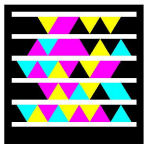
An American Institute for Innovation Excellence
Research Report

1678 Cady Lane
De Pere, Wisconsin 54115
920.309.2012
http://www.AIIEOnline.org

Is Phase-Gate The Right Tool For The Job?

Next Practices in Innovation Management

Research Lead: Paul R. Williams



March 2011 – American Institute for Innovation Excellence

American Institute for Innovation Excellence

Contents

"The stage-gate system is not suited to the task of assessing innovations whose purpose is to build new growth businesses, but most companies continue to follow it simply because they see no alternative."

Clayton M. Christensen, Stephen P. Kaufman, and Willy C. Shih
"Innovation Killers: How Financial Tools Destroy Your Capacity to Do New Things"
Harvard Business Review, January 2008

Introduction

Among many business leaders, the overall impression of "innovation management" can best be described as a concept still struggling to find its footing. Want proof? Look at the myriad of models, approaches, definitions, processes and techniques from which to choose, all claiming to be the answer to, or at least a part of, providing a comprehensive framework for managing the idea-to-product (innovation) business process.

As one of the leading process frameworks for managing innovation, the phase-gate management approach has been both hailed as a savior, and cursed as an obstacle. This research

focus, conducted on behalf of the American Institute for Innovation Excellence, seeks to not only explore the benefits and shortcomings of the popular phase-gate innovation management approach, but also explore fresh thinking on the topic and generate a new holistic model for the management of ideas and execution of innovation.

Research Question:

In the innovation management discipline, and in particular new product development, the most frequently used management framework for the process of transitioning from ideas to products is based on a phase-gated approach made popular by the Stage-Gate® Model. However, the efficiency and effectiveness of this approach has been repeatedly called into question by practitioners of innovation management and new product development. As a result, a number of modifications have been made to the system, including modifications instituted by the Stage-Gate® Model designers themselves. Therefore, the questions tasked to researchers of the American Institute for Innovation Excellence are as follows:

1. If the leading framework and approach for innovation management, such as phase-gate, requires such prolific modification by its professional user base, is it simply the wrong tool for the job?
2. If the answer to question one is in the affirmative, what are some alternatives to moving beyond these linear, step-by-step process-based approaches for innovation management?

Review: Foundational & Historical Analysis

Stage-Gate Specific Foundational Review:

The "Stage-Gate/Phase-Gate Concept" as defined and annotated in Wikipedia[1]:

> "The National Aeronautics and Space Administration (NASA) practiced the concept of staged development in the 1960s with its phased project planning or what is often called *phased review process*. The phased review process was intended to break up the development of any project into a series of phases that could be individually reviewed in sequence. Review points at the end of each phase required that a number of criteria be met before the project could progress to the next phase. The phased review process consisted of five phases (Preliminary Analysis, Definition, Design, Development, Operations) with periodic development reviews between phases. NASA's phased review process is considered a first generation process because it did not take into consideration the analysis of external markets in new product development.
>
> The Stage-Gate®[2] model was developed and first suggested by Robert G. Cooper

[1] http://en.wikipedia.org/wiki/Stage-Gate_model#cite

[2] Stage-Gate® is a registered trademark. In Europe, the owners are Jens Arleth, Stage-Gate.EU and Robert G. Cooper, Product Development Institute Inc. In Canada and USA, the owner is Product Development Institute Inc.

(McMaster University) in his book, *Winning at New Products*, published in 1986. The model is based on empirical findings of numerous "NewProd" Studies conducted by R.G. Cooper (e.g. 1985, 1992, 1994).

The stage-gate model refers to the use of funnel tools in decision making when dealing with new product development. "Gates" or decision points are placed at places in the product development process that are most beneficial to making decisions regarding continuance of product development. These production areas between the gates are idea generation, establishment of feasibility, development of capability, testing and validation and product launch. At the conclusion of each of these areas of development of a new product, it is the responsibility of senior management to make a decision as to whether or not the product should continue to be developed. The passing of gate to gate can be accomplished either formally, with some sort of documentation, or informally, decided upon based on the preferences and culture of the organization.

A common model is composed of the following stages: ideation, preliminary analysis, business case, development, testing, and launch. A stage-gate model is a conceptual and operational road map for moving a new project from idea to launch - a blueprint for managing the new-product process to improve effectiveness and efficiency.

The traditional Stage-Gate® process has five stages and five gates. The stages are:

1. Scoping
2. Build Business Case
3. Development
4. Testing and Validation
5. Launch

At each gate, the continuation of the development process is decided by a manager or a steering committee. The decision is based on the information available at the time, including e.g. business case, risk analysis, availability of necessary resources (money, people with correct competencies) etc.
The stage-gate model may also be known as stage-limited commitment or creeping commitment."

Typically, the same gate approvers appear at each gate review to assess and decide on whether or not the project is allowed to proceed.

In response to the often frenetic ideation-based activity commonly referred to as the "fuzzy front end" of innovation, an additional "pre-step" was added to the front of the process at stage "zero," called Discovery. Most large-scale new product development projects go through the full Zero+Five-stage process.

Project status within the model can further be defined by placing it into one of four possible "states" during its phase-gate lifecycle:

- Work State
  - The state in which the planned work or activity takes place

- Entry State
  - The flow control point where minimum entry criteria must be met in order to schedule a gate review. Typical gate criteria include:
    - Deliverable and / or milestone completion
    - Completed document artifacts
    - Next stage resource requirements
    - Next stage cost estimates
    - Next stage feature / task requirements
- Hold State
  - The state where the project is being held for formal gate review and decision making
- Exit State
  - The flow control point where the project can exit the hold state and proceed to its next work state. Typical gate criteria include:
    - Decision results
    - Resource commitments secured
    - Required document artifacts for next phase defined

In response to concerns about excess process overhead, product and/or service development initiatives that involve less risk or effort, including line extensions, minor modifications and incremental improvements, use the shorter "Stage-Gate® Xpress™" version, which reduces the stages to three steps (from five) that include building the business case, development/testing and launch. In recent years, an additional variant of the model called "Stage Gate® Lite™" was introduced to execute minor tweaks to a product via an even lighter process. Finally, a "Spiral Development" or iterative feedback loop model has most recently emerged from the Stage-Gate® camp.

For additional information regarding the Stage-Gate® processes, including graphical representations of the individual models, the reader is encouraged to visit the web site of Stage-Gate® International[3].

Foundational and Historical Analysis Of Note:

During our research, we also examined a wide variety of similar linear-based process methodology approaches such as:

- Project and Portfolio Management (Traditional and Agile)
- Business Process Management
- Software Development Life Cycle
- Lean and SixSigma Improvement Methodologies

We will not further elaborate on the general process management methodologies listed here. A reader seeking more information or detail on the aforementioned approaches are encouraged to consult the internet for a wealth of additional information. Instead, their mention here serves simply to call attention to the source material used in both extracting successful process management activities for use in a new model and in the purposeful avoidance of the process management shortcomings within each.

