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Modified Stage-Gate: A Product Development Process

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Abstract:
In today’s dynamic marketplace, manufacturing companies are under strong pressure to introduce new products for long-term survival with their competitors. Increased competition and reduced product life cycles put force upon companies to develop new products faster. In response to these pressing needs, there should be some new approach compatible in flexible circumstances. This presentation presents a solution based on the popular Stage-Gate system, which is closely linked with virtual team approach. Virtual teams can provide a platform to advance the knowledge-base in a company and thus to reduce time-to-market. The presentation describes all the major aspects of new product development (NPD), NPD process and its relationship with virtual teams, Stage-Gate system finally presents a modified Stage-Gate system to cope up with the changing needs.
“Process” Trend

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Iran
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Citation Report: **7141**, (from Web of Science Core Collection)
You searched for: **TITLE:** (Process) **Refined by:** **TOPIC:** (product development)
**Timespan:** All years. **Indexes:** SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH.
Citation Report: 7141, (from Web of Science Core Collection)
You searched for: **TITLE:** (Process) **Refined by:** **TOPIC:** (product development)
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Citation Report: **289**, (from Web of Science Core Collection)
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Citation Report: 289, (from Web of Science Core Collection)
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## Organizations-Enhanced

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Countries/Territories

[Bar chart showing countries and their respective values on the y-axis, with countries including USA, Germany, England, Japan, France, Canada, Spain, India, Netherlands, Italy, Brazil, South Korea, Australia, Taiwan, Sweden, Denmark, Switzerland, Belgium, Finland, Austria, Singapore, Turkey, Portugal, Poland, Mexico, Ireland, Russia, Scotland, Malaysia, New Zealand, Romania, Slovenia, Iran, and more, with values ranging from 0 to 1800, and labels for each country on the x-axis.]
New Product Development

Product development definition used by different researchers in slightly different ways but generally it is the process that covers product design, production system design, product introduction processes and start of production (Johansen, 2005). A multidisciplinary approach is needed to be successful in launching new products and managing daily operations (Flores, 2006).
New product development is a multi-dimensional process and involves multiple activities (Ozer, 2000).

Kusar al. (2004) summarized different stage of new product development which in earlier stages, the objective is to make a preliminary market, business, and technical assessment whereas at the later stages they propose to actually design and develop the product(s).

- Definition of goals (goals of the product development process)
- Feasibility study (term plan, financial plan, pre-calculation, goals of market)
- Development (first draft and structure of the product, first draft of components, product planning and its control processes)
- Design (design of components, drawing of parts, bills of material)
Several authors proposed different conceptual models for the NPD process, beginning from the idea screening and ending with the commercial launching. The model of Cooper, called the Stage-Gate System is one of the most widely acknowledged systems (Rejeb et al., 2008).
Stage-Gate System in NPD

The Stage-Gate System model divides the NPD into discrete stages, typically five stages. Each Stage gathers a set of activities to be done by a multifunctional project team. To enter into each stage, some conditions and criteria have to be fulfilled. They are specified in the Gates. A Gate is a project review in which all the information is confronted by the whole team.
Stage-Gate System in NPD

This process is a method of managing the new product development process to increase the probability of launching new products quickly and successfully. The process provides a blueprint to move projects through the various stages of development: 1) idea generation, 2) preliminary investigation, 3) business case preparation, 4) product development, 5) product testing, and 6) product introduction. This process is used by such companies as IBM, Procter & Gamble, 3M, General Motors, and others.
Work in Stages, Review at Gates

A management framework first described ~1985

Originally proposed by Robert Cooper (Winning at New Products) as a model for product development projects to reduce costs and time to market

Source: Cynthia J. Riley, Stage Gate Management Process and Expectations, August 9, 2005
The Stage-Gate System (source: Cooper, 2006)
Many Small Projects In

Product Development Funnel

Few High-Impact Products Out
Stages are where the action occurs.

**Stage 1 Scoping**: a quick investigation and sculpting of the project.

**Stage 2 Build the business case**: the detailed homework and up-front investigation work leading to a business case; a defined product, a business justification and a detailed plan of action for the next stages.

**Stage 3 Development**: the actual design and development of the new product. Additionally, the manufacturing (or operations) process is mapped out, the marketing launch and operating plans are developed, and the test plans for the next stage are defined.

**Stage 4 Testing & validation**: the verification and validation of the proposed new product, its marketing and production.

**Stage 5 Launch**: full commercialization of the product— the beginning of full production and commercial launch and selling.
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 checkpoints: Is this project being executed in a quality fashion?
• Gates also serve as Go/Kill and prioritization decision points: Gates provide the funnels where mediocre projects are successively culled out.
• Finally, gates are where the path forward for the next stage is decided, along with resource commitments. Gate meetings are usually staffed by senior managers from different functions, who own the resources the project leader and team require for the next stage. These decision-makers are called “gatekeepers.”

Gates have a common format:

• **Deliverables:** These are the inputs into the gate review—what the project leader and team deliver to the meeting. They are the results of the actions of the previous stage, and are based on a standard menu of deliverables for each gate.
• **Criteria:** These are questions or metrics on which the project is judged in order to make the Go/Kill and prioritization decision.
• **Outputs:** These are the results of the gate review—a decision (Go/Kill/Hold/Recycle). An action plan is approved, and the date and deliverables for the next gate are agreed upon.
Gate 1

Idea Screen
Does the idea merit any work?

