An Adaptive Approach to Product Development: Exploratory PD® (ExPD)
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The challenge of product development

The most fundamental challenge in product development is uncertainty—including the risk it creates and the potential for loss.

As developers, we try to read the market correctly. But even if we are right today, how can we know whether the market will remain stable while we’re developing the product? During that time, the competition could render our product obsolete. The technology might not work the way we predict. Or our product could be adversely affected by future regulatory changes.

Changes in factors beyond our control tend to happen too quickly and unexpectedly for our product development systems to cope. This paper discusses the state of product development (PD) processes and offers “Exploratory PD®” (ExPD) as an alternative approach that is better suited to today’s environment.

Product development is not a closed system. It is affected by external and internal forces requiring the system to be adaptable.
An adaptive versus structured (phased-and-gated) approach

ExPD is an adaptive approach that explicitly identifies and drives down the risk that can result in product failure. By organizing activities focused on resolving the most important risks, it readily adapts to the nuances of each project as it evolves over time, while eliminating unnecessary activities and paperwork. This translates into speed.

Phased-and-gated processes seek to control risk and ensure that the appropriate work gets done through a structured sequence of prescribed activities, deliverables, and decisions. They also attempt to minimize risk through significant up-front planning by setting a clear scope, objectives, budget, and timeline.

The highly-defined and structured nature of the phased-and-gated approach has 6 major drawbacks:

- **The structure encourages practitioners to fill out documentation with little thought about what they are doing and why.**
- **The sheer comprehensiveness of the activities and documentation can lull managers into a false sense of security that all bases are covered.**
- **A standardized process does not anticipate the unique nuances of projects and will miss potential risks.**
- **Managing according to a prescribed set of activities is problematic when it can’t adjust appropriately to surprises like a major change in the market or technology.**
- **There are typically different process paths depending on product type: full process for new products, light process for revisions and research process for unproven technology. Managing and integrating multiple processes has proven to be very difficult for our clients.**
- **Creates multiple batches that slows down the overall project. Two major sources of batches include phase activities with documentation, and gates.**
Early definition is like using a road atlas to plan and manage a trip. The route is predetermined, and travelers have little ability to modify the route if they encounter road construction or traffic along the way. Delays become a surprise and are difficult to deal with.

ExPD is an adaptive approach and operates like waze®. waze® is an app that plans a driver’s route based on experience and current conditions. Throughout the trip, it continuously monitors road conditions ahead, using real-time feedback. It can evaluate alternative routes and make a recommendation when it identifies a better route. The process is adaptive and learns how to deal with surprises quickly and easily. Most importantly, users end up taking the quickest route to their final destination.
In spite of its shortcomings, the phased-and-gated approach remains appropriate for companies that are in a stable environment and need structure and guidance. We are very familiar with this methodology, and we have more than 25 years of experience consulting and training with companies on how to use it. In fact, our familiarity with the phased-and-gated process is what has enabled us to see how product development can be done differently. The result is ExPD.

ExPD is a two-pronged approach to improving product development. First, ExPD treats product development as a system, whose elements are all fully integrated. Second, it offers a fundamental redesign of the development process that adapts to each project by reducing uncertainties and risks, and leveraging new information.

Product Development Systems Map
The following two examples highlight the key differences between ExPD and the phased-and-gated process.

**Situation 1:** A project team within a large wind turbine manufacturer was asked by senior management if they could build a specialized rotor blade that would be the biggest they had ever built.

**Scenario 1: Exploratory PD® (ExPD):**

At the beginning of the project, the team identified and evaluated the biggest project risks and uncertainties. How to ship to customers was the biggest unknown.

In order to resolve the uncertainty associated with blade shipment, the team built a prototype based on the blade’s expected dimensions and weight and determined shipping feasibility.

