

Best Practices in New Product Development

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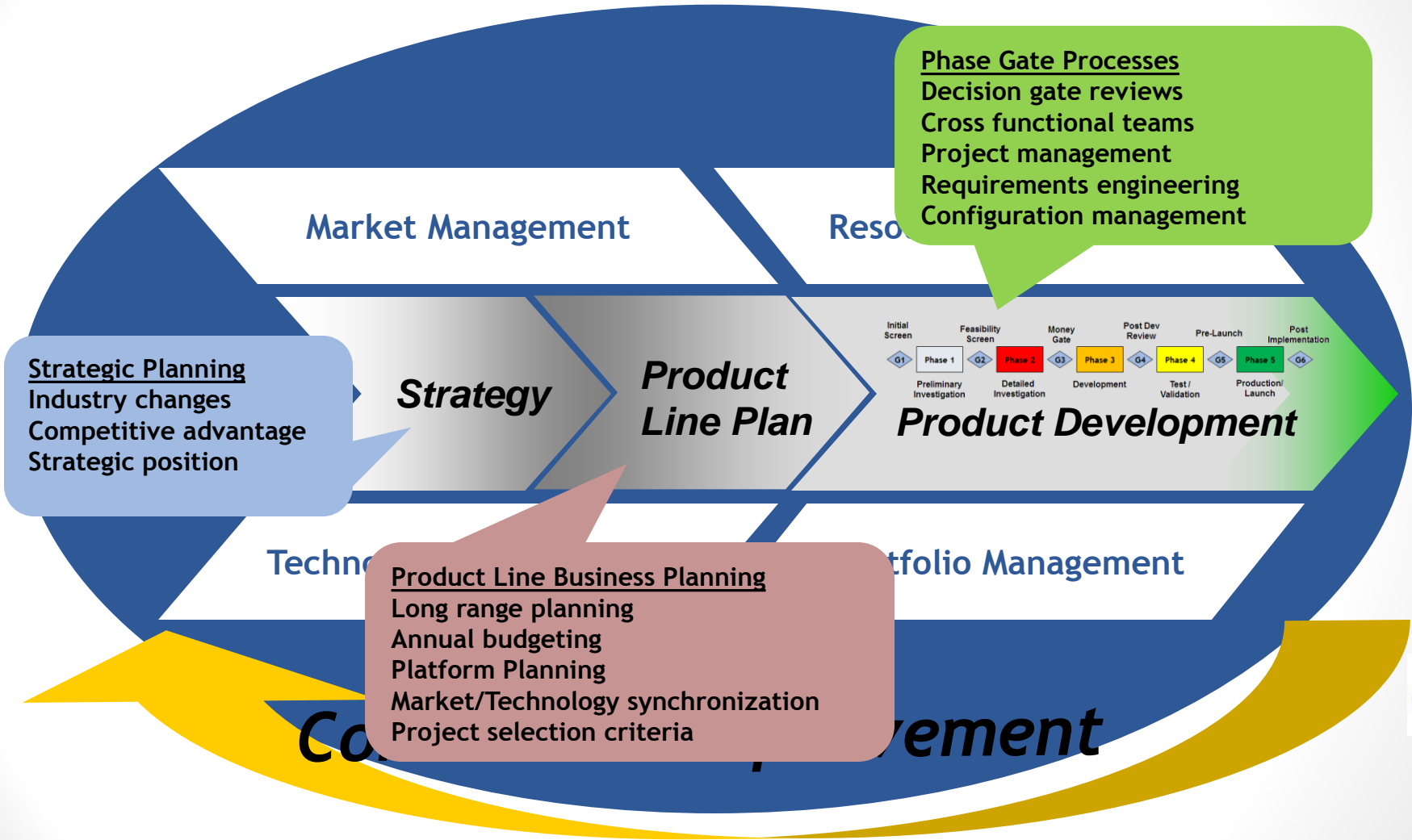


