Integrated Management System & CMMI

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Engineered for life
Integrated Management System
“Leading Our Business with Purpose”

Value Based Management Establishes Business Strategies

Value Based Product Development Transforms Strategies Into Product Development Tactics

• Stage Gate
  – Executive direction
  – Resource allocation
• Nimba Value Model focus on Customer Value
• System Engineering
• CMMI best practice processes

Value Based Lean Six Sigma
• Measurement and Continuous Improvement

CMMI Best Practices Execute VBPD/VBM Policies
ITT Integrated Management System (IMS)
IMS Video Screen shots

Power of IMS as Integrated, Interdependent and Iterative Framework

Power of IMS as Integrated, Interdependent and Iterative Framework

apart is that we embrace the use of the ITT Management System in a disciplined way

with purpose - based on facts rather than gut feelings - and guides the Premier Resource Management

unrivalled value for our customers and for ITT. We capture the voice of the customer and use a

Value Based Product Development

Needs Functions Solutions Processes Value

Nimba Value Arrow
CMMI is our Framework for Product Development Within Our IMS Business Framework

- CMMI for Development (CMMI-DEV) provides a comprehensive integrated solution for development and maintenance activities applied to products and services.
- CMMI® (Capability Maturity Model® Integration) is a process improvement maturity model for the development of products and services.
IMS and CMMI

- **IMS** is an “…integrated, interdependent and iterative framework, guiding our strategic decision making, resource allocation, operational excellence and leadership”

- **CMMI** “processes are planned and executed in accordance with policy; the projects employ skilled people who have adequate resources to produce controlled outputs”

- **IMS** “…guides what we do, measures how well we execute, and creates options for doing even better”

  “…we embrace the use of the ITT Management System in a disciplined way”

- **CMMI** “…processes are well characterized and understood, and are described in standards, procedures, tools, and methods
VBM and Strategic Planning Focuses Value Based Product Development (VBPD)

Strategic Analysis

- Market Place
- Competition
- Core Competencies

Key Growth Strategies

- Where To Invest
- New Products with Unrivaled Customer Value

Action Plan for Growth

- Mergers, Acquisitions, Divestitures
- VBM and Strategic Planning
  - VBM Strategy Development
  - Strategies to Address Customer Needs

Integrated Strategic Processes

- PROFITABLE GROWTH
  - Value-Based Management
  - Resource Optimization
    - Premier Resource Management
    - Portfolio Capital Allocation

- OPERATIONAL EXCELLENCE
  - Value-Based Lean Six Sigma
  - Value-Based Goal Department

- LEADERSHIP & LEARNING
  - Value-Based Leadership Development
  - Partnership for Performance

VBPD

- Lasting Value via Corporate Portfolio Management
- Sustainable Profitable Growth

Develops Product Development Strategies to Address Customer Needs

Value Based Product Development
VBPD Uses the Nimba Value Model to Focus Product Development on Customer Value

Needs
- Business Development

Functions
- Systems Engineering

Solutions
- Design Engineering

Processes
- Manufacturing Engineering

Functions Satisfy Customer Needs
Solutions Provide Functions
Processes Produce Solutions

VBPD Focuses Products and Services on Customer Value
Stage Gate Within VPBD Transforms Strategy into Tactics to Develop the Right Projects to Serve Customer Needs

This is a model *Stage-Gate* process for new Defense Product Development. It is ITT Defense policy that each Value Center adapts a *Stage-Gate* tailored for their business.

Defense policies imbedded in this process is to establish a process that incorporates “best-in-class” practices for focusing resources on finding, qualifying, pursuing and winning opportunities by:

- Focusing on Gate and Milestone decisions and the information required for the decision
- Coupling resource allocation and expenditures to milestone decisions
Stage Gate Within VPBD Ensures We Select the Right Products For Development

Value Based Product Development

VBM
Market Segmentation/Selection Attractiveness Competitive Position

IR&D Technology Development

Strategy

Discover Idea Scope Pursue Propose, Win and Plan Develop External Test

Build Capture Team Capture Program Plan Preliminary Program Plan Proposal Plan Program Plan