**Approximate time:**

2-3 weeks to build and test the shipping prototype

**Scenario 2: Phased-and-Gated Process**

The project team starts in the early phases to determine if the project is commercially and technically feasible. If the project appears to be feasible, it then proceeds to development. Extensive paperwork is filled out within each phase by multiple departments. Operations then determines if the specialized blade can be shipped during the verification & validation phase.

**Approximate time:**

3-5 years

What happens if they can’t ship the blade?

In **scenario 1**, you lost **2-3 weeks** prior to a significant investment in the project.

In **scenario 2** (Phased-and-Gated), you lost **3-5 years** with significant resource investment and opportunity cost.

**Key takeaway:**

Minimize uncertainty by identifying risks at the onset and throughout the project.
Situation 2: A product manager proposed a new smart product that would incorporate software into a mature product category. The application of smart technology was new to the category and new to the business unit (BU).

Scenario 1: Exploratory PD® (ExPD):

At the beginning of the project, a cross-functional team identified and evaluated the biggest project risks and uncertainties, and presented these findings to senior management.

The biggest uncertainty was caught by the VP of Engineering. In fact, it was a deal breaker. If they didn’t get buy-in from another BU with resources to deliver on the technology, they would have to kill the project.

The VP checked with his counterpart in the other BU to determine interest and resource availability in co-developing the product. Approximate time: 1 hour plus a little kibitzing on the football game.

Scenario 2: Phased-and-Gated Process

The cross-functional project team begins by evaluating commercial and technical feasibility. The team prepares and delivers project documentation for each gate: Discovery, Scoping and Business Case. The gatekeepers then spend time evaluating these documents.

Not until the Business Case phase does the project team and management start to determine project resources for the next phase, Develop. At that time, they discover that software resources from the other BU are critical, and unofficially ask for help.

Because the project has not been on the other BU’s radar and it competes with the BU’s own near-term projects, they get a lot of resistance. The project significantly stalls, and now they have to consider killing the project.

Approximate time: 6 mo – 1 yr

What happened? There are a lot of unwritten nuances with projects in product development, and the phased-and-gated process includes prescribed activities that don’t always catch all these nuances. This is especially problematic for this project, because the unique smart technology resources are not addressed until the Business Case phase, when it is already too late.

What happens if there is not buy-in from the other BU for smart technology resources?

In scenario 1 (ExPD), you lost 1 hour prior to any significant investment in the project.

In scenario 2 (Phased-and-Gated), you lost 6 months to 1 year with significant resource investment and opportunity cost.

Key takeaway:

Use ExPD to identify unwritten and unique project risks.
High-level overview of Exploratory PD® (ExPD) and its key features

The phased-and-gated process is a case of the tail wagging the dog. The rigid structure of the process drives the project.

In contrast, ExPD is a case of the dog wagging its tail. It is an adaptive approach that identifies and drives down risk. By iteratively resolving the most important risks, the process easily adapts to the needs of the project.

Figure 1. Exploratory PD®

The ExPD system consists of three segments, identified by the three ORANGE labels in Figure 1. The segments have different purposes and incorporate different approaches, tools, and resources. Meeting the purpose of each segment leads the business from strategy to successful product launch:

**Strategy**
The purpose is to establish a guide for making decisions about which products, markets, and technologies should be pursued.

**Ideas & Select**
The purpose is to generate and collect new-product ideas and to select the best product ideas to pursue.

**Explore & Create**
The purpose is to create a successful new product while reducing the risk of failure and improving time to market.
Segment 1: Strategy

In the Strategy segment, a guide to product development is created. To facilitate this, ExPD uses a framework called the s2m Strategic Framework™, which comprises three pillars: Enterprise, Business Unit, and Product Development (PD). The three pillars are integrated with the execution elements of Pipeline, Process, and Portfolio—together, P³ (Figure 2).

Figure 2. s2m Strategic Framework™

In Figure 2, the Enterprise Pillar includes strategies developed at the enterprise/corporate level. It also includes mission, vision, and values. Enterprise strategies are typically determined by executive management and the board of directors, and are executed across the whole organization.