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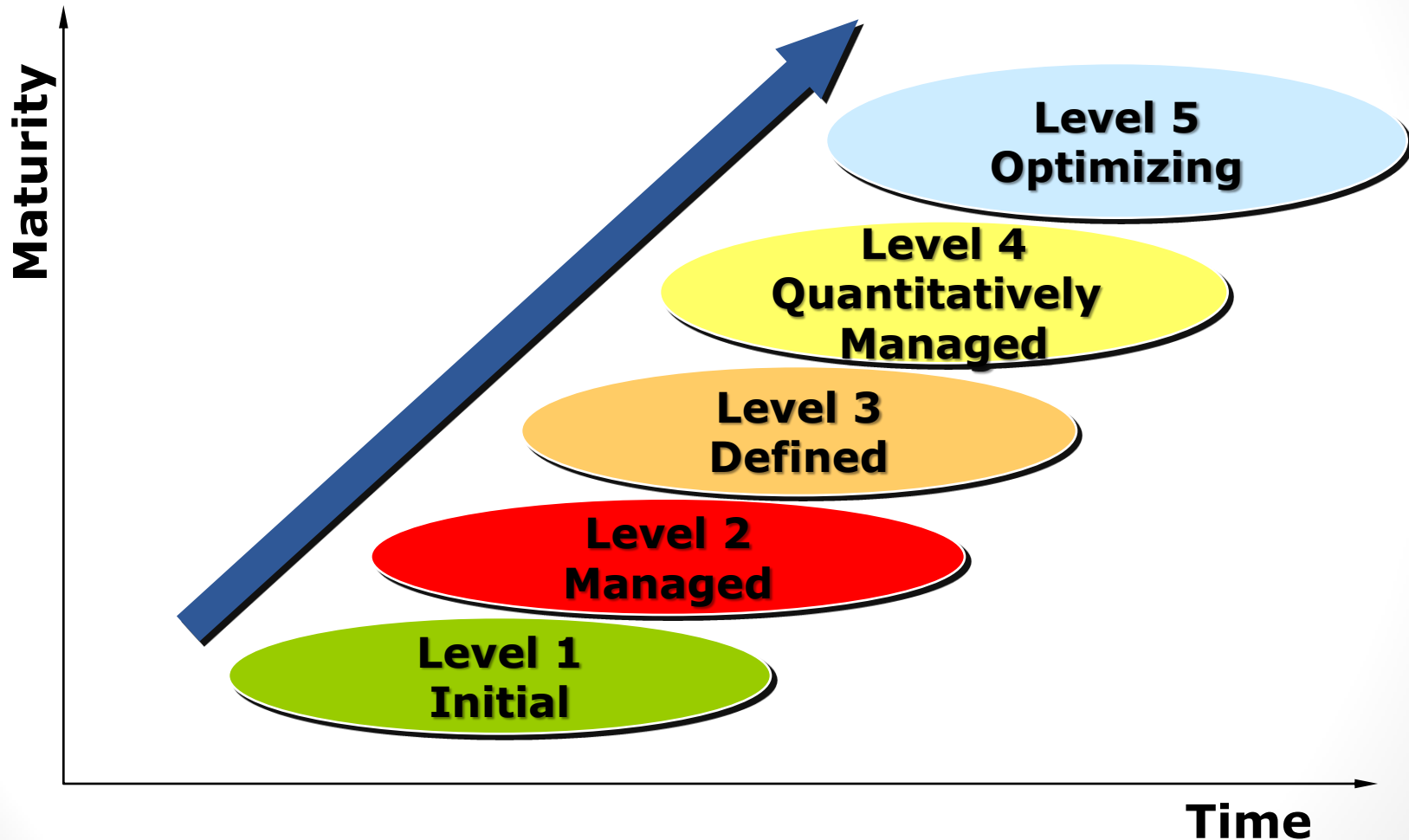
- **President, Leap Innovation LLC and The Alternative Board Valley of the Sun**
- 28+ years of experience in engineering, manufacturing, quality and product development
 - Intel Corporation - 18 years
 - Salt River Project – 6 years
 - Orbital Sciences and Sandia National Labs
- Product Development Subject Matter Expert
 - PDMA-Certified New Product Development Professional
 - Former Book Review Editor for JPIM
 - APQC SME for 2008 Study “New Product and Service Innovation: Improving Front-End Effectiveness”
 - Founder and President of Arizona Chapter of PDMA
 - PDMA VP of Association Development
- RAB-Certified Quality Management Systems Auditor
- TAB-Certified Facilitator and Strategic Business Leadership-Certified Coach.
- MBA from U of A, MSEE and BSEE degrees from NMSU



Framework for Product Innovation



Capability Maturity Model Integrated



What maturity level is your company?



New Product and Service Innovation: Improving Front-End Effectiveness

**A Consortium Benchmarking Study
Knowledge Transfer Session
November 12-13, 2008**



Subject Matter Expert Perspectives

Donovan Hardenbrook, Principal Consultant,
Hardenbrook Consulting

Stephen Wunker, Senior Partner, Innosight



Best-practice Partners

- > CSC
- > Ethicon Endo-Surgery Inc.
- > Kennametal Inc.
- > Kraft Foods Inc.
- > Shell International Exploration & Production

- > Cemex Inc. (Data Partner only)



General Observations

- Diversity of best practice partners and sponsors
- Innovation processes & tools have matured
- Business needs driving innovation intensity
- On-going process of learning and improvement

Presentation of Key Findings - Part 1

- Take a portfolio approach to the front-end of innovation
- Manage different types of innovation differently
- Keep it simple and get people engaged
- Evaluate ideas through the lens of the customer, both internal and external.
- Strive for fast execution of ideas and/or rapid prototyping.