Equally, our research activities also discovered and examined a number of new, unique "breakthrough" process approaches for

[3] http://www.stage-gate.com/index.php

managing the execution of ideas and we include a brief review of few of them here as worthy of additional consideration for the reader:

1. Batch Process Development:

   - Currently utilized by a Fortune 500 financial services firm
   - There are two unique concepts that stand-out in this approach:
     - Specialized resources are leveraged to ensure that subject matter expertise review and approval is present at each major project phase
     - Rather than having one project at a time progress into individual reviews when they have reached certain entry criteria, multiple projects, at similar phases of their progression through the process, are "batched" to be reviewed and decided upon together by the specialized set of resources
   - Each phase of the overall innovation process has its own specialized review and/or portfolio management teams
     - Concept Development Review is conducted by the Concept Team
     - Design Development Review is conducted by the Development Team
     - Execution Development Review is conducted by the Execution Team
     - Commercialization Review is conducted by the Operational and Sales Teams
   - Batch Process Development Variant:
     - Multiple phases are grouped together to speed review and reduce process steps:
       - Concept + Design + Prototype Review is conducted by the Development Team
       - Build + Execute Review is conducted by the Implementation Team
       - Market + Commercialize Review is conducted by the Release Team
     - The Review Teams essentially approve of plan to continue by "paying for" the next phase of planned activities out of their budget. This ensures projects have a solid enough foundation upon which the Review Team is willing invest in additional project work

2. Organized Chaos:

   - Currently utilized by a Fortune 100 manufacturing organization
   - "Front end" activities like ideation, exploration, research and prototyping are allowed (and encouraged) to occur uncontrolled
   - These activities are continuously monitored, however, by subject

matter experts or review teams for promising ideas and concepts
- Selected ideas and concepts discovered by the subject matter expert teams are placed into a more traditional phased execution model for further review and development.

3. Spiro-Level 3D Approach To Innovation:

   - Recently introduced in a presentation given at Product Camp Austin Summer 2010 titled, "Beyond Stage-Gate: A New Approach to Innovation" by Dr. Jose Briones[4], the "Spiro-Level™ 3D Approach To Innovation" creates a truly iterative spiral development process. The basis of his presentation and new approach is that traditional phase-gate process is limited by a linear delivery model that works well for incremental innovations and product enhancements, but fails when seeking disruptive innovations. Similar to the spiral development concept currently being utilized in the Agile Project Management discipline, Dr. Briones' Spiro-Level method is a three-dimensional approach to innovation management. Starting at the lowest level, resource and time commitments are small, but gradually increase in size and breadth as the initiative progresses through the following four quadrants:
     - Quadrant I
       - Idea Generation
       - Voice of the Customer
     - Quadrant II
       - Technology Assessment
       - Business Case Development
       - Regulatory / Intellectual Property Strategy
     - Quadrant III
       - Prototype Development
       - Value In Use Analysis
       - Supply Chain Analysis
     - Quadrant IV
       - Customer Testing
       - Risk Analysis
       - Roadmap / Timeline
       - Launch
   - There are many exciting and useful new concepts forwarded from Dr. Briones' new approach:
     - The analysis tools used at each spiral turn through the quadrants are unique to that specific development phase. This is key to the whole process, as attention to detail increases as the idea moves through the model
     - The progressive elaboration inherent in its design encourages continual consideration and re-consideration, thus ensuring that only the best possible ideas, or combinations of ideas, are allowed to move forward in the process
     - As ideas and concepts progress through the model, they are subjected to increasingly more rigorous analysis and scrutiny
     - It adds repetitive investigation of topical areas frequently ignored

[4] http://www.slideshare.net/Brioneja/brioneja-beyond-stagegate-a-new-approach-for-innovation

by other models such as technical impact assessments, intellectual property strategy, customer value propositions and supply chain considerations

Spanning between these traditional and cutting-edge management process approaches are the foundations upon which this research team has built a new framework for delivering a more comprehensive and holistic innovation management methodology. Within this research initiative, an exhaustive review of contemporary thinking has been conducted among such broad constructs as leadership, governance, culture, strategy, execution, systems, tools, portfolio management, administrative practices, processes and concept development.

"In essence, the 'front end' activities normally associated with idea management and creative problem solving concepts are relegated to a singular 'Discovery' phase bolted onto the front of the typical five step "develop and deliver" phase-gated approach…"

Analysis: Challenges With Traditional Phase and Gate-Based Approaches

Traditionally, innovation management has been heavily rooted in idea management and creative problem solving concepts. These concepts are known to have a strong focus on idea generation and selection, but lack specific process attention to the execution of actually delivering the idea, better known as "innovation."

An idea management-focused approach will typically include the following steps along a problem solving continuum:

- Observe
- Understand and Clarify
- Define
- Prepare and Incubate
- Search and Select
- Test and Apply
- Feedback and Learn
- Finalize
- Accept
- Deliver

Meanwhile, the utilization of a phase-gate model for innovation management takes the opposite approach. In essence, the "front end" activities normally associated with idea management and creative problem solving concepts are relegated to a singular "Discovery" phase bolted onto the front of the typical five step "develop and deliver" phase-gated approach mentioned earlier in this report. When implemented and executed upon individually, both methods tend to fail via the exposure of their weaknesses.

One additional key weakness that both approaches traditionally fail to overcome is adequate consideration of the "ambient" environmental framework encompassing the entire set of processes that make up an effective innovation management approach:

- Effective Human Resource and Allocation Management considerations
  - The right kind / blend of people
  - The right kind / blend of training
  - Avoiding over-commitment and fractionalization
- Financial Management
- Time Management
- Spatial Management
- Effective leadership commitment and engagement
- Promotion of an innovation supporting culture
  - Risk taking
  - Failure acceptance
  - Experimentation
  - Strategic and long-term focus
  - Big picture thinking
  - Challenging the status quo
- Taking deliberate steps to avoid common barriers to innovation
- Connecting innovation management with daily business operations

Resulting from a lack of one holistic, agreed upon methodology for the management of innovation activities, along with the inherent difficulty of managing the creative approach itself, and finally, considering the reality that the phase-gate process is so commonly adjusted and modified to meet the unique needs of so many different styles of innovation management, it is not entirely unexpected that a number of complaints and unsupportive behaviors have arisen:

- Slow progression through the model, with high overhead and bureaucracy
- Emphasis is placed on form rather than substance during gating decisions
- Views all projects and products the same
- Treats all choices as singular, independent decisions
- Lends itself to be politically and bureaucratically manipulated

In fairness to the Stage-Gate® Model and its developer Dr. Cooper, these common grievances are not really indicative of a problem stemming directly from the model or approach itself, but are actually systemic of the weak or absent over-arching framework that provides the required support. Any process-driven approach, without a larger framework of culture, expectations, measurement and leadership, will not survive.

