Product Portfolio & Top-Down Resource Capacity Planning

Pursuing Predictable Product Development

Susan Trahan
Director of Product Development
NeoMetrics, Inc.

Gary Wereley
Director, Product Development Processes
St. Jude Medical Atrial Fibrillation Division
Predictable portfolio development is built on a foundation of accurate resource capacity planning.
“Vision without resources is hallucination”

Robert Bruininks, President University of Minnesota
Portfolio Development

Tying Product Portfolio Development to Reality
Terminology

- **Business Group** – a grouping of like products sold to similar customers (e.g. business, product family, division)

- **Product** – a device that will be sold

- **Technology** – enables product, process, or efficiency development

- **Project** – an effort to accomplish a defined goal; typically executed using a stage/gate process

- **Portfolio Plan** – includes project priorities, timing, cost, and resource needs; includes all types of related projects (e.g. product, technology, and clinical)
Prerequisites

● List **ALL** projects – active and planned

● Divide projects into relevant categories
  
  *Examples:*  
  Research  
  Product Development  
  Technology Development  
  Clinical  
  Operations  
  Regulatory/Compliance

● Prioritize projects based on established criteria

● Define project characteristics – schedule, budget, headcount, required capital, etc.

● **FOCUS** – may need to cancel or delay projects
Cross Functional Input

- Marketing
- Clinical/Regulatory
- Global Market Strategy
- Clinical and Regulatory Strategies
- Product Pipelines
- Resource Plans
- Project Proposals
- Integrated Portfolio

- Finance
  - Budget/Analysis

- Engineering
  - Resources & Technology

- Operations
  - Capacity Readiness

- Core Team Leaders
  - Project Status

Susan Trahan Director of Product Development NeoMetrics, Inc. and Gary Wereley Director, Product Development Processes St. Jude Medical, PMI-MN May 12, 2009
Product Pipeline Creation

Business review of:
- Market Size / Share
- Business Objective
- Competitive Strategy
- Investment Level

Investment for Business Group

Scenario Analysis

PD Cost
Tech Cost

PD Cadence
Tech Roadmap

Pipeline Creation

2003 Q1 Q2 Q3 Q4 2004 Q1 Q2 Q3 Q4 2005 Q1 Q2 Q3 Q4 2006 Q1 Q2 Q3 Q4 2007 Q1 Q2 Q3 Q4

Pipeline Creation

Susan Trahan Director of Product Development NeoMetrics, Inc. and Gary Wereley Director, Product Development Processes St. Jude Medical, PMI-MN May 12, 2009
Linking to Strategy

**Cycle of Business Management**
- Executive Committee Review
- Quarterly Commitments/P&L
- Management Boards

**Business Plan**
- Objective
  - lead
  - compete
  - maintain
- Strategy Review
- Financial Projections
- New project proposals

**Portfolio Plan**
- Technology Projects
- Product Development
  - Clinical
- Operations

**Project Execution**
- Individual project review
- Stage – Gate project review

Susan Trahan Director of Product Development NeoMetrics, Inc. and Gary Wereley Director, Product Development Processes St. Jude Medical, PMI-MN May 12, 2009
Scenario Planning

- Ability to do “what if” scenarios and assess impact on portfolio
  - Budget
  - FTE
  - Timelines
  - Revenue

- Examples:
  - Adding or Canceling a project
  - Changing project scope or timeline
  - Changing technology strategy

- Can complete analysis of multiple scenarios
Scenario Planning

- Managing throughput requires attention to pipeline entry, resource loading, project priorities, and early cancellation of marginal projects

**Supporting Tools**
- Financial Projections
- Investment Mix
- Master Project Plan
- Capacity Plan

**Process Elements**

**Pipeline Balancing**
- Measuring strategic investment levels
- Rationalizing aggregate product-line plans with resource capacity
- Long-range functional skill set planning
- Priorities are consistent

**Pipeline Loading**
- Managing entry, exit, and mid-course corrections of development projects
- Staffing in functional areas is balanced with requirements
- Resources are focused on fewer projects that proceed more rapidly

**Pipeline Delivery**
- Efficient individual project assignment and loading
- Look-ahead capability for shared resource organizations
Scenario Planning – Pipeline Interactions

For each project, there are three basic decision levers
- Scope/content
- Schedule
- Resources

Effective decision making requires managing the entire project pipeline
- Projects under development
- Current and future deployment

If sufficient resources are unavailable, management has a tough decision
- Reduce the scope of the product
- Lengthen development time
- Take resources from another project
- Hire more resources or outsource work
- Cancel the project
Monitor the Portfolio

Evaluate at Multiple Levels

- Project Level – Project Valuation and Performance
- Business Group Level – Spend, Competition
- Divisional Level – Growth, Profitability and Efficiency
Summary of Key Points

● Senior Management Support

● Decision Making
  ○ Neutral
  ○ Prompt Decisions
  ○ Have Authority to Make Decisions Stick

● Review and Adjust Portfolio on a Defined Basis

● Implementation: start with the basics and add capability as you master the process
Resource Capacity Planning

Bridging Portfolio Plans & Project Execution
Resource Capacity Planning Value Proposition

- Portfolio valuation, product pipeline maps, trade-offs, what-if and impact analysis all come together and are realized at resource capacity planning.