The Business Unit Pillar includes the business strategy, business model, and innovation strategy. These are typically developed at the business unit level and must be consistent with the enterprise strategy.

The PD Pillar incorporates the market, product, technology/IP, and platform strategies, along with the corresponding road maps. These are typically written by product management, marketing, and engineering, and they support the business unit strategies.
In our experience, companies have struggled with the implementation of their strategies when there is no clear linkage between strategy and execution. The most effective approach we have seen includes linkages between strategies and P3, i.e., the design and implementation of the idea pipeline, product development process, and portfolio management system.

The s2m Strategic Framework should be an adaptive, ongoing, collaborative effort. The approach isn’t necessarily top-down, it is bidirectional and iterative. Senior managers are ultimately responsible for setting the direction through the enterprise and business unit strategies. As the product development strategies are developed and executed, they can provide feedback and lead to changes in strategy at the business unit and enterprise levels.

Similarly, as market intelligence-gathering activities proceed, including the identification of opportunities and threats, the various elements of the strategic framework need to be evaluated and modified. In a fast-changing, uncertain environment, the organization should be ready with a rapid-response process, whereas a slow-moving or more certain environment would call for reviews on a less frequent basis (e.g., biannually).

The s2m Strategic Framework addresses the fundamental principles that product development contends with: doing the right projects and optimizing resource usage. The framework brings clarity to the product development system. The product developer gains a stronger sense of purpose and confidence in reaching decisions rapidly and without extensive debate and politicking. Since there is more certainty around commercial and technical feasibility, projects on the road maps should move quickly through the process.

For more explanation of the s2m Strategic Framework, please visit strategy2market.com/product-development-strategy.
The Ideas & Select segment comprises two sets of activities (Figure 3). Those depicted on the left side of Figure 3 correspond to the generation and collection of ideas. Some product ideas will emerge from the road maps; others will be serendipitous. Located on the right side is the “Select Ideas” activity, which involves evaluating and selecting the best ideas, which then feed into the Prioritization Valve (PV1) for prioritization.

**Ideas**

Some new product ideas are identified and vetted through the strategic planning process and are included in the product road maps. Other ideas are serendipitous, meaning they are unplanned and can come from a variety of sources.

Serendipitous ideas should be encouraged from both internal and external sources. Internal sources might include ongoing programs for gathering market and competitor intelligence, as well as programs that encourage suggestions from employees. External sources of ideas would include programs seeking input from customers, suppliers, and inventors.

All these ideas need to be collected and organized in a database. This is important, because it provides a way to keep track of all ideas previously considered or judged. This will also help you avoid losing ideas and important intellectual property that have been squirreled away on someone else’s hard drive, or, worse still, in the head of someone who has left the company.
Select

The “Select Ideas” process requires that a committee (typically a senior-level, cross-functional team) will review all incoming ideas, whether generated serendipitously or from the road map, to determine which ideas will move forward. There are three possible review outcomes (Figure 4). The **YELLOW** “yield” sign denotes an idea that has been placed on hold. The **RED** “stop” sign shows that the idea has been killed. The curved **BLUE** arrow indicates the project moving forward to PV1, prioritization for the Explore & Create Segment.

The road map only includes ideas that have already been vetted and found to align with the strategy and that meet the approval of senior management. Ideas that do not appear on the road map must be vetted according to those same criteria. Often, the committee will have insufficient information to perform a proper evaluation, but it can still apply appropriate filters to screen out the most obvious “misfit” ideas.

When the committee believes an idea has promise and is willing to allocate time and resources (e.g., people, money, and lab space), it can feed the idea through the Prioritization Valve (PV1), and onward into the Explore & Create Segment for further analysis (Figure 4).

![Figure 4. Prioritization Valve™ 1 (PV1)](image)

The Prioritization Valve provides two benefits:

1. **Timelier resourcing.** Projects are simultaneously prioritized and resourced during the ExPD committee meeting, rather than waiting for resource allocation at the quarterly portfolio meeting. This avoids the common difficulties companies experience when attempting to actively manage projects at the process level while those same projects are resourced on an intermittent basis at the portfolio level.