A TACTICAL VIEW: ONE SIZE DOES NOT FIT ALL

BEST PRACTICES

- Link execution to strategy
- Develop appropriate stage gate process
- Separate breakthrough from incremental innovation
- Nurture emergent innovation
- Kill innovation projects when they lose viability

SIMPLICITY AND ENGAGEMENT BEST PRACTICES

- Actively engage external stakeholders and expertise
- Develop user-friendly ideation processes
- Use subject matter experts versus idea submitter for due diligence

PUT YOURSELF IN THE CUSTOMER'S SHOES

BEST PRACTICES

- Engage customers early in the innovation process
- Use ethnography to uncover customer needs
- Develop use cases / usage models to gain better stakeholder insight

Best Practices

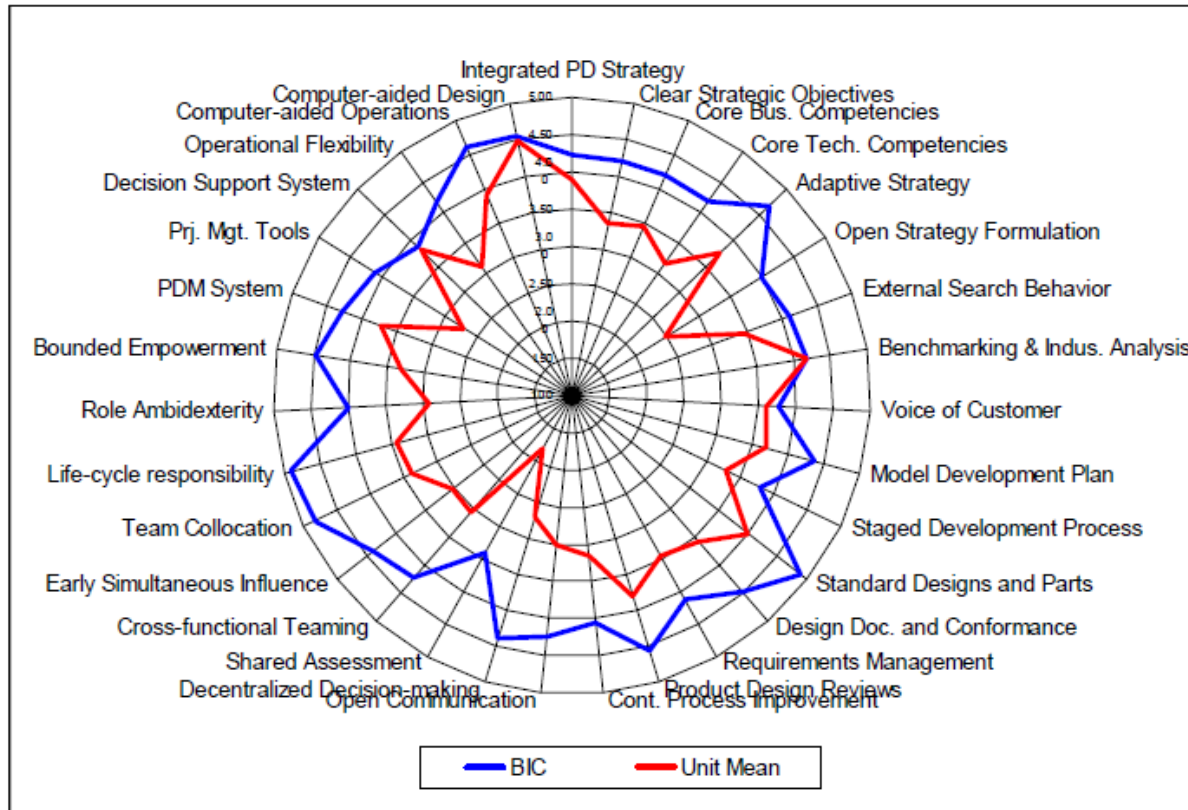
- Provide quick access to funding and resources
- Use prototyping to expedite customer feedback and learning
- Make execution timely so the value of the innovation can be determine quickly