- Resource capacity planning is the bridge between a well planned portfolio and a well executed product development pipeline.
Planning Types

- Business Planning
  - Strategic Planning
  - Annual Operating Planning
  - Quarterly Forecast

- Project Planning
  - Work breakdown structures
  - Logical scheduling
  - Names tied to tasks (activities, deliverables)
Planning Uses

- **Top-down** – high-level rapid and multiple iteration *scenario analysis* in support of developing realistic portfolio plans
  - Used primarily during strategic and annual operating planning

- **Mid-tier** – detailed and accurate allocation of functional resources to development initiatives (projects)
  - Used primarily during annual operating planning and quarterly forecasting by departments and/or functions

- **Bottom-up** – specific resources to specific tasks per detailed project plan
  - Used primarily for planning and executing projects and/or programs
Types of Planning

Business Planning Lifecycle

- Strategic Planning
- Annual Operating Planning

Quarterly Forecast

Project Planning Lifecycle
Types of Planning

Business Planning Lifecycle

Product Map Review → Model & Validate → Review & Approve

Checkpoints:
- Model
- Plan, Review & Approve

Annual Operating Plan:
- Checkpoint
- Model
- Plan, Review & Approve

Quarterly Forecast:
- Map
- Model
- Plan

Strategic Plan:
- Map
- Model
- Plan

Susan Trahan Director of Product Development NeoMetrics, Inc. and Gary Wereley Director, Product Development Processes St. Jude Medical, PMI-MN May 12, 2009
Data Sources

- Annual operating plan
- Quarterly forecasts
- Detailed plans of currently executing projects
- Scoped project data (estimated)
Types of Planning

Business Planning Lifecycle

Project Planning Lifecycle
Focus Area

Top-down resource capacity planning adds reality to portfolio planning
Prerequisites

- Must have an approved *project priority list* (one list)
- Model only the meaningful resources
  - Focus – Remove resources not relevant to the planning process
    - (Administration, Management, Support, Direct Labor, etc.)
- Must have *accurate resource profiles* for all proposed projects
- Must know what your resources are *currently* working on
- Must know what resources and skill-sets free up when
- Must monitor and manage critical resources closely
  - Identify the organizations most critical resources by name
    - Knowing their combined capacity may determine the most the organization can deliver as a whole
# Example Data Set

<table>
<thead>
<tr>
<th></th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Information Technology</strong></td>
<td>IT</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>11</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td><strong>Finance</strong></td>
<td>FIN</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td><strong>Human Resources</strong></td>
<td>HR</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td><strong>Legal</strong></td>
<td>LGL</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td><strong>Administration</strong></td>
<td>ADM</td>
<td>36</td>
<td>36</td>
<td>36</td>
<td>36</td>
<td>36</td>
<td>36</td>
<td>37</td>
<td>37</td>
<td>37</td>
<td>37</td>
<td>37</td>
</tr>
<tr>
<td><strong>Clinical Affairs</strong></td>
<td>CA</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td><strong>Design Quality Engineering</strong></td>
<td>DQE</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td><strong>Documentation</strong></td>
<td>DOC</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td><strong>Hardware Engineering</strong></td>
<td>HW</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td><strong>Management</strong></td>
<td>MGT</td>
<td>55</td>
<td>55</td>
<td>55</td>
<td>55</td>
<td>55</td>
<td>55</td>
<td>56</td>
<td>56</td>
<td>56</td>
<td>56</td>
<td>56</td>
</tr>
<tr>
<td><strong>Manufacturing Engineering</strong></td>
<td>ME</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td><strong>Manufacturing Engineering Tech</strong></td>
<td>ME-T</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td><strong>Marketing</strong></td>
<td>MKT</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td><strong>Operations</strong></td>
<td>OPS</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td><strong>Product Development</strong></td>
<td>PD</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td><strong>Program Management</strong></td>
<td>PM</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td><strong>Quality Assurance</strong></td>
<td>QA</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td><strong>Regulatory Affairs</strong></td>
<td>RA</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td><strong>Software Engineering</strong></td>
<td>SWE</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td><strong>Software Engineering Tech</strong></td>
<td>SW-T</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td><strong>System Engineering</strong></td>
<td>SYS</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td><strong>Technology Development</strong></td>
<td>TD</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td><strong>V&amp;V Testing</strong></td>
<td>V&amp;V</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td><strong>Available Capacity</strong></td>
<td>AVL</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Total**: 455, 455, 455, 455, 455, 455, 457, 457, 458, 459, 460, 460
Model Only Meaningful Resources

- Filter out as much nonessential data as possible

<table>
<thead>
<tr>
<th></th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical Affairs</td>
<td>CA</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Design Quality Engineering</td>
<td>DQE</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Documentation</td>
<td>DOC</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Manufacturing Engineering</td>
<td>ME</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Manufacturing Engineering Tech</td>
<td>ME-T</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Marketing</td>
<td>MKT</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Product Development</td>
<td>PD</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Program Management</td>
<td>PM</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Regulatory Affairs</td>
<td>RA</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>System Engineering</td>
<td>SYS</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Technology Development</td>
<td>TD</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Available Capacity</td>
<td>AVL</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Susan Trahan Director of Product Development NeoMetrics, Inc. and Gary Wereley Director, Product Development Processes St. Jude Medical, PMI-MN May 12, 2009
Model Only Meaningful Resources

- Focus attention on key development resources
Accurate Resource Profiles

- Skills-based ROM estimates

Consider Categorization:
- Software heavy
- Hardware heavy
- Balanced
Resources Are Currently Working On What?

