



VIEWPOINTS ON INNOVATION

BETWEEN THE GATES:
**PRACTICAL TIPS FOR
NEW PRODUCT DEVELOPMENT**

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Between the Gates: Practical Tips for New Product Development

Like a rugby scrum, new product development works best when participants bind together to move towards the same goal. On the new product development field, gated processes are supposed to clarify team roles and help companies meet innovation expectations. Noel Sobelman brings his experience to bear to help us understand what's really needed to plan, monitor, and successfully execute product development projects. In other words, practical tips for what happens "between the gates".

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Between the Gates

by Noel Sobelman

Gated development processes have been around for over 25 years now and I rarely come across a company these days that does not have some form of a gated process in place. A gate review process, when well implemented, allows leadership to evaluate projects from a business perspective at critical junctures, leaving day-to-day project execution to an accountable project team. Then why are so many of these same companies falling short of their innovation goals?

Kalypso conducted a study of 30 companies across multiple industries and found that, while all claimed to have a gate review process in place, few went very far beyond a list of phase objectives and deliverables. Their project teams lacked sufficient guidance and tools needed to plan, monitor, and successfully execute product development projects. They were missing the “how”. In other words, guidance on what happens “between the gates”.

Vol. 1: Opportunity Proposal Development Practical tips for new product development

An opportunity proposal, sometimes referred to as a project charter, is an initial analysis of a proposed product’s business opportunity, the proposed project’s scope, and the rough plan to deliver it. It is created in what most companies call their “concept phase”. The ultimate objective of this first step in the development process is to determine if the proposed new product concept warrants investment in full product definition and project planning activities.

Sounds simple, right? Well, not so fast. Most of the companies we studied get “wrapped around the axle” when defining this seemingly straightforward step. Typical frustrations include:

- How can you expect someone to come up with a market projection or project plan before the product concept is fully defined?
- Where does idea generation end and opportunity proposal development begin?
- How do we know if the product concept is technically feasible?

Here are some practical tips for concept champions or project teams who want to improve their opportunity proposal development.

1. **Avoid the temptation for too much detail.**
Successful companies balance the desire for market and project plan detail with the need to move quickly and with minimal resources during the concept phase. This way, they can evaluate more opportunities and quickly narrow to those that rise to the top and fit the business strategy without spending too much money or taxing too many of their scarce resources. How is this accomplished? The data in the opportunity proposal should be based on assumptions. The focus of the concept phase gate review is on key business case and customer need assumptions and the plan to validate those assumptions during the subsequent project planning phase. The opportunity proposal, should it get approved, evolves into a fully validated business case during the project planning phase.
2. **Establish clear phase entry and exit criteria.**
The line between idea generation and opportunity proposal development is fuzzy in many organizations. This fuzziness can lead to lots of front end churn, confusion over which ideas have been funded, and worse, “skunk works” side projects that consume scarce resources. Establishing a formal project selection process that defines who decides, when, and how projects are initiated and funded, will help eliminate the front end confusion. Some companies include project selection as part of a quarterly portfolio review where product line roadmaps and development capacity are also examined. Others have stand-alone project selection meetings cadenced by the capacity of the development pipeline’s front end. Whichever approach you take, the difference between a funded opportunity and an idea needs to be clear to everyone in your development organization.

3. **Separate technology development from product development.** Companies must ask themselves whether or not a potential concept is technically feasible. Technology uncertainty adds risk to your project schedule. While technology uncertainty may be unavoidable, it can be managed by separating technology development (i.e., invention or discovery) from product development and building a technology assessment step into the front end of your product development process. In doing so, you can avoid entering full-scale development with unpredictable technologies that have not yet been reduced to practice. If too much “invention” is done during development, the uncertain timing makes scheduling difficult, leading to missed launch windows. The earlier you can identify potential “show stopper” technologies the better (i.e., fail fast). At a minimum, you should assess the status of required core technologies relative to agreed-upon performance thresholds as part of opportunity proposal development.