Needs VOC Derive Requirements Functional Trades Proposal Plan

Hi-Level Market Analysis VOC

Needs VOC Hi-level Req’ts

Hi-level Functional Trades

Value Based Product Development

Needs Functions Solutions Processes Value

Nimba Value Arrow

IMT
Apply CMMI Best Practices to Develop the Project Plan

Double Click on Word Icons to View Process

Project Planning

Establish Estimates
- Estimate the Scope of the Project
- Establish Estimates of Work Product and Task Attributes
- Define Project Life Cycle
- Determine Estimates of Effort and Cost

Develop a Project Plan
- Establish the Budget and Schedule
- Identify Project Risks
- Plan for Data Management
- Plan for Project Resources
- Plan for Needed Knowledge and Skills
- Plan Stakeholder Involvement
- Establish the Project Plan

Obtain Commitment to the Plan
- Review Plans that Affect the Project
- Reconcile Work and Resource Levels
- Obtain Plan Commitment

Needs  Functions  Solutions  Processes  Value

Nimba Value Arrow

Value Based  Product Development
Stage Gate Ensures We Apply CMMI Best Practices to Develop the Product Right

- **IR&D Technology Development**

  - **Discover**
  - **Idea**
  - **Scope**
  - **Pursue**

  - **Propose, Win and Plan**
  - **Develop**
  - **External Test**

  - **Strategy**
  - **Tactics**

  - **VBM**
    - Market Segmentation/Selection
    - Attractiveness
    - Competitive Position

  - **Project Monitoring and Control**
  - **Supplier Agreement Management**
  - **Integrated Project Management**
  - **Risk Management**
  - **Integrated Teaming**
  - **Integrated Supplier Management**

  - **PM Engrg**
    - Design the Product
    - Document the design
    - Design comprehensive product-component interfaces
    - Make/Buy/Reuse Decisions
    - Implement the Design
    - Product Support Documentation

  - **Needs**
  - **Functions**
  - **Solutions**
  - **Processes**
  - **Value**

  - **Nimba Value Arrow**

  - **Double Click Links to Open**
Processes are Tailored to the Project

- Defense MC Reviews
- Model & Reporting Requirements
- Stage Gate Business Processes

“What is to be done”

Process Owners/Managers
- Program Management
- Business Development
- Engineering
- Quality
- Operations/Logistics
- Finance
- Contracts

“How it is done”

COE Processes

Approvals/Rejections

Report

Approvals/Approve

Project Management A
- Tailor/Approve

Project Management B
- Tailor/Approve

Project Management C
- Tailor/Approve

Standards/Metrics

Value Based Product Development
VBPD VOC to Concept Creation and Differentiation Through Functional Analysis

Elicit VOC
- Identify and Prioritize Customer Needs

Analyze Functions
- Identify Functions required to meet Needs. (What the system should do.)
- Develop solution Independent Functional Requirements promoting Innovation/Differentiation

Generate Concepts
- Innovate
- Develop Multiple Concept alternatives to provide functions

*Spoken & Unspoken Non-Functional Needs

Analyze and Select Concept(s)
- Correlate Functions and performance to Customer needs
- Assess Competitively (SWOT)
- Assess best customer and business value options

Refine Selected Concept(s)
- Refine concept to maximize Customer Value
- Identify Constraints and Re-use
- Refine business case

Develop Design Strategy
- Plan for detailed design.
- Establish Functional, Detail Design, Performance and Cost Requirements

Validate Needs and Deeper Dive

Revise or Deeper Decomposition

Innovate/Differentiate

Loop back as appropriate

Team Review

Decompose and Deeper Dive

Needs
Functions
Solutions
Processes
Value

Nimba Value Arrow

Gate 2
Requirements Review
Go to Gate 2
Loop back as appropriate

Value Based Product Development
VBPD Kano Analysis of Needs

**CMMI:** Eliciting goes beyond collecting requirements by proactively identifying additional requirements not explicitly provided by customers.

**CMMI:** The basic activity addresses the receipt of requirements that a customer provides to define what is needed or desired.