- Do not assume that the annual or quarterly financial planning data accurately represents what people are really doing.
YTD Actual, Current and Projected Allocations

Susan Trahan Director of Product Development NeoMetrics, Inc. and Gary Wereley Director, Product Development Processes St. Jude Medical, PMI-MN May 12, 2009
Available Capacity

Organizational Capacity

Assumes margin is built into each project plan

Available Capacity

Project 1
Project 2
Project 3
Project 4
Project 5
Project 6
Project 7

Sustaining Engineering
Technology Development

Susan Trahan Director of Product Development NeoMetrics, Inc. and Gary Wereley Director, Product Development Processes St. Jude Medical, PMI-MN May 12, 2009
Resource Capacity Planning Methodology

- Top-down project-level resource capacity planning seeks to optimize the pipeline per portfolio plans based on available resource capacity and resource skill sets
  - Proposed projects are layered on top of existing projects by project priority
  - Proposed projects must have an accurate skills-based resource model
  - Layering is conducted within organizational constraints and defined margins while balancing and optimizing resource demands with capacity
    - Knowing what skills-sets are becoming available is critical
      - You will not be able to start a SW heavy project with mechanical and electrical engineering resources coming off a hardware heavy project
YTD Actual, Current and Projected Allocations

Susan Trahan Director of Product Development NeoMetrics, Inc. and Gary Wereley Director, Product Development Processes St. Jude Medical, PMI-MN May 12, 2009
Project Layering Process

Organizational Capacity

Project 1

Project 2

Project 3

Project 4

Project 5

Project 6

Project 7

Technology Development

Sustaining Engineering

Susan Trahan Director of Product Development NeoMetrics, Inc. and Gary Wereley Director, Product Development Processes St. Jude Medical, PMI-MN May 12, 2009
Project Layering Process
Project Layering Process

Susan Trahan Director of Product Development NeoMetrics, Inc. and Gary Wereley Director, Product Development Processes St. Jude Medical, PMI-MN May 12, 2009
Resource Capacity Planning Methodology

● Refine planning by moving from project-level modeling to skill-level analysis
  ○ Here is where balancing and optimizing is conducted
    • This is an iterative process that often times requires adjustment to the portfolio plan to ensure proper resource utilization
  ○ Ensure that critical skills are neither over or underutilized
    • Near-term overutilization will require pipeline adjustments to optimize resource use
    • Overutilization further out on the horizon can be managed by planned talent acquisition
    • Underutilization can provide opportunity to pull in projects aligned with a specific skill sets
    • Underutilization may also indicate a business direction change, requiring planned management
Skills-Based Over- and Underutilization Analysis

Overutilization on the horizon can be managed by planned talent acquisition.

Overutilization of multiple skills at a similar time may indicate the need to adjust project loading/timing.

Long-term overutilization typically indicates an organizational need.

Susan Trahan Director of Product Development NeoMetrics, Inc. and Gary Wereley Director, Product Development Processes St. Jude Medical, PMI-MN May 12, 2009
Benefits of High-Level Capacity Planning

- Adds confidence to strategic plans and product maps
- Establishes a baseline for ongoing impact and what-if analysis, forecasting and strategic planning
- Provides a roadmap for:
  - Name-based detailed functional and departmental planning
  - Strategic talent acquisition
    - Long-range hiring plans by skill-set
  - Regulating demand of specific skill sets while reducing the propensity to manage cyclical resource demands with lay-offs and/or panic hiring
Watch Outs

● More often than not programs are constrained by the availability of human resources not by funding

● Organizations regularly plan at or beyond the human resource capacity capable of executing the desired projects

● The Devil is in the details
  ○ The unavailability of a key resource and/or key skill pools can derail an entire program even if it appears to be fully funded and staffed
  ○ Limited availability of extremely senior technical talent spreads and defocuses to the point of handicapping multiple projects
  ○ Special projects deemed high-priority by a functional area can pull away key resources
  ○ Preventative and corrective action projects often require the original design team to conduct the investigation and corrective action
Summary

- Senior Management Support
- Crisp Decision Making
- Review and Adjust Portfolio on a Defined Basis
- Align processes and partner with Finance, Product Planning and Program Management
- One project list – One project priority list
- Focus on the few
  - Categorize into meaningful buckets
  - Don’t be afraid to cancel programs
- Know where your people are currently working
- Know what skill sets become available and when
- Conduct accurate skills-base ROM estimates for proposed projects
- The devil is in the details
Questions

Product Portfolio & Top-Down Resource Capacity Planning