Over time, and as the Stage-Gate® Model has been put into practice, Dr. Cooper has witnessed some these environmental short-comings first hand. In his latest book, "*Lean, Rapid, and Profitable New Product Development*[5]," he addresses these potential deficiencies by updating how the foundational process fits within a larger framework. He promotes a new "Next Gen Stage-Gate®" process, which incorporates a number of ideas and direct observations from some of the organizations for whom he has helped to incorporate the Stage-Gate process model into their operations.

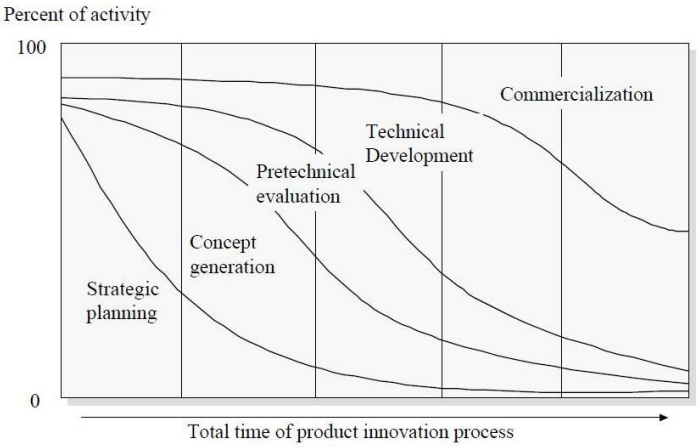
[5] "Lean, Rapid and Profitable – New Product Development", Dr. Robert G. Cooper and Dr. Scott J. Edgett, Published by Product Development Institute, 2005

Specifically, Dr. Cooper incorporates seven "Lean, Rapid and Profitable" (LRP) ideas that support the new framework including:

1. Customer focus
2. Front-end loaded
3. Spiral development
4. Holistic approach driven by cross-functional teams
5. Metrics, accountability and continuous improvement
6. Focus and effective portfolio management
7. Flexible, adaptive, scalable and efficient product innovation system

While certainly adding to the environmental framework that supports a more robust and efficient innovation management approach, the phase-and-gate process still has some legitimate gaps:

- It really is nothing more than a linear process, moving from one step to another, guided by traditional project management methodology that provides for periodic oversight and stop/kill decision points
  - The actual "activity-over-time" behavior of an innovation process is more appropriately conceptualized as shown in this figure from C.M. Crawford's book, "*New Products Management*" [6]:



- As a linear process, it is limited in its ability to incorporate and support strategic and future-focused activities such as visioning, trend analysis, horizon scanning, etc.
- Also as a linear process, it does not encourage movement outside of the current "stage," such as reconsideration of concepts held in a previous phase
  - One of the reasons organizations struggle with phase-gated approaches is that once the project clears a certain gate, they tend to never look back
  - Having a constant holistic view of the entire process and the courage to return to an earlier stage in order to tweak or re-design a piece of the solution is key

[6] Taken from "New Products Management, "Crawford and DiBenedetto , McGraw-Hill/Irwin, Burr Ridge, Boston 1994; ISBN: 978-0072471632

- Oversimplified management of gates is typically restricted to "go/no go" decisions, which limit consideration of alternative decision making options that are available, but many times unknown, to gate management teams:
    - Edit / Change
        - Adjust, edit, change or otherwise modify
    - Hold
        - Wait state until a certain condition is met
    - Go Back To…
        - Return to an earlier iteration for redesign or reconsideration
    - Buy Up
        - Option to add more scope and / or benefit based on need or resource availability
    - Buy Down
        - Option to subtract scope and / or benefit based on need or resource availability
    - All or Nothing
        - Consider as a whole only; cannot break into parts
    - Minimal
        - Reduce scope to minimum required to achieve benefit
    - Combine
        - Take whole or parts and combine with another initiative
- Gates are treated as a chance to provide status updates, milestone checks or review sessions.
    - This is the main contributor to ineffective and inefficient gate reviews. Instead, gate reviews should only be scheduled for "state" decisions, resource commitments and other decision making tasks
    - Gate approvers should seek to review status updates on their own time and outside of the decision making gate process
- The gating process facilitates the disruptive behavior of "out of sight, out of mind" where management or decision maker attention is focused only during the gate reviews and not while work is being done in between the review sessions.
    - In essence, the gate concept itself requires a project to come to a full stop, thus allowing management the time necessary to catch up and become reacquainted with the effort.

Despite noted short-comings in the phase-gate management approach, many of which are also noted to be self-inflicted by the organization itself, there are certainly a number of benefits to this style of management:

- Provides a logical path for ideas to follow
- Resources are focused on the "right" things

- Management has oversight of development initiatives
- Increases the chances of success
- Places rigor into a process that typically goes unmanaged
- Ensures initiatives that are no longer needed, effective or efficient are culled as soon as possible

"…the gate concept itself requires a project to come to a full stop, thus allowing management the time necessary to catch up and become reacquainted with the effort."

Concept 1: Making The Case For A New Innovation Management Framework

As has already been mentioned in these findings, it is simply not enough to have in place a robust phase-gate approach to managing ideas and innovation. For concepts and ideas to be effectively and efficiently designed, built, tested and leveraged for commercialization, a more comprehensive framework or methodology is needed to fill in the gaps of a linear management method.

Perhaps the first way to leverage all of the pieces of the innovation management puzzle is to assemble an "innovation value chain."[7] Leveraging Michael Porter's Value Chain concept, an innovation value chain would connect existing, proven innovation-related processes together to create a new, value-rich holistic process. For example:

[7] Note to the reader that the proposed "Innovation Value Chain" concept referenced in this work shares the same name, but differs from the Hansen/Birkinshaw Innovation Value Chain concept referenced in the June 2007 Harvard Business Review article focusing on "Generating, Converting and Diffusing"