2. **Match between number of projects and available resources.** Among their prioritization criteria, the committee must consider which of the resources needed to do the work are actually available. If the available resources are inadequate, the committee must place the project on hold. The function of the PV is to control the number of projects in the system and prevent excessive pressure on resources. The ideas are maintained in a prioritized queue, each waiting its turn to be resourced and advanced into the third segment, Explore & Create.
To solve this problem, we implemented a tracking system that would keep management informed of available capacity when prioritizing projects. Matching active projects to resource capacity clarified priorities and reduced priority fluctuations while allowing teams the necessary time to focus and complete projects.
Segment 3: Explore & Create

In the Explore & Create segment (Figure 5), we have three major components starting with 1) Investigate, which includes identification, evaluation and prioritization of assumptions for each project. 2) All projects from Investigate go to PV2 for prioritization and allocation of resources. This is the gateway to 3) the Resolve Loop where the project undergoes resolution of the biggest uncertainties and leads to the development of the product.

Investigate

The Investigate component works to determine the kinds of situations or outcomes that would kill the project, and to identify where a potentially high level of risk will need to be managed. Risk arises from incomplete or missing information and unpredictable future events, both of which affect decision making and may lead to unexpected results.

We recommend that the project team rephrase the risks and uncertainties in terms of assumptions. Rephrasing the risks helps the team develop hypotheses it can test.


The Investigate component involves two major steps:
1. Identification of assumptions, and
2. Evaluation and prioritization of assumptions. The project team starts by identifying assumptions and any deal breakers or showstoppers. A deal breaker is an assumption that, if proven false, will result in killing the project or putting it on hold.
We have built a tool called the Business Fit Framework™ (BFF) that helps identify assumptions based on commercial and technical feasibility and business model fit. We will describe the BFF and other tools in further detail in our soon to-be-released book.

After the cross-functional team has identified the assumptions, the team then evaluates and prioritizes the assumptions in the Assumptions Tracker™. This tool is used by the team during the project to help evaluate, prioritize, and track the riskiest project assumptions.

In the same way as in Ideas & Select (Figure 3), the committee must evaluate all ideas before they enter the prioritization valve, PV2. Some ideas are selected to proceed through the process, and others are killed or put on hold. The purpose of PV2 is the same as PV1, but the extent of resources committed is much greater. PV2 is the gateway to entering the Resolve Loop, where the new product undergoes resolution of uncertainties and includes the actual development of the product.

At PV2, it is especially critical that resource availability be assessed before the committee authorizes a project to proceed in the product development process.

As stated previously, the committee is responsible for providing the project team with the necessary resources, budget, timeline, and tools to achieve the agreed upon Resolve Loop goals and objectives. At the same time, the project team must commit to achieving certain milestones in developing the product and resolving risk.

This commitment is expressed in the Pledge, a written agreement between the committee and project team. The Pledge authorizes the team to make more decentralized decisions without constantly checking back with the committee (following a practice called management by exception). The result of decentralized decision making is improved speed and quality of decisions.

Cross-functional teams are imperative for identifying, evaluating, and prioritizing risk. The most effective teams include disciplines such as engineering, marketing, operations, supply chain, service, and regulatory. They should include members at different levels of the organization: project team members and senior management, as well as a senior fellow (e.g., a chief engineer with extensive experience) to play the role of a contrarian.

Deal breaker example:
A company normally used a vinyl chloride plasticizer to obtain the flexibility and durability required for its product. The project team was aware of an impending European ban of the most common vinyl chloride plasticizers—including the one used by the company. If the team could not find a suitable replacement material, the project would have to be killed. In this case, the deal breaker assumption was that the company could find a material other than the banned plasticizers that would provide the same product properties. (The company did find one, by the way.)
Resolve Loop

The last part of the Explore & Create segment consists of a series of Resolve Loops (Figure 6). Inputs to the Resolve Loop include the inventory of prioritized assumptions, a plan for resolution, and the Pledge of resources, budget, time, and objectives.

