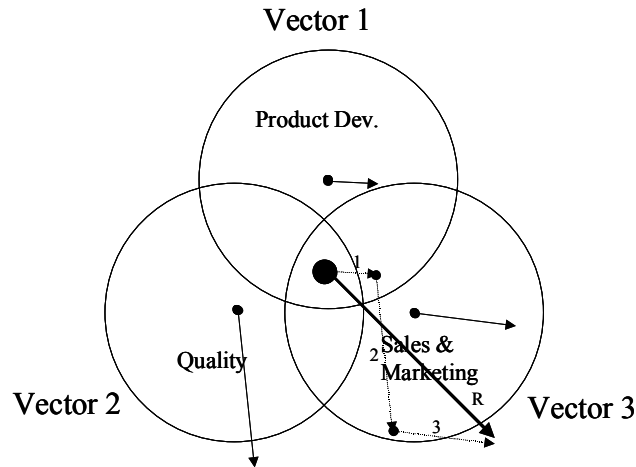


Figure 1. Concept of a Vector

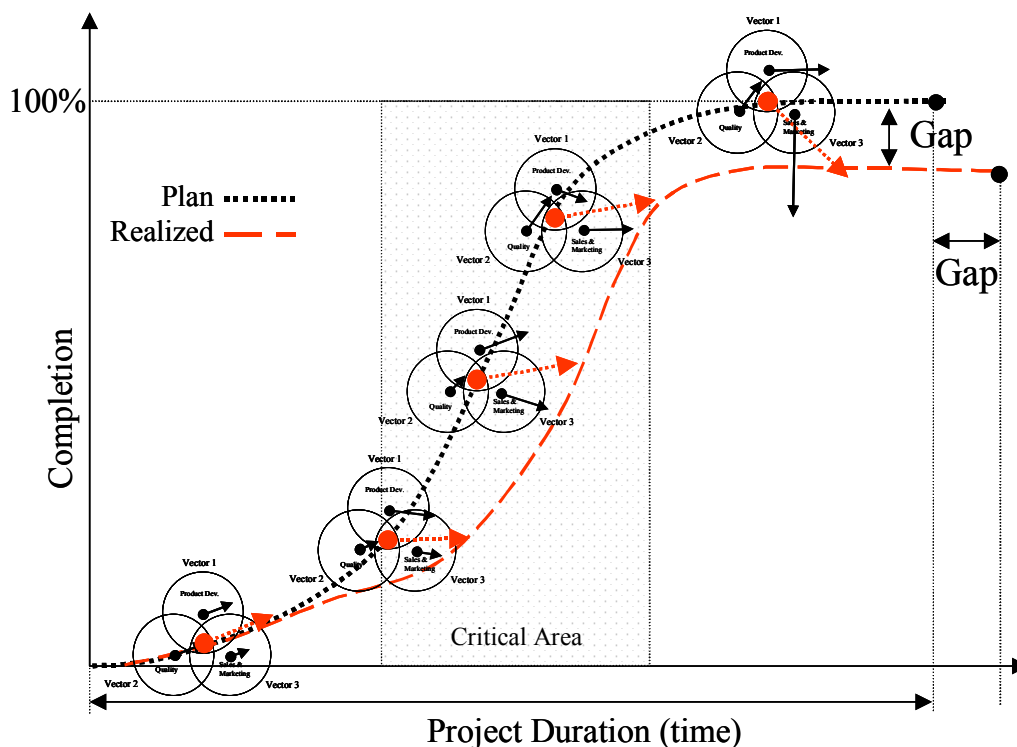


Figure 2. Moving of Interest Along Project Duration

Acceleration, deceleration, speed, and direction of the project are represented by this vector. It is not uncommon that at a certain period project speed will be very slow and even not moving at all. It is also possible that the project is decelerating, or moving on different direction.

Logically, the implication of this situation will be to project cost and project completion schedule. Moreover, if this situation is out of control then it can change the project to totally different goal than what it is intended at the first time (Figure 2).

2.1. Role of Business & Correlation to Business Plan

In a reliability improvement project, it is meaningful to understand the impact of this project for business. Sometimes it is not easy to (quantitatively) justify the impact for business. However, it is sufficient if the project has already been aligned to the business indicator preferably to key performance indicator (KPI).