Preliminary Investigation
Prelim market assessment
Prelim technical assessment
Prelim financial & business assessment
Action plan for Stage 2

Stage 1

Gate 2

Second Screen
Does the idea justify extensive investigation?

Stage 2

Detailed Investigation
User needs & wants study
Competitive analysis
Value proposition defined
Technical feasibility assessment
Operations assessment
Product Definition
Financial analysis
Gate 3 Decision to Develop
Is the business case sound?

Stage 3 Development
Technical development work
Rapid prototypes
Initial customer feedback
Prototype development
In-house product testing
Operations process development
Full launch & operations plans

Gate 4 Decision to Test
Should the project be moved to external testing?

Stage 4 Testing & Validation
Extend in-house testing
Customer field trials
Acquisition of production equipment
Production/operation trials
Test market/trial sell
Finalized launch and operations plans
Post-launch & life cycle plans
Gate 5: Decision to Launch
Is the product ready for commercial launch?

Stage 5: Launch
Market launch & roll-out
Full production/operations
Selling begin
Results monitoring
Post-Launch & life cycle plans under way

Post-Lauch Review
How did we do vs. projections?
What did we learn?
Modified Stage-Gate:
A Conceptual Model of Virtual Product Development Process

Modified Stage-Gate

The architecture is structured in a two-layered framework: Traditional Stage-Gate system and collaborative tool layer which is supported by virtual team. Merge of Stage-gate system with virtual product development team lead to increase new product performance and decrease time-to-market. The following sections will describe some elements of the collaborative tool layer in more detail.
Discovery  
Gate 1  
Stage 1  
Scoping  

Second Screen  
Gate 2  
Stage 2  
Build Business case

Go to Development  
Gate 3  
Stage 3  
Development

Go to Testing  
Gate 4  
Stage 4  
Testing & validation

Go to Launch  
Gate 5  
Stage 5  
Launch
Discovery
Gate 1
Stage 1
Scoping

Second Screen
Gate 2
Stage 2
Build Business case

Go to Development
Gate 3
Stage 3
Development

Go to Testing
Gate 4
Stage 4
Testing & validation

Go to Launch
Gate 5
Stage 5
Launch

• Capturing Customer Requirements
• Internal and External Relations
• Project Timing Plan
• Multidisciplinary Team Data
• Product File Access
• Decision Support

• Collaborative Capabilities
• Top Management Support
• Technological Synergy
• Company Resources
• Marketing Synergy
• Product Concept

• Product specifications
• Financial/Business Analysis
• Project Timing Plan
• Selection of Product Equipments
• Process Parameters
• Distributed Team Member

COLLABORATIVE TOOLS

Video Conferencing
E-mail
Instant Messaging
On-line Meeting
Online Reporting
Document Sharing
Discovery
Gate 1
Stage 1
Scoping

Stage 2
Gate 2
Build Business case

Stage 3
Gate 3
Development

Stage 4
Gate 4
Testing & validation

Stage 5
Gate 5
Launch

Capturing Customer Requirements
• Internal and External Relations
• Project Timing Plan
• Multidisciplinary Team Data
• Product File Access
• Decision Support

Collaborative Capabilities
• Top Management Support
• Technological Synergy
• Company Resources
• Marketing Synergy
• Product Concept

Product specifications
• Financial/Business Analysis
• Project Timing Plan
• Selection of Product Equipments
• Process Parameters
• Distributed Team Member

Collaborative Tools
Video Conferencing
E-mail
Instant Messaging
On-line Meeting
Online Reporting
Document Sharing

Greater client satisfaction
Able to tap selectively into centre of excellence
Less resistant to change
Most effective in making decisions
Reduce relocation time
Greater productivity
Better team outcomes
Reduce time-to-market
Enable organizations respond faster
Improve the detail and precision of design
Activities
Facilitating transnational innovation processes
Shorter development times
Modified Stage-Gate

- Idea Screen
  - Discovery
  - Scoping
  - Capturing Customer Requirements
  - Internal and External Relations
  - Project Timing Plan
  - Multidisciplinary Team Data
  - Product File Access
  - Decision Support

- Second Screen
  - Gate 1
  - Stage 1
  - Build Business Case
  - Collaborative Capabilities
  - Top Management Support
  - Technological Synergy
  - Company Resources
  - Marketing Synergy
  - Product Concept

- Go to Development
  - Gate 1
  - Stage 2
  - Development
  - Product Specifications
  - Financial Business Analysis
  - Project Timing Plan
  - Selection of Product Equipments
  - Process Parameters
  - Distributed Team Member

- Go to Testing
  - Gate 1
  - Stage 3
  - Testing & Validation
  - Video Conferencing
  - E-mail
  - Instant Messaging
  - On-line Meeting
  - Online Reporting
  - Document Sharing

- Go to Launch
  - Gate 1
  - Stage 4
  - Launch
  - Greater client satisfaction
  - Able to tap selectively into centre of excellence
  - Less resistant to change
  - Most effective in making decisions
  - Reduce relocation time
  - Greater productivity
  - Better team outcomes
  - Reduce time-to-market
  - Enable organizations to respond faster
  - Improve the detail and precision of design activities
  - Facilitating transnational innovation processes
  - Shorter development times
Conclusion:

The modified Stage-Gate system has demonstrated to be a good development platform for the NPD. In order to integrate and share the information and knowledge available within geographically distributed companies, this model can be a reference model.
Thank you!

Nader Ale Ebrahim, PhD

www.researcherid.com/rid/C-2414-2009
http://scholar.google.com/citations
References:


