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The Latest View: The Stage-Gate® System for New-Product Development

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Most firms have adopted some form of a gated Idea-to-launch system such as Stage-Gate®.

Summary: This article takes a look at the Stage-Gate® system, developed and trademarked by Cooper. A bit of background is provided, followed by the most current view of the process (Stage-Gate has changed a lot in the last ten years; so if you’re using an older version, this section is a good update). How the key success drivers are built in is next outlined. The article concludes with a look at some of the more novel approaches that leading firms are building into Stage-Gate that take them to the next generation of Stage-Gate.


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Introduction
New products fail at an alarming rate. Only one new-product concept in seven is a commercial success, and an estimated 44-percent of developed products fail to achieve their sales targets. By investigating large samples of successful new products versus unsuccessful ventures, many of the critical success drivers in product development have been uncovered. Observing what highly successful project leaders and teams do during their projects, together with a knowledge of the critical success divers, ultimately led to the creation of a model for successful development, namely the original Stage-Gate® system*. Many leading firms then adopted the system. And significant improvements have made made to the system over the years, so today’s Stage-Gate is very different that models envisioned just a decade ago. This chapter outlines what a Stage-Gate system is and how it works; how the system builds in critical the success drivers; and the newer generation Stage-Gate, namely the Triple A process: agile, adaptive, and accelerated.

The Stage-Gate System
A Stage-Gate system is designed to drive new-product projects to market, quickly and effectively. And almost every top-performing company has implemented a stage-and-gate system, according to APQC (American Productivity and Quality Center) and PDMA (Product Development and Management Association) studies. So what is this ubiquitous Stage-Gate? It’s simply a playbook, game plan or road map to guide new-product projects from idea to launch and beyond… much like a playbook guides a football team down the field to a goal.

The Structure of Stage-Gate
Stage-Gate breaks the product innovation process into a predetermined set of stages, each stage consisting of a set of prescribed, cross-functional, and parallel activities (a typical 5-stage, 5-gate process for major projects is shown in Figure 1). Gates are the entrance to each stage, and serve as quality-control check-points and Go/Kill investment decision-points. This stage-and-gate format leads to the name “Stage-Gate” process.

The stages: Stages are where the project team members execute key tasks or actions to move the project forward, and also to gather information needed to make the vital decisions at the next gate. There is a fairly standard or prescribed list of actions for each stage, based on research into best practices and also insights into how winning project teams do so well.

Stages are cross functional: There is no R&D or Marketing stage, and handoffs from one department to another are not permitted. Rather, Stage-Gate is an integrated business process, with each stage consisting of a set of parallel tasks undertaken by people from different functional areas within the firm, working together as a team and led by a project team leader.

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*Stage-Gate® is a registered trademark in different countries of Robert G. Cooper, R.G. Cooper & Associates Consultants Inc., and Stage-Gate International Inc.
To manage risk, the parallel tasks in each stage are designed to gather vital information – the technical, market, financial, and operations information needed to validate assumptions and thereby reduce both the technical and business risks of the project. Each stage is more expensive (more resources required) than the previous one, and thus there is an incremental commitment to the project: with more and better information at each stage, resource commitments increase. In this way, risk is mitigated – much like purchasing options on the project.

The flow of the typical Stage-Gate model is shown in Figure 1:

0. Discovery: pre-work designed to discover opportunities and to generate new-product ideas.
1. Scoping: a quick, preliminary investigation, and scoping of the project. This stage provides inexpensive information – based largely on desk research – to enable the list of projects to be narrowed before Stage 2.
2. Build the business case: a much more detailed investigation involving primary research – both market and technical – leading to a business case. This is where the bulk of the vital homework is done, which results in a business case: the product definition, the project justification, and a project plan.
3. Development: the detailed design and development of the new product, along with some product testing work. The deliverable at the end of Stage 3 is an alpha-tested or lab-tested product. Full production and market launch plans are also developed in this potentially lengthy stage.
4. Testing and validation: tests or trials in the marketplace, lab, and plant to validate the proposed new product, and its marketing and production or operations. Tasks include field trails or beta tests; test market or trial sell; and operations trials.
5. Launch: commercialization – beginning of full operations or production, marketing, and selling. Here the market launch, operations, distribution, and post-launch plans are executed.

The gates: Preceding each stage is an entry gate or a Go/Kill decision point. Effective gates are central to the success of a fast-paced, new-product process:

- Gates serve as quality-control check-points, ensuring that the project is executed properly.
- Gates also serve as Go/Kill and prioritization decisions points: mediocre projects are culled out at each successive gate.
- Finally, gates are where the action plan for the next stage is agreed, and the resources needed to execute the plan are committed.