Also it is not uncommon for reliability improvement projects that the contributions are considered as indirect contribution. It is valid only under circumstances that a direct contribution can only be made if a project is aligned to the key performance indicator. For this reason, it is necessary to know the links to other projects especially to those under the same umbrella of key performance indicator (see Figure 3).

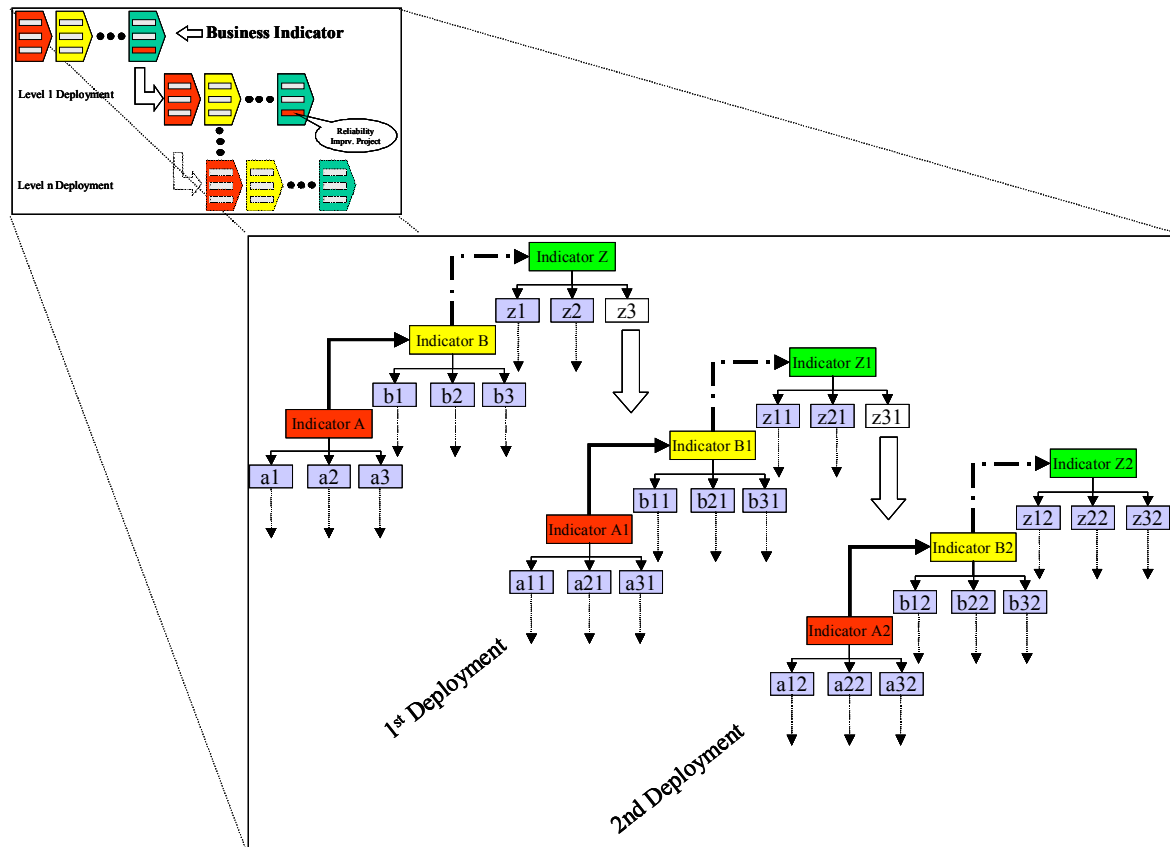


Figure 3. Deployment of Business Indicator

Figure 3 shows the deployment of indicators that are initiated from balanced scorecard (Kaplan and Norton, 1996). Method of the performance indicators deployment can also be found in performance prism (Neely and Adams, 2000). Include in the deployment the detail decomposition of goal/target/task. The decomposition is aimed to achieve good control on the project. It is expected that the project does not loose its alignment to business indicators.