A well-defined opportunity proposal development process addresses the most common frustrations and questions. It provides just enough information on the market size and strategic fit without spending excessive time and money, establishes clear concept phase entry and exit criteria, and sets the wheels in motion to answer the technical feasibility question early on.

In future volumes of *Between the Gates*, we will take a look at other key steps in the product development process, including product requirements generation, beta test planning and execution, and market introduction planning.



Vol. 2: Product Requirements Practical tips for new product development

The primary objective of product requirements development is to translate customer and user wants and needs into a definitive description of new product capabilities. The most effective product requirements describe the product's functions and attributes using unambiguous language with terminology that is meaningful to the customer or end user. The resulting document is used to guide the development effort and ensures that the resulting product matches the intended requirements.

Three common problems companies face when developing product requirements include:

- Viewing product requirements solely as a marketing responsibility
- Jumping too quickly to solutions before fully defining the product
- Changing requirements late in the development cycle

Here are some practical tips for project teams who want to improve product requirements development.

Develop Product Requirements Cross-Functionally

While the marketing project team member is responsible for obtaining and synthesizing market, customer, and competitor information, he or she cannot create requirements in a vacuum.

Effective product requirements development requires a careful balancing of customer needs against technical, market window, schedule, product cost, production, and resource considerations. A cross-functional team, including operations, engineering/R&D, quality, and customer support, should work together to evaluate alternatives, prioritize requirements (e.g., must-haves vs. nice-to-haves), and conduct the inevitable trade-offs that come with requirement generation.

Avoid the Temptation to Jump too Quickly to Solutions

Product requirements focus on the "what" of the development effort. Teams need to avoid the temptation to jump too quickly to the "how". While it is wise to think through alternate design approaches and to conduct proof of concept studies in conjunction with product requirements development, starting detailed design activity before requirements are nailed down can create unnecessary churn and add significant risk and delays to the overall development cycle time.

Well-written requirements are stated in a way that clearly differentiates the "what" from the "how". They are clear, concise, complete, and measurable.

They avoid vague, subjective, over-generalized, or incomplete statements (e.g., avoiding words like "similar," "easy," "at least," and "should").

The following is an example that shows the cascade from the customer's voice to a well-written requirement:

Customer Voice:

“I’m very busy. I want to start my patient’s IV and move on...”

User Need:

Nurse sets up IV in minimal time

Product Requirement:

IV system is set up within 30 seconds of initial interaction

Avoid Late Stage Changes

Nothing slows down product development cycle times more than late-stage changes to product requirements. With every significant change comes the potential for re-design, re-test, and in extreme cases, re-tooling. That said, sometimes changes cannot be avoided. Changes to product requirements can be driven by a variety of factors, including shifting market conditions, changing customer needs, and unanticipated competitor moves.

Project teams can minimize these late stage changes with a robust front-end process for validation of market and product requirements. This should include frequent customer interaction, rapid prototype development and test, market and competitor scenario analysis, “should cost” analysis, and the use of tools, such as quality function deployment (QFD), product roadmapping, and conjoint analysis to gain a clear understanding of perceived customer value.

Product requirements development is the central, integrative step that brings together all functions that touch the product development process and, done well, will set the stage for effective full-scale development and in-market success.



Vol. 3: High Level Design Practical tips for new product development

High level design, sometimes referred to as system design or design architecture, is the first step in developing a solution to address the functions and features described in the product requirements. If the product requirements describe the “what,” in terms meaningful to the customer, the high level design begins to describe the “how” in terms meaningful to the engineer, industrial designer, scientist, or manufacturer who is tasked with creating a producible solution.

Of the companies we studied, most struggled with three aspects of high level design:

- How to do it well
- Where it fits in the product development process (relative timing)
- How much or how far to take the high level design before beginning detailed design

How? Incorporate a System Approach

High level design starts with an analysis of the preliminary product requirements. Different design approaches are considered as you start to define how functional and other product attributes map to a system, product architecture (platform architecture in the case of new platform development), or formulation that is further divided into subsystems (or ingredients in the case of a formulation or drug). A design approach is described from a system point

of view before being broken down into subsystem definitions. Throughout this process, you might develop system simulations, performance budget calculations, subsystem interaction analysis, technology feasibility assessments, and early customer interaction through use of rough prototypes. This is also the place to begin reviewing manufacturability, reliability, testability, serviceability, and product cost requirements.

Companies who incorporate a system approach will lay out a high level design that provides leverage for multiple product generations. Thinking strategically about those common design elements and the core, differentiating technologies (or chemical compounds) that carry forward from product to product can yield substantial R&D productivity, cost, production, and market benefits.

Where? Develop in Conjunction with Product Requirements

It is not wise to develop a set of product requirements without considering solution alternatives. As stated in *Between the Gates, Volume 2*, effective product requirements development requires a careful balancing of customer needs against technical, market window, schedule, product cost, production, and resource considerations. Creating a high level design in conjunction with product requirements allows development teams to assess the inevitable trade-offs that come from different design approaches. The knowledge gained from high level design will impact the feature and function requirements described in the product requirements document. At the same time, the relative importance of product features and functions will impact the design approach. For this reason, we recommend starting high level design in the early stages of product requirements generation - after a first draft is complete - and working through both of these highly interdependent steps in together.

How Much? Understand Trade-Offs, Set Guidelines and Leave Room for Judgement

The “how much” question is the source of endless debate in many organizations. The engineer being held accountable for a delivery schedule will want to work with the detailed design while the marketer ultimately responsible for ensuring that the product meets customer needs will want to conduct additional primary research to validate attribute preferences. If too much design work is completed before the product requirements are validated and locked down, companies run the risk of having to re-do the design. Successful companies understand the trade-offs involved, employ a clear set of guidelines for high level design scope, and leave room to the judgment of an informed cross-functional project team.

High level design is another central, integrative step that takes place prior to full scale development. Companies that do it well understand the interdependencies with product requirements development and are able to make appropriate trade-offs, giving project engineers, industrial designers, scientists, and manufacturers with a path to an easier solution.



Vol. 4: Beta Test Basics

Practical tips for beta test design and management

What value can beta testing provide in a company's new product development process? How should test programs be designed and managed to maximize strategic business value? How far along should a beta product be before being sent to customers?

Most would agree that the primary purpose of this test (a customer-conducted test of a pre-release product in user environments with real-life workloads) is to learn about end-user acceptance of the product. However, beta testing can be much more strategic, and has the potential to deliver business value throughout the product development process. Leading companies include market message evaluation, customer support readiness assessment, pricing strategy confirmation, product packaging and out-of-box experience assessment, and set-up instruction clarity as part of their beta test objectives.

How can you better define and maximize the value of your beta tests?

Understand the Purpose

The purpose of beta testing falls into three major categories. Companies should understand which category or categories are most important to them as a starting point, and which category to expand into.

Product Function:

Does the product do what it was designed to do? While most firms do extensive alpha testing (i.e., in-house testing), they recognize that the demands put on the product by external users cannot always be anticipated or realistically simulated in-house. In addition to a basic functional check, data can be obtained on customer-desired refinements. Even if launch pressures restrict late stage changes to minor design modifications or "bug" fixing, more significant improvements should be passed on for incorporation into the next generation of the product.

Product support/marketing:

Are we ready to support and promote the product with sales channel training, end user documentation, marketing, and other support elements? Beta testing should be used to ensure that all customer support processes are in place and the call center is ready to receive customer calls prior to full-scale production.

Data from beta testing can also help to determine or confirm the product's optimal market positioning, target market selection, and even introductory pricing. This is particularly important when serving multiple market segments or sub-segments. Beta testing with a diverse set of users in different regions can provide market data specific to targeted segments.

Sales promotion:

Have we gained feedback that will improve channel and customer relationships and help us promote the new product? A successful beta test reduces uncertainty about the new product and has the potential to increase publicity. Positive beta test results with key opinion leaders can provide influential testimonials. Using a prestigious company as a beta tester is a good way to legitimize the product. This is especially important for new, complex products.