Gate meetings are usually staffed by senior management from different functions – the gatekeepers – who own the resources required by the project team for the next stage.

Gates have a common format:

1. A set of required deliverables: what the project team must bring to the gate decision point. These deliverables are visible, and based on a standard menu for each gate, and are decided at the output of the previous gate. Management’s expectations for project teams are thus made very clear. Deliverables are both hard (such as a “field-tested prototype” or “set of CAD design drawings”) and soft (such as a “full business case” or “launch plan”).
2. Go/Kill Criteria: the project is judged against these to make the Go/Kill and prioritization decisions.
3. Defined outputs: for example, a decision (Go, Kill, Hold or Recycle), an approved action plan for the next stage, the resources committed to execute the next stage, and the agreed-to deliverables for the next gate.

Types of gate criteria: Each gate has its own set of criteria for use by the gatekeepers:

- Readiness check: These are Yes/No questions that check whether the key tasks have been completed, and that the deliverables are in place for that gate. A “No” signals a recycle to the previous stage because the project is not ready to move on.
- Must meet: These are Yes/No or “knockout” questions that include the minimum business criteria that a project must meet to move forward. A single consensus “No” signals a Kill decision. Example: “Does this project align with our business strategy?” If No, then Kill.
- Should meet: These are highly desirable project characteristics that are used to distinguish between superb projects and the minimally acceptable ones. These are typically in a scorecard format, and include strategic, competitive advantage and financial criteria, and are used for both Go/Kill and prioritization decisions.
The Success Drivers Built In

*Stage-Gate* was based on research into why some projects and project teams do so well. Here are some of the research-based best-practices that are built into *Stage-Gate*:

1. **Striving for Unique Superior Products**
   Delivering products with *unique benefits and a compelling value proposition* to customers and/or users distinguishes winners more often than any other single factor! Such superior and differentiated products have five times the success rate, over four times the market share, and four times the profitability than me too, copy-cat, reactive and ho-hum products. Achieving a unique superior product is the goal of every stage in the *Stage-Gate* process: numerous actions are built into stages that ensure customer input and feedback is available to the product designers and developers; and gate Go/Kill scorecards emphasize product superiority as a criterion for moving forward.

2. **Market Driven and Building In the Voice of Customer (VoC)**
   A thorough understanding of customers’ needs and wants, the competitive situation and the nature of the market is an essential component of new product success. This tenet is supported by virtually every study of new-product success factors. Note that a *market focus and constant interaction (iterations)* with customers are integral facets of *Stage-Gate*, throughout the entire process (the circular arrows across the bottom in Figure 1 – from idea generation right through to launch).

3. **Pre-Development Work – the Homework**
   Solid front-end homework is critical. Countless studies reveal that the steps that precede the actual design and development of the product make all the difference between winning and losing. The message is to *front-end load the project* – to undertake a higher proportion of the project’s work in the early stages. Thus, *Stage-Gate* builds in two vital homework phases (Stages 1 and 2 in Figure 1), with extensive actions required in Stage 2 in particular: VoC research, concept testing, market and competitive analyses, technical and source of supply assessments, financial and risk assessment, etc.

4. **Sharp, Early and Stable Project and Product Definition**
   Two of the worst time-wasters in a new-product project are “project scope creep” and “unstable product specs”. Securing *sharp, early, stable and fact-based product definition* during the homework phase is a solution. How well the project and product are defined prior to entering the development stage is a major success factor, impacting positively on both profitability and reduced time-to-market. Thus, crafting a fact-based product definition is a key action in Stage 2, Build Business Case in Figure 1; and this definition is confirmed throughout the rest of the project via spirals or iterations with customers (see “spiral development” below).

5. **Effective Cross-Functional Teams**
   Product innovation is very much a team effort! Do a post mortem on any bungled new product project and invariably you’ll find: each functional area doing its own piece of the project, with very little communication between players and functions – a fiefdom mentality; and no real commitment of players to the project. Key best practices here, built into *Stage-Gate*, include: a clearly assigned team of players for each significant new-product project, complete with time commitments; cross-functional project teams, with team members from Technical, Sales, Marketing, Operations, etc.; a clearly identified team leader; the project team and leader remaining on the project from beginning to end of project; and project teams accountable for their project’s end result.