However, careful consideration is required in the decomposition. For example, if clustering with incorrect decomposition technique then it will end up with different goal as initially set. Therefore, it is important to have a correct decomposition technique. For example, the below vector matrix decomposition technique can be used as a model (Figure 4).

$$\begin{array}{c}
 \begin{bmatrix} A \\ B \\ \cdot \\ \cdot \\ \cdot \\ Z \end{bmatrix} = \begin{bmatrix} [a1 \ a2 \ a3] \\ [b1 \ b2 \ b3] \\ \cdot \\ \cdot \\ \cdot \\ [z1 \ z2 \ z3] \end{bmatrix} = \begin{bmatrix} \begin{bmatrix} a11 & a21 & a31 \\ a12 & a22 & a32 \\ a13 & a23 & a33 \end{bmatrix} \\ \begin{bmatrix} b11 & b21 & b31 \\ b12 & b22 & b32 \\ b13 & b23 & b33 \end{bmatrix} \\ \cdot \\ \cdot \\ \cdot \\ \begin{bmatrix} z11 & z21 & z31 \\ z12 & z22 & z32 \\ z13 & z23 & z33 \end{bmatrix} \end{bmatrix}
 \end{array}$$

Figure 4. Matrix Decomposition

From this model, the project that has correlation to the reliability problem is on vector z_{31} , decomposed from the vector z_3 with the initial indicator of Z . The vector z_{31} has two neighbors of z_{11} and z_{21} ; they are located under z_3 root (see also in Figure 3). Therefore to ensure the direction of z_3 under its intended direction it is necessary to resume test on the small projects of z_{11} , z_{21} , and z_{31} .

3. PROJECT DESIGN

3.1. Conceptual Development

Conceptual development plays a very significant role in order to have smooth and determined goal and/or objective. It is an initial step of a project design before defining a project plan. The conceptual development involves an understanding of big picture of the business such as grand business strategy and its correlation to other influence factors. The influence factors are technology development, market change, and other issues that influence to the project.

The conceptual development is described in Figure 5. It shows that before determining project strategy it is necessary to consider other project linkages. The goal is to ensure the alignment of the project strategy to the business strategy.

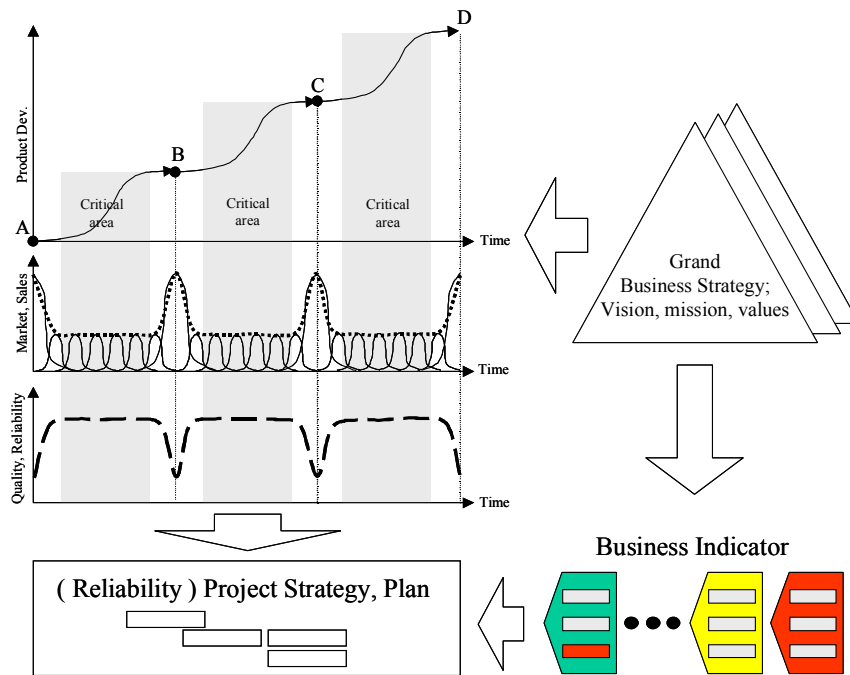


Figure 5. Conceptual Development

3.2. Project Global Strategy

To develop a project global strategy it is important to have the ability to define the strategy in a broader view (Figure 6). The global view helps to maximize control on the project.