Survey of Best Practices



Birdseye View

Benchmark Gaps for 31 sets of Practice Birdseye



Peripheral line is the best score attained in the SPOT databank

- Significant gaps with Best-in-class (B.I.C.) exist in all 31 practices in Strategy, Processes, Organization and Tool categories
- ABC can likely improve cycle-times and reduce product development costs by closing key gaps
- These key gaps are identified below



Overview

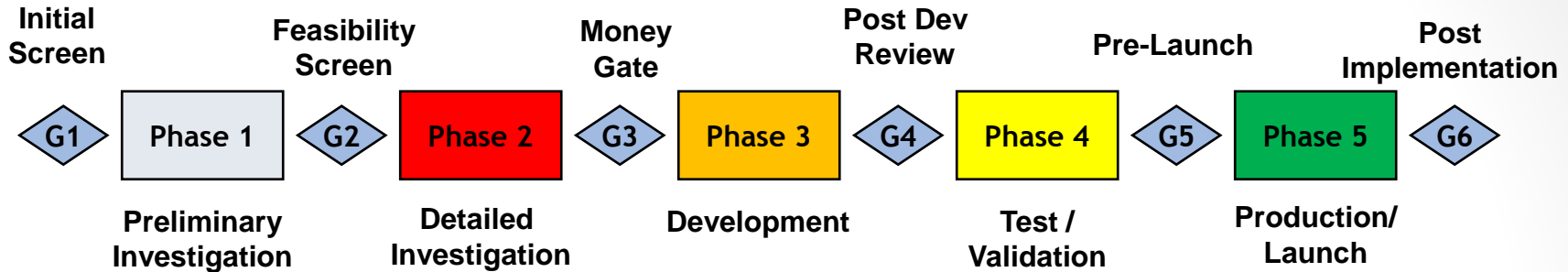
- Process is measured in SPOT Diagnostics by nine sets of practice
- The rank order of the impact of these processes on performances is shown below by the strength of the correlation with performance (measured as time compression, cost reduction, quality improvement and product innovation)

- The top three are the strong drivers of performance lead by Requirement Management
- The use of a Model Development Plan is almost as strong a predictor of performance

.60+
Requirements Management
Continuous Process Improvement
Product Design Reviews
.50+
Model Development Plan
.40+
Design Documentation and Conformance
Voice of Customer
.30+
Benchmarking & Industry Analysis
Standard Designs and Parts
0%
Stage-gate Process



Phase Gate Basic Concepts



Phase 1 – Preliminary Investigation

A product or product family opportunity is evaluated on its market, technology and business merits.

Phase 2 – Detailed Investigation

Sufficient product detail is provided to establish schedule, resource commitments, product and development costs to enable the organization to commit funding and resources.

Phase 3 - Development

The Product Development Team develops the product to meet its product requirements, verifies that it does so, and validates product quality.

Phase 4 – Test / Validation

The Product undergoes product, customer, and/or market testing and evaluation for feedback to determine conformance to requirements.

Phase 5 – Production / Launch

Manufacturing, Sales, Customer Support and Service activities are ramped up to support full product availability across all targeted segments and geographies.



Stage/Phase Gated Process: Benefits

- Zero correlation ($\rho = .0$) measured as time compression, cost reduction, quality improvement and product innovation
- Aligns the organization
 - Standardizes terminology and expectations regarding milestones
 - Consistent execution
- Establishes product development synch points
 - Phased activity with active management review and approval
 - Consistency in content and intent
- Improves discipline and accountability
- Forms the foundation for best practices development and productivity improvements

CAUTION: Necessary but not sufficient!



Stage/Phase Gated Process: Best Practices

- Clear decision criteria for each gate review
- Due diligence by product development team
- Business case revisited through each phase
- Risk identification and mitigation
- Documentation templates



Cross Functional Teams: Benefits

- A positive effect on product innovativeness
- Enhances organization structure
 - Better decision autonomy due to sharing and combining of expertise
 - Teams enjoy shared responsibility for organization's overall performance
- Enhances relationships
 - Social interaction enhances high quality knowledge exchanges
 - Trust reduces time and money monitoring other team members
 - Having similar goals invite sharing more knowledge and reducing conflict

Source: Dirk De Clercq, Narongsak (Tek) Thongpapanl, Dimo Dimov, A Closer Look at Cross-Functional Collaboration and Product Innovativeness: Contingency Effects of Structural and Relational Context, Journal of Product Innovation and Management, 28 (4)



Cross Functional Teams: Best Practices

- Co-development partnerships
- Concurrent product creation process
- Co-location
- Matrix project teams
- Team stays intact concept to launch