6. **The Resources in Place**
   Too many development projects simply suffer from a lack of time, people and money! The results are predictable: When people and resources are spread too thinly over too many projects and other tasks, short-cuts are taken, quality of execution suffers, some key tasks don’t get done at all, and time-lines stretch. The end-result is: much longer times-to-market and lower success rates. Best practice companies commit the necessary resources to new products much more so than do most firms, according to research. And this is a key feature of *Stage-Gate*, not only via cross-functional teams, but also at gates: Gates not just project approval points; *gates are resource commitment decisions* made by senior people.
#7. Sharper Focus, Better Prioritization
Most companies’ new-product efforts suffer from a lack of focus: too many projects, and not enough resources… and often the wrong projects. The need is for a new-product funnel, rather than a tunnel. A “new-product funnel” builds in tough Go/Kill decision points throughout the process; mediocre projects are weeded out; scarce resources are redirected towards the truly deserving projects (the high value ones); and more focus is the result. Note that Stage-Gate is built around a set of gates or Go/Kill decision points, as in Figure 1. Gates pose two fundamental questions:

- Are you doing the project right?
- Are you doing the right project?

The gates in Stage-Gate are thus a critical component of overall portfolio management – making the right R&D investment decisions.

Newer Generation Stage-Gate – Triple A
Many improvements have been made to Stage-Gate since it was introduced; these conveniently fit into three groups of A’s:

A1 – Adaptive and flexible: The newer-generation systems are adaptive, because things change all too quickly these days. Building in adaptivity via spiral development deals with this “fluid information” dilemma. Spiral development means getting something in front of customers or users early, cheaply and often via a series of “build-test-feedback-and-revise” iterations.

Newer systems are also flexible, with actions for each stage and deliverables to each gate being unique to each product, and based on the project’s context: the nature of the market and the needs of the specific development project. For example, Figure 2 shows three different versions of Stage-Gate for high risk, moderate risk and low risk projects; there is also a version of Stage-Gate for technology platform and science projects.

A2 – Agile: The newer-generation systems also incorporate elements of agile development, the rapid development system deployed by the IT industry based on the Agile Manifesto. Agile methods break the development process into one- to four-week “sprints”, followed by a team “scrum meeting”. At the end of each sprint, the project team delivers a working version of the IT product that can be demonstrated to stakeholders. Physical products are obviously different from software development, and it may not be possible to deliver a working version or potentially releasable product after every two-week sprint, but the objective is much the same: Deliver something that can be demonstrated to stakeholders (customers and management) early, cheaply and often – a crude model, design drawings, a rapid prototype, or an early stage protocept.

The new systems are also much leaner and more nimble, with all waste removed, no bureaucracy and no unnecessary activities. Firms have applied the principles of Lean-Six-Sigma, focusing on the value stream (much
like in a manufacturing plant), and removed all work that adds no value, thereby accelerating the system and improving work efficiency.

*Accelerated:* Newer-generation *Stage-Gate* accelerates the development process. One of the most important improvements is that projects are properly resourced and fully staffed by a dedicated cross-functional team for maximum speed to market for important projects. This requires integrating *Stage-Gate* with portfolio management and resource management, ensuring that the number of projects in the pipeline is consistent with the resources available.

Additional ways that newer systems accelerate time to market include:

- **Concurrency:** Activities within stages (and even the stages themselves) now overlap – parallel rather than sequential processing – to reduce waiting time and hence time-to-market. It’s alright to move long-lead-time activities forward, provided the risk is assessed.
- **Making the fuzzy front-end less fuzzy:** More emphasis is placed on front-end and its due diligence, so that the project is clearly scoped, and that key unknowns, risks and uncertainties are identified as early as possible. In this way, potential problems and roadblocks that might surface later on are identified in advance, and time is saved.
- **IT support:** A number of leading software suppliers have created IT in support of *Stage-Gate*, designed to reduce work, provide better communication and accelerate the process; such IT is reputed to reduce time and project workload by as much as 30-percent.

**Some Tips for Moving Forward**

The *Stage-Gate* system has been widely adopted, partly because the results achieved are quite positive. According to various independent studies, new-product success rates increase by 37-percent, projects hitting profit targets increase by 72-percent, and percentage of sales from new products more than triple with an effective gating system installed. But as with any good concept, there are issues. Most of the challenges have to do with getting the right system for your business (as mentioned, *Stage-Gate* is context-based), and also problems regarding ineffective implementation. If you already have *Stage-Gate*, but it’s more than five years old, it’s probably a little slow, cumbersome and dated – so time for a good overhaul (see endnotes for updating references). And if you don’t have such a system, maybe it’s time for a look: There’s are lots of references in the endnotes, but consider getting help too.

**Bio-Sketch**

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**References & Additional Reading**


3 See success drivers, endnote (1); and Chapters 2 & 3 in endnote (2).