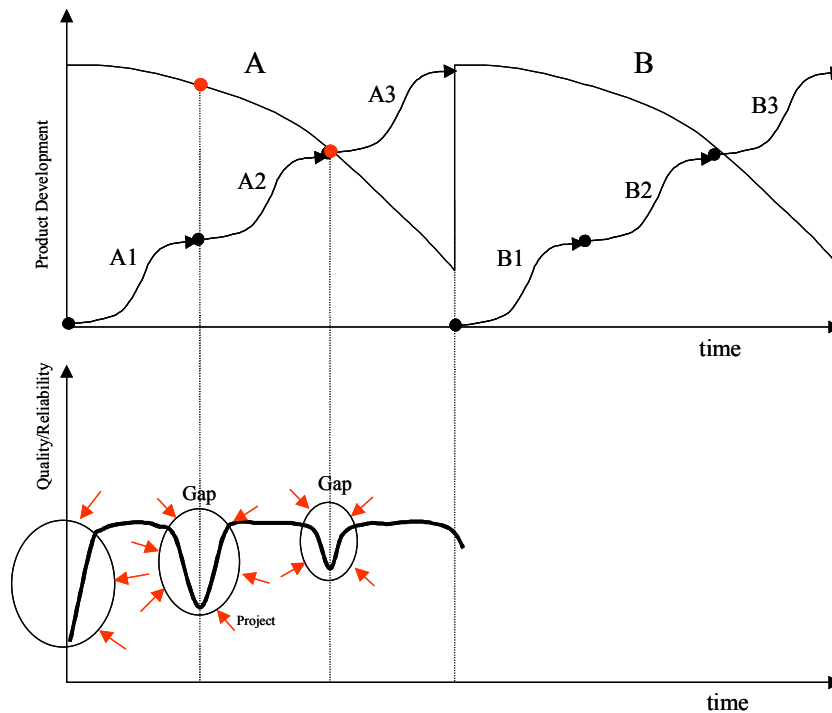


Figure 6. New Product Development Model

Figure 6 gives a model in global view of new product development; it starts with the project plan to develop product A to product B that has different characteristics. Therefore, in Figure 2, the A and B curves are located differently. Among other reasons of developing a new different product, usually one of them is due to innovation that is driven by technology breakthrough, saturation of market, and other driving forces (van Driel, 2003; von Stamm, 2003). In the life cycle of a product, namely product A from the conception to disposal, commonly there is a continuous improvement on the product namely A₁, A₂, A₃, etc. Usually, on this improvement no major change/ breakthrough on the product.

Figure 6 also shows that weakness on product quality and reliability can happen regularly every time the product is introduced to the market. It is a gap between optimum performances of product quality/reliability to the first time performance when it is introduced. Therefore, reducing this gap can be one of the quality/reliability improvement strategies.

3.3. Importance of Modeling

After knowing what gap to be filled and its behavior, it is now the time to define the model. The model is used to describe the condition and the way to achieve the goal. It is the model that will explore root causes of the gap.