American Institute for Innovation Excellence

Strategic Planning Activities

Research & Development Processes

Execution / Delivery Model

New "Value Chained" Innovation Process

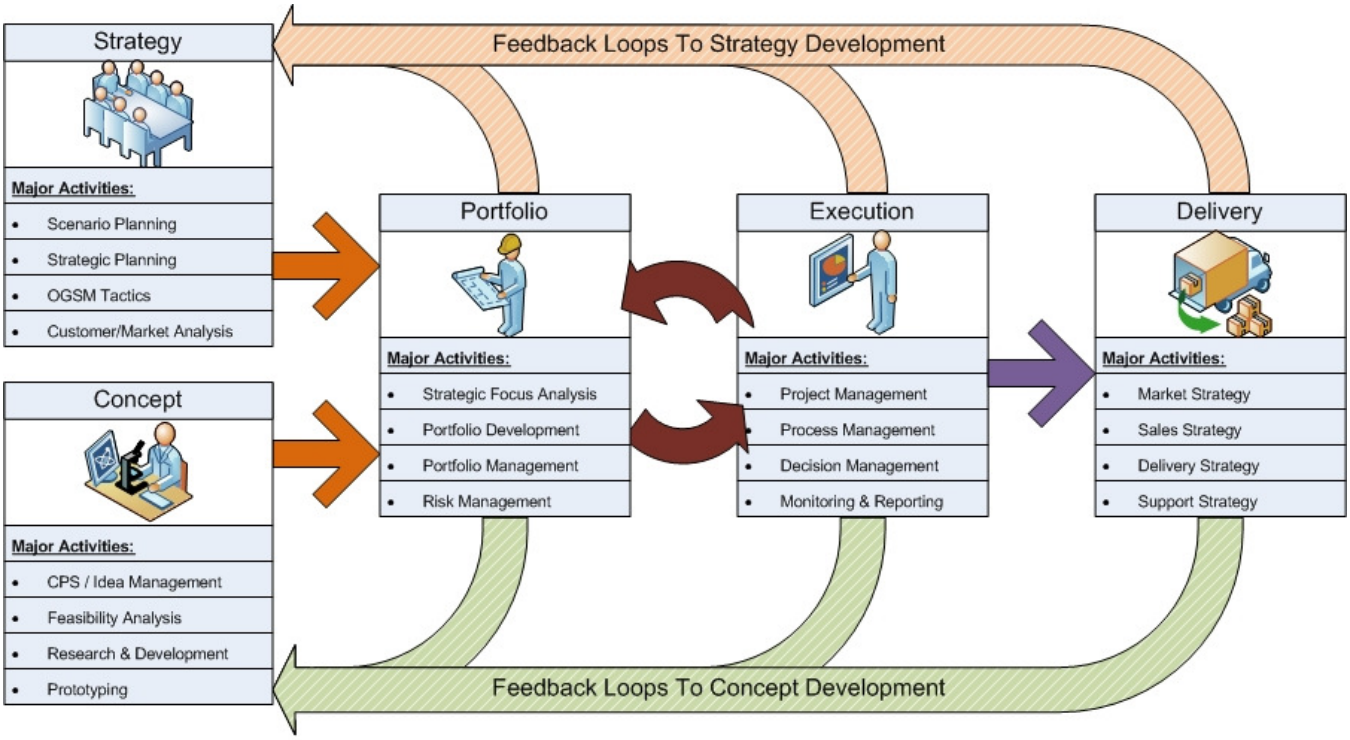
The inclusion of strategic planning activities early and iteratively in the process captures one of the key components most often overlooked in other innovation management processes. However, in our view, it still misses the mark when dealing with two of the biggest pain points (and main points of failure) experienced by organizations seeking revenue growth through an innovation management approach:

1. Review, selection and management of multipleideas (Portfolio Management)
2. Execution of individual initiatives within the portfolio (Execution Management)

By combining the new innovation value-chain concept with specific focus areas dedicated to portfolio management and execution, this research team has developed a new framework for the management and control of ideas and innovation. We call this new framework, **The Innovation Portfolio Management Model, or IPMM**.

> "…the goal of any portfolio-based approach is to maximize the value of the overall portfolio and to balance the strategic fit, timing and sequencing, investment risk, operational capability and resource capacity."

The Innovation Portfolio Management Model – Summary Overview



The Innovation Portfolio Management Model is a collection of five distinct "modules," placed in a deliberately designed sequence which allows for both the logical progression of an idea-based initiative and for continuously iterative feedback loops. In concept, each individual module stands on its own as a uniquely separate business function, but also has direct dependency relationships with the other modules. This loose framework ensures that a structure exists, with appropriate boundaries, limits and flow, but which also does not interfere or compete with the daily business operations.

As we take a walk through the framework, both modules of Strategic Development and Concept Development start the process and occur in parallel. Key to this design feature is that the organizational activity used to determine the overall objectives, goals, strategies, tactics and measures are conducted independent of research and development activity. The forced union between strategic and R&D activities this early in the process is self-defeating. There will be plenty of time in the next module of the framework to align the outcomes of these two separate functions.

In the Strategic Development function, the strategic leadership team can independently determine **where** they see the organization needing to be positioned in future and **how** they will get there from a tactical perspective. This activity also ensures a focus on market and environmental trends, developing responses to various potential future scenarios and observing consumer preferences and behaviors. While the strategic leadership team certainly collaborates with research and development on what is

"possible" as one input to their overall decision making, the focus here will remain on establishing plans and roadmaps to ensure that the overall agreed upon strategic direction is followed.

Likewise, the Concept Development module ensures that the research and development teams can also independently assess market trends, research scientific developments, explore alternative uses for existing materials, develop potential new product/service feature enhancements and encourage innovative new thinking. This deliberate separation from organizational strategy allows the research and development function to not be limited in their exploration and thinking as to only what is planned from a strategic standpoint. This "blue sky" approach will ensure an appropriate mix of risk / reward initiatives in the innovation portfolio.

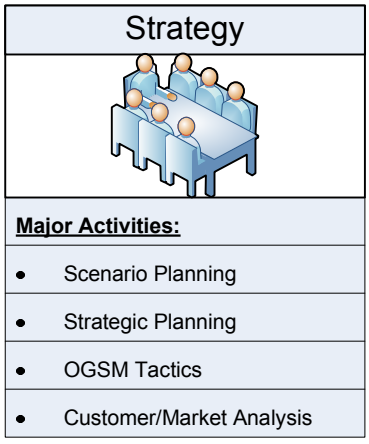
Portfolio Development is where strategy and possibility are combined to ensure that the organization works on the right initiatives to maintain a growth focus and starts that work at the right time within identified near-term, mid-term and long-term time horizons. This portfolio-based approach explores risk, places initiatives into categories that align to strategic focus areas, manages resources, sets priorities and conducts time-boxing, sequencing and duration setting functions.

Once the portfolio of initiatives is determined, it integrates seamlessly and iteratively with the Execution Development module. This module is where day-to-day project operations are planned, executed, monitored and controlled. It is also where process development occurs and requirements, functional design, technical specifications, testing and implementation decisions are made. Review processes and decision making complete the circular feedback loop with Portfolio Development, thus ensuring that the individual efforts being managed within this execution-based module remain aligned to the appropriate strategic portfolio focus areas and time horizons. Monitoring and reporting make up the main feedback mechanisms utilized to ensure the initiatives either continue toward delivery or take some other action to change course.

Finally, as the strategically aligned initiatives reach a maturity level that places them at the threshold of completion, they are transitioned to the Delivery Development module and are positioned with the strategies established by the organization for marketing functions, sales approaches, delivery mechanisms and established levels of support. Here, and at all previous modules, feedback loops are connected to both Strategic Development and Concept Development to capture whether the new products and/or services have met the objectives set forth in the strategic plan, solved the problems identified in R&D or generated lessons learned that can be captured and leveraged to improve upon or modify the current strategic or concept development direction.

The Innovation Portfolio Management Model – Modular Approach Detailed Analysis

There is still much work to be done via additional research, data and process modeling, end-user trials and implementation feedback in order to build a complete and robust set of detail-level activities, but we will provide some of our key thoughts surrounding each module in this section.



STRATEGY DEVELOPMENT:

Strategy development takes its ancient roots from military tactics and extends it to business operations. Formally defined as "a plan of action designed to achieve a desired goal," in the context of innovation management, it is the vision, plan and direction of an organization, defined over a set period of time, and designed to achieve a specific business goal such as growth, profit, meeting the needs of customers, etc. In order to adequately develop an effective strategy, organizations must be able to see into the future, define a purpose, mission and goal, analyze trends and current events, conjure up scenarios and develop tactics and measures for reaching the desired end state.

- Scenario Planning
  - Future State Analysis
  - Preparation
  - Research & Planning
  - Scenario Development
  - Scenario Execution
  - Scenario Outputs
- Strategic Planning
  - Historical Analysis
  - Definition of Current Vision / Mission
  - Internal SWOT (Strengths-Weaknesses-Opportunities-Threats) Analysis
  - External SWOT
- Strategy Execution Planning
  - OGSM Framework
    - Objectives
    - Goals
    - Strategies
      - Tactics
    - Measures
- Customer / Market Analysis
  - Market Profiling
    - Exploitation Analysis
    - Saturation Analysis
    - Size
    - Growth Rate
    - Distribution Channels
    - Supply / Vendor Channels
    - Trending
  - Ethnography
  - Needs Analysis

American Institute for Innovation Excellence

Concept

Major Activities:
• CPS / Idea Management
• Feasibility Analysis
• Research & Development
• Prototyping

CONCEPT DEVELOPMENT:

Typically the function of a formal R&D (Research & Development) business unit, however there are other "standard" business functions tasked with concept development activities such as New Product Development Teams, Project Teams, Creative Departments and "SkunkWorks" Facilities. New ideas are introduced into the organizational system via a number of different sources: internal employees, open innovation initiatives (where anyone can submit ideas), continuous improvement programs, customers, suppliers or via purchasing / licensing intellectual property. In concept development, the purposeful search for problems to solve is conducted and any new ideas developed are further explored and tested:

- R&D Management and Organizational Functions
- Creative Problem Solving Processes
  - Problem Identification
    - Root Cause Analysis
  - Incubation
  - Ideation
    - Group
    - Individual
  - Grouping / Narrowing
  - Selection
  - Experimenting / Testing / Validating
- Idea Management Functions
  - Tools Library (Tool Box)
  - Techniques Library
  - Process Best Practices
  - Facilitation
- Gap Analysis
  - Past / Current State Mapping
  - Strategic / Future State Mapping
  - Gap Identification
  - Remediation / Gap Closure
- Feasibility Analysis
  - Prototyping
  - Market Analysis
  - Financial Analysis

"The old corporate game of fractionalizing resources to satisfy everyone on the stakeholder list isn't going to work if things really need to get done."

American Institute for Innovation Excellence

Portfolio

Major Activities:
• Strategic Focus Analysis
• Portfolio Development
• Portfolio Management
• Risk Management

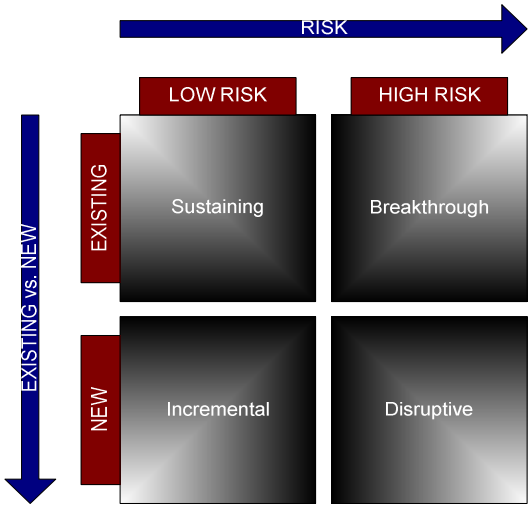
PORTFOLIO DEVELOPMENT:

Portfolio management enables organizations to identify, select and manage the investments that will maximize business value. These "investments" are also known as projects, or product development initiatives. At the portfolio level, an organizational, cross-sectioned view of strategy is assessed and decisions on priority and resourcing are made to control the rate and direction of implementation.

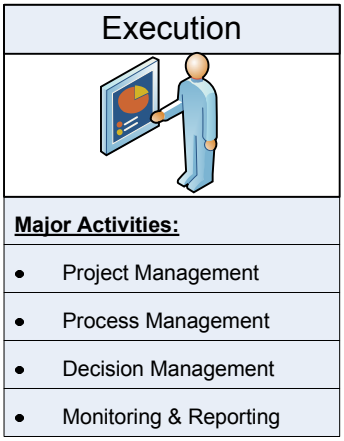
Portfolio management approaches seek to optimize the organizational investments through the development of filtering and ranking criteria, analysis of business cases, evaluation of presentations and research reports, decision making on efforts to proceed, stop or hold, monitoring progress and fine-tuning resources and implementation approaches. In essence, the goal of any portfolio-based approach is to maximize the value of the overall portfolio and to balance the strategic fit, timing and sequencing, investment risk, operational capability and resource capacity.

The old corporate game of fractionalizing resources to satisfy everyone on the stakeholder list isn't going to work if things really need to get done. Tough decisions, based on an honest assessment of the priorities within a portfolio, are required.

- Strategic Focus Area Development
  - Sustaining Portfolio
    - "Keep The Lights On" (KLO) Activity
    - Maintenance
    - Support
  - Incremental Portfolio
    - Continuous Improvement / Lean Activities
    - Line Extensions
    - Feature Releases
  - New Concept Development – Breakthrough Portfolio
    - Existing market "game changers"
  - New Concept Development – Disruptive Portfolio
    - New / Adjacent market "game changers"



- Portfolio Development and Management
  - Validate Strategic Fit
    - Strategic Balancing
  - Timing & Sequencing of Initiatives
  - Categorization Activities
    - Prioritization
    - Force Ranking
  - Funding / Resource Management
    - Financial Budgeting and Risk Balancing
    - Capacity Analysis and Planning
    - Resource Allocation and Management
  - Reporting
    - Bubble Charting
    - Decision Trees
    - Strategic "Bucketing" Concept
    - Scoring Models
    - Comparative Ranking Models
- Risk Management
  - Risk Types
  - Mitigation Strategies
  - Frequency vs. Impact Analysis



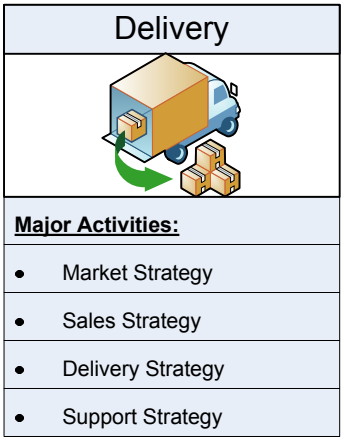
EXECUTION DEVELOPMENT:

"Execution" is one of those business concepts that holds tremendous promise, but is difficult to put into practice. In other words, it's much easier said than done. However, execution is critical to any successful innovation management framework. In essence, without execution, you fail.