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**Unspoken Needs and Delighters**

- that customers are not aware of until presented to them
  - *Differentiators in the market*

**Articulated Needs**

- *All competitors strive to meet and exceed requirements*

**Basic Unspoken Needs**

- *Basic requirements to enter market*

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**Elicit VOC**

- Identify and Prioritize Customer Needs
- Validate Needs & Deeper Dive

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Value Based Product Development
VBPD Consider All Stakeholders in the Product Life Cycle

**CMMI:** … these requirements address the needs of relevant stakeholders, including those pertinent to various product life-cycle phases

The Customer Value focus changes during the product life cycle.

- Prospects are attracted with image
- Customer value is important to buyers
- Recipients value precision in accuracy in response to purchase specifications
- User values quality and performance
- End of Life Decommissioners value recycling to simplify work

Taken from "NIMBA Value Model" Chapter 17 page 12
VBPD: Needs are Opportunities Which Should Be Articulated:

- In the language of the customer, not the language of the designers
- In the domain of the customer, not the domain of the product

CMMI: The customer requirements may be expressed in the customer’s terms and may be non-technical descriptions.

VBPD: Independent of a solution (or even the possibility of a solution)
- As a “need to” …. (do something); not as a “need for” … something
  - A “need for” something implies a solution
- Characterize desired outcome
VBPD: To Ensure Unrivaled Customer Value in Product Development, Needs Must Be:

- Identified
  - “You can observe a lot just by watching.”
- Translated into clear, concise and measurable technical requirements
  - “You’ve got to be very careful if you don’t know where you are going because you might not get there.”

**CMMI:** The stakeholder needs, expectations, constraints, interfaces, operational concepts, and product concepts are analyzed, harmonized, refined, and elaborated for translation into a set of customer requirements.
VBPD: Needs, Functions and Customer Value Should Drive Concept Selection

“No amount of architectural or detailed design rigor can make up for an inferior concept selection”

**CMMI**: Requirements are the basis for design. The development of requirements includes the following activities:

- **Elicitation, analysis, validation, and communication of customer needs, expectations, and constraints** to obtain customer requirements that constitute an understanding of what will satisfy stakeholders
Functional Analysis

**VBPD:** “to capture the intended behavior of the system”… to satisfy the customer’s “need to do something”

**CMMI:** The definition of functionality, also referred to as “functional analysis,” is the description of *what the product is intended to do.*

- **Elicit VOC**
  - Identify and Prioritize Customer Needs

- **Analyze Functions**
  - Identify Functions required to meet Needs. (What the system should do.)
  - Develop solution independent Functional Requirements promoting Innovation/Differentiation

- **Validate Needs and Deeper Dive**

**Nimba Value Arrow**

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CMMI Analyses occur recursively at successively more detailed layers of a product’s architecture until sufficient detail is available to enable detailed design, acquisition, and testing of the product to proceed. As a result of the analysis of requirements and the operational concept … concept(s) produces more derived requirements.

Recursive and Iterative Functional Analysis and Concepts
VBPD Concept Development

Elicit VOC

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Validate Needs & Deeper Dive

Decompose and Deeper Dive

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Innovate

Team Review

Decompose and Deeper Dive

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Needs
 Functions
 Solutions
 Processes
 Value

Nimba Value Arrow

Value Based Product Development
Functional Analysis Drive Solutions and Identifies Interface Requirements

VBPD
Functional Analysis
…Moves our focus from outside the system and what the system is intended to do …to inside the system and begin to specify how it will accomplish its intent

CMMI
Interfaces between functions (or between objects) are identified. *Functional interfaces may drive the development of alternative solutions*
USE Cases

**VBPD** … Study the desired behavior of the product before a solution is developed

**CMMI** … Typical Work Products

- Timeline analyses of product-component interactions
- *Use cases*

Analyses are performed to determine what impact the intended operational environment will have on the ability to satisfy the stakeholders’ needs, expectations, constraints, and interfaces.
CMMI – The objectives of the analyses are to determine candidate requirements for product concepts that will *satisfy stakeholder needs*, expectations, and constraints; and then translate these *concepts* into requirements.

Requirements are validated to increase the probability that the resulting product will perform as intended in the use environment.
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