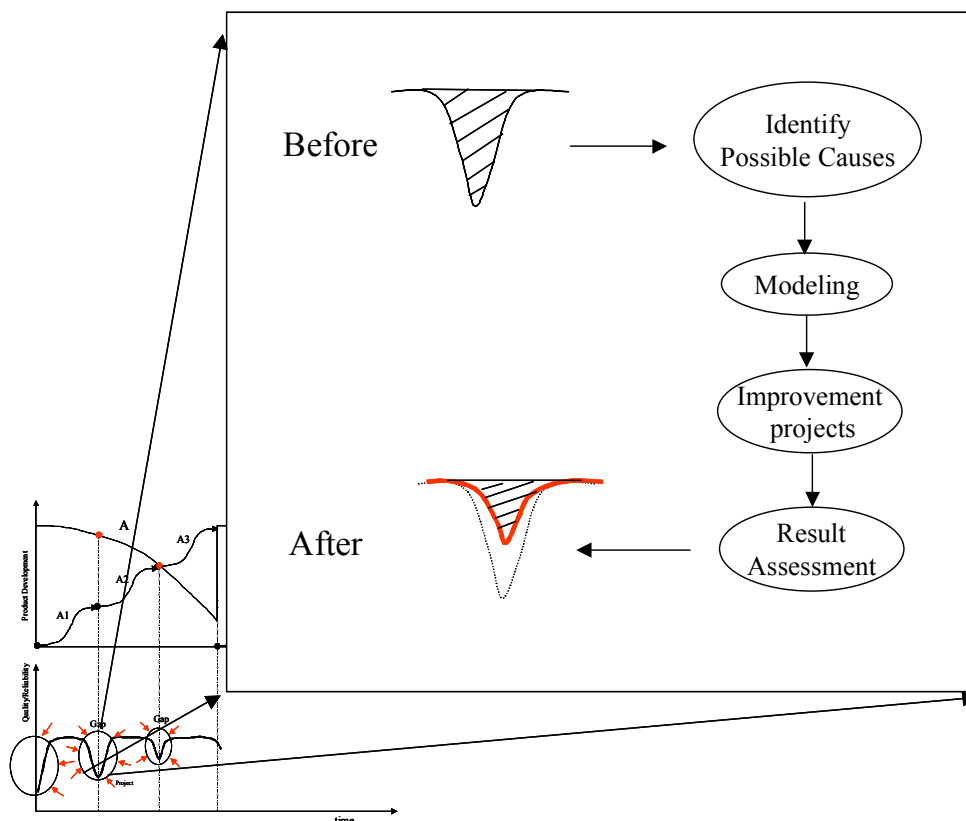


Figure 7. Model to Guide the Improvement

Figure 7 shows an importance of a model in order to address the right issue. Using a model can help to describe the possible causes of the gap. The importance of using a model is also to have a clear step to overcome problems.

4. PLANNING FROM THE MODEL

Planning is the crucial start of a project improvement; the intention is on how to achieve the goal in an efficient, short and determined way. To better develop an efficient plan it is necessary to regularly refer to the model. Also important is on how to define the short path. Before developing a plan the following consideration should be taken into account:

1. Project duration
2. Resources availability
3. Budget availability

Commonly, these three factors can influence significantly to the project plan. Therefore, it is not uncommon that along the projects path these three factors have to be reviewed to ensure the objective is achievable. It is also important that for simplicity the ultimate goal can be breakdown to sublevel goals (see Figure 8).

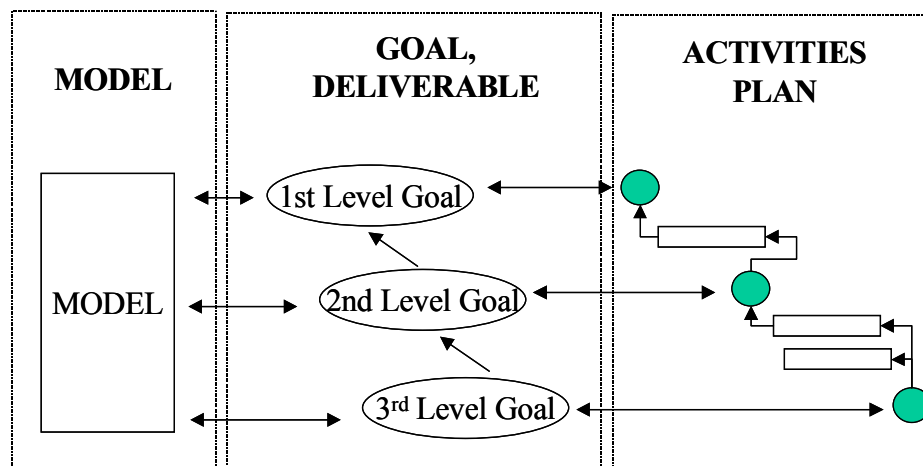


Figure 8. The Breakdown of Project Goal

5. DISCUSSION

From the previous description, it can be noted that the importance factors for reliability improvement are as follows:

- Role of business
- Product portfolio strategy
- Business indicators
- Gap identification
- Efficient plan

It is possible that if reliability improvement projects established without proper consideration of the above factors then it can slip from the initial goal. Moreover, to develop a project strategy, the following factors are also important to be considered.

- Gap to be filled
- Model
- Goal/deliverable
- Metric

- Resource
- Budget
- Time frame

Finally, to establish a reliability improvement project, it is urged that the project should be:

- Focus
- Small
- Medium time
- Team based
- Division of goal

This is necessary to bring the energy and momentum along the project and to ensure the success of the project.

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