Requirements Engineering: Benefits

- A positive correlation of ($\rho=.60+$) measured as time compression, cost reduction, quality improvement and product innovation
- Improved customer satisfaction
- Reduces risk
- Decreased time to market
- Better product quality



Requirements Engineering: Best Practices

- Define products by the job that needs to get done
- Stories and Use Cases
- Planguage
 - An informal but structured keyword-driven planning language created by Tom Gilb. It can be used to create measurable, concise requirements and design statements.
 - The basis for both functional and non-functional requirements specification
- Requirements Management Tools
 - Requirements are too hard to manage in Excel
- SQC Based Reviews



Voice of Customer: Benefits

- A positive correlation of ($\rho=.40+$) measured as time compression, cost reduction, quality improvement and product innovation
- New customer insights



Voice of Customer: Best Practices

- “Experience Economy”
- Ethnography
- Lead Users
- Use cases



Continuous Improvement: Benefits

- A positive correlation of ($\rho=.60+$) measured as time compression, cost reduction, quality improvement and product innovation
- Reduced waste
- Improved product quality
- Reduced rework time
- Improved cycle times
- Becoming more competitive by driving down costs
- Retaining/gaining customers through innovative products and services



Continuous Improvement: Best practices

- Lean product development
- Failure Effect and Mode Analysis (FMEA)
- ISO 9001 certification
- Business process management



Corp A: Dramatic Improvements in Innovation and Profits

- **Concurrency Product Creation:**
 - They adopted a strategy of rapid, reiterative product introductions
 - They introduced a disciplined, but flexible PD processes and trained everyone in the company
 - They organized cross-functional product development teams with four critical functions always present: engineering, manufacturing, procurement, marketing
 - They adopted integrated tool sets, e.g., Pro-E, Wind-chill
- **Performance Improvements (1998 and 2004)**
 - Increased its sales from new products less than 12-months old from 3% to over 10% at higher margins.
 - Increased its sales of new products less than 36-months old from 8% to over 25% at higher margins.
 - Introduced over 100 truly new products annually.
 - Received 8 Business Week/IDSA awards, putting it in the top 10 among all companies in the period.
 - Bolstered by new product introductions, experienced increased sales revenue while competitors' sales declined from 10%-15%.



Company B:

Reduction in Late-stage ECN's

Problem: Too many late stage engineering change notices originated by customers.

Actions Taken:

Intra-company User Group participants met to prioritize gaps for closure and brainstorm ways of reducing late-stage ECNs. Over the next five months, one business group implemented the following concurrency practices:

1. Involved more marketing staff in product design reviews
2. Had engineers accompany marketing on sales calls, but with the norm of “don’t promise them anything.”
3. Improved communications between marketing and engineers by early, incremental information sharing.

Result: Customer originated changes were reduced from 26 to 3 over a period of 5 months. Estimated cost savings was several million.



Company C:

Integrated Voice of Customer in Design

Problem: Product development teams were sticking with traditional designs in a changing marketplace. Their principal competitor launched a new product that reduced Company C's market share by 30% within 4 months.

Actions Taken:

1. Systematically adopted concurrent methods of product development:
 - Linked PD processes with ISO
 - Improved requirements management
 - Integrated development with marketing, etc.
 - Introduced QFD and related practices for integrating VOC into designs.

Result: Reestablished their market share with new product introductions.



Best Practices Summary

- Establish a stage/phase gate framework to develop your processes around
- Focus on continually improving core product innovation systems and processes
- Work on processes that have positive impact on product realization
- Look outside your industry for best practices



Questions?



Thank You!

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Resources

- New Product and Service Innovation: Improving Front-End Effectiveness
 - <http://www.apqc.org/knowledge-base/collections/new-product-and-service-innovation-improving-front-end-effectiveness-coll>
- Strategy Research Group <http://srgtime.com/>
- Product Development and Management Association <http://pdma.org>
- *The PDMA Handbook of New Product Development, 2nd Edition*, Ken Kahn, Oct 2004
- *New Product Development For Dummies*, Robin Karol & Beebe Nelson, May 2007



Proposed Monthly Workshop Topics

Manufacturing

- Product Portfolio management
- Implementing New Product Development Processes
- Requirements Engineering
- Business Process Mapping
- Supplier Performance Management
- ISO 9001 certification
- Internal auditing
- Factoring
- Outsourcing
- Disaster Recovery

General

- Marketing your company
- Developing a sales process
- Strategic Planning
- Using Social Media
- Time management
- Job Benchmarking
- Behavioral job interviewing
- Behaviors and Motivators