Beta testing is most valuable when:

- Potential applications of the product are not fully understood
- Users are heterogeneous
- Alpha testing is unable to guarantee a “bug-free” product
- Decision-making for the purchase is complex
- Opinion leaders have a high impact

Tips for Maximizing the Potential Business Value of Beta Tests

Freeze product design prior to beta.

Other market research methods provide a better and timelier input into the design phase of development. For example, early prototype testing is useful for new-to-market, disruptive products. Less disruptive products can have their requirements’ definitions validated via less costly means, such as surveys or focus groups. Most practitioners agree that beta testing should be done only after detailed alpha testing is complete. Rushing a beta product with too many bugs or design deficiencies can cause problems with customer relationships and create negative publicity.

Identify the full set of possible benefits from your beta test.

Product Managers should explicitly set out the purpose of a beta program during test planning. These purposes may not be the same for every test site and, therefore, will influence decisions on the number and type of sites, data collection approach, and information dissemination to development team members.

Recognize market segmentation and make beta testing a close approximation to real-world experience.

If all potential users will use the product the same way, it is easier to understand and replicate the use in-house. This means that the basic functioning check can be done through alpha testing while beta testing serves a marketing or commercialization purpose. Testing for a full range of applications may require a large number of sites in different market segments.

Grow the number of beta sites over time, beginning with sophisticated customers where a good relationship exists.

Beta testing with too few sites means that feedback data may not be representative of the entire set of product applications. Testing with a large number of sites increases the burden of managing information flow (and risks customer relationships if the product turns out to have more bugs than anticipated). Some companies manage beta site activity using a team headed by marketing and also including engineering, documentation, and customer support functional representatives. This group sits between customers and developers to act as a buffer, prioritizing fixes so developers can stay focused. In most situations, however, it is not recommended to have a filter between the design team and customers. Rather, it is better to begin with a small number of beta testers, growing the number over time as uncertainty is reduced.

Ideal early testers are those who place a high value on receiving the new product early, have good relationships with your company, use the product in a non-critical application, and are technically sophisticated. These characteristics mean that the test site will be more willing and able to find bugs and report them quickly. Best of all, even if an issue affects a key component of their business, the customer relationship will not be destroyed.

Keep testers engaged and actively monitor beta product performance.

The relationship with testers needs to be such that the sites will take the initiative to immediately report bugs. Some companies have achieved this by compensating beta test sites for their contribution.

Successful companies make weekly contact with testers to understand ongoing status. Regular contact helps customer relationships and can quickly indicate whether the test should be terminated or expanded. A formal beta test report is useful for testimonials and passing on next-generation product enhancement requests.



Vol. 5: Market Launch Planning & Execution Practical tips for new product development

For many in the marketing function, planning is a four-letter word. “Fire, ready, aim” is the common mantra for the left-brained creative types who would rather walk a bed of nails than sit through a project schedule review.

Here’s what leading companies are doing to overcome this traditional culture clash, ensuring tight launch coordination and improved in-market success.

The primary purpose of market launch planning and execution is to prepare a product launch plan that produces a successful market introduction and to carry out that plan. The plan should address market communications and promotion, channel strategy, pricing, and sales support, among other awareness and demand generation activities.

Market Launch Planning

A successful product launch requires extremely tight coordination between marketing-driven tasks and other, interdependent steps in the new product development (NPD) process, including supply chain development, customer support process development, and production ramp-up. For example, supply chain and manufacturing ramp are highly dependent on user documentation, packaging artwork, and product announcement timing. A delay or missed handoff between any one of these steps can lead to late stage “fire-fighting” and missed launch windows that will impact the success of the market introduction.

Market launch planning begins by identifying key product benefits and marketing messages. Those messages should be tested with channel partners, key industry influencers, and lead customers before being refined. At the same time, strategies are developed for product pricing, communications and promotions, distribution, and sales support.

Plans to carry out those strategies are then formulated and communicated to the full marketing communications team and broader project team.