Each Resolve Loop addresses an assumption. A project team can resolve several assumptions at the same time in parallel. Generally, the riskier the project, the greater the number of assumptions to be addressed.

Within each project, the team maintains an inventory of assumptions and works through the biggest uncertainties first. During the Resolve Loop, the team is not only driving down commercial and technical risks, but also driving down uncertainties around operational risks like manufacturability.

Cross-discipline integration throughout ExPD is required. This includes resolving any uncertainties of other departments, such as distribution, sales, downstream marketing, customer service, regulatory, legal, and finance. Over time, some risks will drop off because they’re no longer relevant; others will need to be continually monitored, and new ones are added as they arise.

A Resolve Loop has four major steps:

1. In **Design**, the project team finalizes the plan for resolving each prioritized assumption. The plan can consist of secondary research, primary research, an experiment, prototypes for end-user feedback, or a mitigation plan that allows the company to reduce or eliminate the risk as quickly and inexpensively as possible.

2. Next is to **Build** the test—that is, the company creates the test environment to address the plan from Design. Options for Build include the creation of models, prototypes, or surveys to test assumptions.

3. In **Execute**, the company tests as defined in Design, using the items created in Build.

4. Finally, in **Learn**, the project team analyzes the findings and their impact on the assumptions. The team determines whether it has learned enough and sufficiently resolved the risk. It might be necessary to iterate again or to introduce another assumption that needs to be resolved.

The length of a loop varies based on the complexity of the assumption. Typically, we like to run these Resolve Loops in a short sprint, similar to agile techniques.

While resolving risk, the project team needs to make progress in developing the product. The backbone of the process is what we call the Concept Maturity Model™. This model ensures that the product is designed, tested, and launched. It helps the team stay on track and works with the Pledge to identify objectives and milestones all the way through to Launch.
ExPD: What’s in it for you?

1. Speed
2. Adaptability
3. Strategic alignment
4. Risk reduction
5. Products that begin with the customer
6. Real-time project prioritization and resource optimization
7. Learning fast from key uncertainties and killing projects quickly
8. Decreased bureaucracy and paperwork
9. Better decision making through team empowerment

The overall benefit of using ExPD is speed and adaptability to the complex and ever-changing environment of product development. We understand that product developers not only have to react quickly to external forces, but also must adapt to a complex internal environment.

Learn more
We invite you to visit our blog at www.exploratorypd.com for more information on ExPD. There you will also find updates about the availability of our forthcoming book. We welcome your thoughts and comments, in the hope they will contribute to a lively and useful discussion.
About Strategy 2 Market

Since 2002, our product development consultants have been working with companies to achieve three primary goals:

1. Drive new product revenue through a comprehensive and strategically aligned product development program
2. Reduce the complexity of the product development process and improve time-to-market
3. Select the right product development projects and optimize resources

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Mary’s expertise is in product development strategies and product development processes, including the integration of flexible and lean methods. She also has expertise in product management, team structure, organizational development and culture. Mary has an MBA from the University of Chicago. She recently graduated from the Lean Launch Pad Educators Seminar at the University of California, Berkeley.

Mary also works part-time for the University of Chicago, as a Faculty Coach for the New Product Development, Market Research and Intellectual Property Lab courses. Mary is currently co-authoring a book with Kathy Morrissey on a new way to develop products.

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Kathy’s product development expertise is in developing business models, innovation and product development strategies, as well as product and technology roadmaps. In addition, she also has considerable experience in portfolio management and early-staged product development activities. Kathy also works part-time for The University of Chicago, as a Faculty Coach for the New Product Development, Market Research and Intellectual Property Lab courses. Kathy is currently co-authoring a book with Mary Drotar on a new way to develop products.

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