Examples of market launch plan elements and their cross-functional dependencies include:

Market Launch Plan Elements	Downstream Dependencies
Identify pricing objectives and anticipated pricing changes for each distribution channel or customer tier	Downstream dependency: Project business case, sales collateral development
Create communication and promotion plans, including product packaging, product announcement, trade show preparations, product demonstrations, advertising, and marketing collateral	Downstream dependency: Manufacturing and supply chain development, beta test, regulatory or agency approvals
Identify distribution channels with forecasted sales volumes for each	Downstream dependency: Manufacturing and supply chain, sales, project business case, channel, and end customer training and support

Market Launch Execution

Execution tasks include the preparation of marketing communications material, sales, channel, and customer support training, and ongoing refinement of all customer facing materials based on early market feedback. Packaging and promotional material development needs to take into account long lead time items such as artwork creation and regulatory or agency approvals.

Packaging, data sheet, and press release claims need to be updated to accurately reflect product performance characteristics (which may not be confirmed until final product qualification). Sales, channel, and customer support training sessions need to be scheduled and conducted with up-to-date marketing collateral and sales documentation. You get the idea—lots of interdependent, tasks with task owners spread across multiple disciplines.

Leading companies make use of early product demonstrations in front of friendly lead customers or industry influencers to gain testimonials that can be used in marketing collateral to boost demand. Once all the input from these sources, **beta testing**, and the latest market data is collected, the team can make any last-minute changes to key messages, finalize pricing, and fine tune the forecast and production schedule.

One common mistake many companies make when launching a new product is to begin project wrap-up activity just after the first revenue-producing product is shipped. Leading companies keep the core project team engaged through volume production. This is when agreed-upon, stable manufacturing criteria are achieved and early channel and customer feedback is incorporated in the form of product and customer support enhancements.

This approach also keeps the focus on in-market results. After all, success is ultimately defined by results, not by shipping the first product.

Planning and executing a market launch is a multi-faceted undertaking that requires tight coordination across all functions involved in development. In the planning phase, marketing team members must work with the full cross-functional project team to understand critical task dependencies and hand off points. With strong upfront planning, there will be fewer late stage surprises and market introductions will have a better chance for success.



Vol. 6: Resource Management Practical tips for new product development

An overloaded development pipeline is one of the **chronic problems** companies are faced with today. Virtually every company experiences it, but most struggle with how to deal with it.

This viewpoint explores **where** resource approval decisions are made, **who** makes those decisions, **how** the decisions are executed, and **why** it is so important.

Where and Who

Phase reviews are an ideal forum for making resource allocation approval decisions. When a cross-functional governance team says “yes” to an investment decision to continue funding a promising project, they are, at the same time, saying “yes” to the staffing plan the project team proposes. Think of it as a two-way agreement - the governance team approves allocation of the staff the project team needs and, in return, the project team commits to deliver to the objectives of the next development phase. For this approach to work well, it requires some upfront work. That’s where the “how” comes in.

How

In advance of the phase review, project teams work with functional managers (or dedicated resource managers in larger organizations) to negotiate staffing plans taking development portfolio priorities and downstream constraints into consideration. Spreadsheets or enterprise planning tools, such as product portfolio management (PPM), are great for this type of analysis, providing aggregate demand and capacity visibility by function, role, and skill set. They also enable powerful “what if” analysis where different scenarios can be analyzed. By the time the team gets to the phase review, they can confidently stand behind their proposed staffing plan and be prepared to answer any resource allocation questions that might come their way. This allows the phase governance team to focus on the decision at hand.

Why

Growth through innovation is on the mind of virtually every corporate executive. However, most are extremely cautious when it comes to hiring to expand development capacity. Instead, they are turning to improved development productivity to increase innovation throughput. Some are taking the additional step to reshape the mix of their development portfolios, balancing incremental innovation with enough breakthrough products to move the growth needle. Regardless of which approach you take, a disciplined resource management capability with a tight linkage to your phase gate process is a must.

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Noel has led several high profile product development programs that have received national recognition, including the USA Today/Rochester Institute of Technology's Quality Cup, PC Magazine's Editors Choice, PR Week's "Best High Tech Consumer Launch", and CNET's "Best of CES" awards

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