Execution can be broken down into a set of process steps or activities that enable an organization to implement a desired strategy. There are a number of different execution management strategies, tools, techniques and cultural behaviors available to transition from concept to reality. Our preferred execution method relies heavily on project management discipline, as the rigor it provides ensures that innovative ideas actually get implemented.

- Project Management
  - Traditional
    - Plan
      - Charter / Scope
      - Business Case
      - Design / Specification

        - Execute
            - Development
            - Testing
            - Implementation
        - Close / Hand-Off
    - Agile
        - SCRUM
- Organizational Execution Excellence
    - Leadership
    - Commitment
    - Engagement
    - Accountability
    - Communication
    - Alignment
    - Effectiveness
    - Reward & Recognition
- Process Administration
    - Checkpoint / Gating Strategy
    - Facilitation
    - Operations Management
- Decision Making Strategy
    - Decision Tree / Matrix
    - Criteria Development
- Monitoring and Reporting
    - Project Management Plan
    - RAID (Risks, Assumptions, Issues & Decisions) Log
    - Dashboards
    - Status Reports
    - Health Checks
    - Change Management Documents
    - Project Schedule
    - Project Budget
    - Key Performance Indicators
    - Metrics



DELIVERY DEVELOPMENT:

By amalgamating a number of popular definitions for the term "innovation," we forward our own definition, "*The process of acting upon, or putting to use, a new concept or combination of concepts that creates new value and/or captures value in new ways*." Accepting this definition of innovation assumes that someone has found enough value in the new concept to exchange payment for its use. This is where the delivery, or commercialization, of innovation management is planned for, managed and executed.

- Commercialization
    - Market Strategy
    - Sales Strategy
    - Pricing Strategy
- Delivery Strategy
    - Early Release
    - Full Release
    - Feature Releases
    - Incremental Release
    - Maintenance Release
- Support Strategy
    - Service
    - Maintenance

- After-Market
- End of Life / Decommissioning Strategy

Again, there is much more work to be done in order to further "flesh out this straw man" of a process framework, but we feel that it both effectively and efficiently addresses many of the current shortcomings and weakness of current models, approaches and frameworks.

Specifically, we call attention to several key points of differentiation:

- Creating a separate, dedicated focus on strategic planning and organizational strategy alignment
- Deliberately structuring the process framework to keep strategic planning and concept development separated, allowing each to focus on what is "possible" without worrying about the self-imposed limits created by the other
- Replacing the singularly focused, linear, phase-gated approach to execution with a more global view of appropriately "risk balanced" initiatives
- Basing the new approach on portfolio management concepts and a continuous, iterative assessment of the execution of the portfolio as a whole
- Connecting feedback loop mechanisms from each stage of the process back to strategy and concept development

The Innovation Portfolio Management Model – Benefits

With the rough process framework now in place, we next asked ourselves what potential benefits organizations might expect to derive from taking such an approach?"

- Linkage of strategic vision to execution
- Linkage of market and economic realities to the strategic vision
- Linkage of future trends to the strategic vision
- Provides an appropriate blend of investments in growth-based initiatives with the overall risk tolerance of the organization
- Provides a mechanism to periodically review, adjust and / or cull projects or initiatives
- Generates a continuous, managed approach for innovation
- The portfolio-based approach includes not just current, approved and executing projects, but new / proposed projects, recently completed projects and projects that may be on hold so that a broader view of the overall blend of initiatives can be ascertained
- Introduces the concept of maturity improvement to the lifecycle of innovation management
- Provides for more meaningful metrics, robust systems of measurement and dashboard style, balanced scorecard reporting for innovation management

The Innovation Portfolio Management Model – Challenges & Obstacles

Inversely, we endeavored to examine possible challenges, obstacles and short-comings of our own model. In our analysis, we did discover a number of potential stumbling blocks that the reader should consider:

- Portfolio management-based models require significant leadership attention
- This new process scales up nicely, but does not scale down well
  - Portfolio management may not be appropriate for smaller organizations with limited resources or few initiatives to manage
- Deliberately separating strategic functions and concept development functions opens up the risk of developing certain ideas and concepts that will be considered "throw away" or waste
  - While we consider this to be an actual strength of the model in order to expand the vision of possible concepts, certain organizations may not have the capability or capacity to take this drastic of a step
- Organizations who are intensely process-focused, have a strict adherence to lean process principles and tolerate little variance will struggle with the purposely designed-in "looseness" of the proposed process flow
- Organizations who are weak in project management skill and discipline will likely not benefit from this framework

Concept 2: Innovation Architecture

We would certainly be remiss if we did not address one of the other major pain points of the phase-gate approach that we identified earlier, which is an adequate consideration of the "ambient" environmental framework that should encompass any set of processes that make up an effective innovation management approach. As also previously noted, even the creators of the Stage-Gate® Model have recognized the importance of including such an over-arching support environment for innovation through their development of the new "Next-Gen Stage-Gate®" model and Dr. Robert Cooper's seven "Lean, Rapid and Profitable" (LRP) ideas.

Our vision of an all-encompassing framework for innovation management includes an integrated design called the "Innovation Architecture" that incorporates the following key structures:

1. Implementation of the Innovation Portfolio Management Model
2. Encouragement of the Supporting Environmental Forces
3. Focus on providing the Supporting Operational Forces
4. Awareness and Acknowledgement of Organizational Barriers and Process Excellence Requirements
5. Establishment and Maintenance of a Continuous Innovation Loop "micro-Process"

A closer examination of the "Supportive Environmental Forces" reveals a list of attributes and behaviors that enhance and

promote a productive environment for innovation:

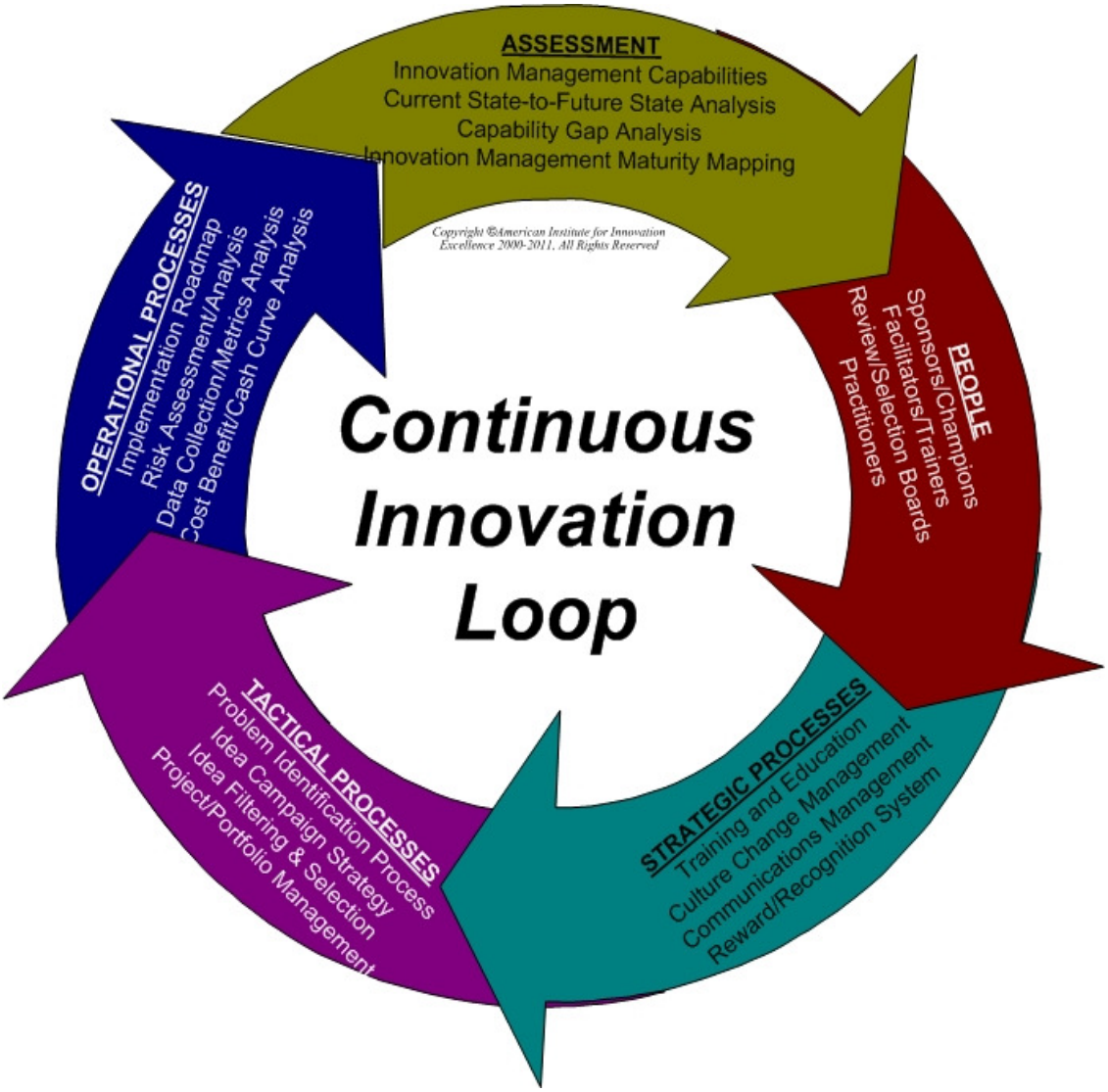
- Leadership
  - Dedicated Executive Leader for Innovation Management
  - Participation and Engagement
  - Effective Decision Making
  - Resource Allocation Planning
  - Idea Championing / Sponsorship
  - Strategic Leadership
- Culture
  - Trust-Based
  - Idea Sharing
  - Risk Tolerant
  - Failure Tolerant
  - Learning Culture
  - Reward / Recognition Systems
  - Collaborative
  - Experimenting
- Resources
  - Human Resources
  - Financial Resources
  - Time Resources
  - Spatial Resources
  - Product Resources
  - Collaboration Resources
  - Tools & Systems
- Business Discipline
  - Continuous Innovation
  - Dedicated Innovation Management Business Function
  - Innovation Center of Excellence
  - Innovation Community of Practice
  - Knowledge Management
  - Portfolio & Project Management
  - Financial Management
- Training
  - Basic & Advanced Training
  - Creative Problem Solving Concepts
  - Process Training
  - Idea Management Concepts
  - Innovation Management Concepts
  - Facilitation Training
  - Leadership /Sponsorship Training

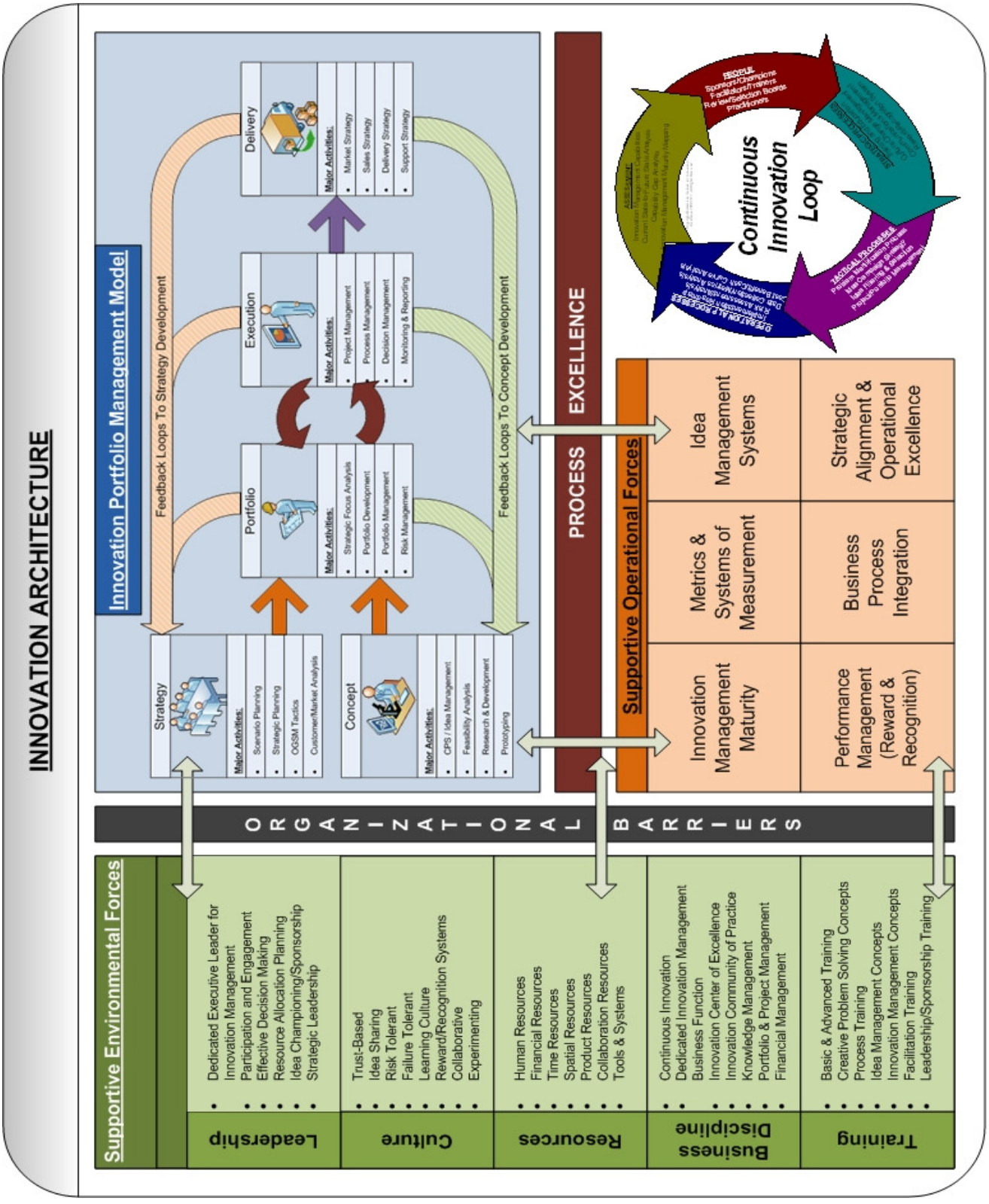
"Supportive Operational Forces" are those that provide the supporting administrative functions and systems to ensure efficiency in the overall approach:

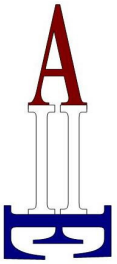
- Innovation Management Maturity
- Metrics & Systems of Measurement
- Idea Management Systems
- Performance Management Systems
- Business Process Integration
- Strategic Alignment & Operational Excellence

Lastly, a memorable, visual mechanism that displays the key people, processes and tools for making innovation a consistent and repeatable business process should be leveraged. This tool provides users with a pictorial representation of the new architectural approach, along with demonstrating that the process of innovation can be managed, can be made easy to understand and can be an integral part of helping organizations grow and profit:

The AIIE Continuous Innovation Loop Model:







American Institute for Innovation Excellence

Conclusion

Innovation management is indeed a concept still very much in the process of being defined. By its very nature, that may always be the case. The best practices of today inevitably lead to the next practices of tomorrow. The purposeful search for new problems to solve, and the new solutions that capitalize on them, constantly begs for contempt of the status quo. We do not claim that the material presented in this research is the one and only best approach for all of innovation management. We do put forward, however, that the research conducted here, along with the creation of the "Innovation Portfolio Management Model" and the "Innovation Architecture" framework, establishes a fresh, new direction for the efficient and effective management of ideas and innovation and is worthy of further exploration and use by innovation management professionals.

That being said, any new approach, we feel, should also be designed with appropriate mechanisms for adjustment and modification. One of the arguments that this research was based upon was that the current phase-gate approaches have been so frequently modified that the original model must somehow be flawed. In our analysis, the main reasoning behind such criticism was not related to the model itself, but rather in its application.

For example, the Stage-Gate® Model, in concept, was crafted to have the greatest impact on the "New Product Development" process environment, and was not specifically designed for the management of all innovation-related processes. Unfortunately, in practice, this has not turned out to be case and its application in everything from service-based innovation, innovation management, idea management and even project management has been akin to forcing a square peg into a round hole. Documented weaknesses of the model, such as a lack of focus on the "front end" or the number of steps/overhead applied or the inability to manage multiple efforts within the same pipeline are all symptomatic of the wrong tool being used for the "job to be done," in the words of our esteemed colleague, Clayton Christensen.

We acknowledge that our own model may eventually be construed in the same manner. This was the premise behind exploring the "modular" approach. A modular-based framework liberates the end user, with express permission granted up front, to "plug and play" with any the individual modules as needed to achieve the maximum effectiveness and efficiency for their specific circumstances. In fact, the modules were designed to stand on their own as self-contained business units that both consume and produce valuable information and resources for the rest of the organization.

We endeavored to learn from the evidence that past, similar process frameworks have suffered most criticism only after poor management, inappropriate application, and political infighting resulted in frustration and failure, and not as a result of their physical design. Based upon that learning, we have also sought to pro-actively address these weaknesses through the application of supporting environmental and operational factors built into a larger "innovation architecture" framework. This, along with an acknowledgement of the organizational barriers that likely exist and the

need for process excellence to already be in place within the organization, rounds out the complete view required to excel at innovation management.

We welcome engagement and discussion with organizations and individuals that put our new model into practice, so that we can learn from your successes, failures or required modifications, and share that learning with others. If you are not already a member of the American Institute for Innovation Excellence, please consider joining our organization to partner with us in delivering key research and development programs designed for the creation of next practices and improvements in the field of innovation management.

It is the sincere hope of this research team that organizations will find our work to be the alternative that allows them to take action and move beyond a phase-gate approach to innovation management, in direct reference to the quote with which we started off this research paper and attributed to Clayton M. Christensen, Stephen P. Kaufman, and Willy C. Shih in their January 2008 Harvard Business Review article titled, "Innovation Killers: How Financial Tools Destroy Your Capacity to Do New Things."

Published by the American Institute for Innovation Excellence
March, 2011
Research Lead: Paul R. Williams

American Institute for Innovation Excellence

Appendix A – Innovation Portfolio Management Model Suggested Roadmap

Timeline of Events:

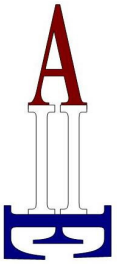
1. Assess
   - Understand current competencies
   - Understand potential areas of opportunity
2. Plan
   - Develop a strategic plan combining identified competencies and opportunities
   - Communicate executive and organizational commitment
   - Identify and assess existing innovation, project and portfolio processes
3. Design & Develop
   - Design and implement innovation portfolio and risk segments
   - Align existing initiatives into portfolio based approach
   - Gather customer insights and needs
   - Design idea management processes
   - Design idea and initiative review and selection criteria
4. Implement
   - Allocate people, money, space, time and tools to portfolio based approach
   - Provide training, knowledge management and support functions
   - Solicit ideas / Conduct idea generation sessions
   - Introduce new initiatives into portfolio based approach
5. Improve
   - Manage portfolio blend and align to strategy
   - Identify broader scope of potential opportunities and risk segments
   - Improve existing processes and look for new, more efficient processes
   - Build and maintain supporting culture for new ideas, innovation and execution

Foundational Milestones:

- Develop Innovation Portfolio Design
- Selection & Evaluation Criteria Complete
- Develop Idea Management System
- Develop Centers of Excellence Internally
- Develop Partnership and Alliance Opportunities Externally
- Develop Customer Ethnography Tools
- Conduct Executive Portfolio Management Workshops

Process Development and Establishment Tasks/Activities:

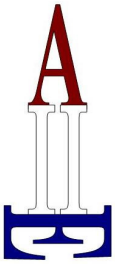
- Performance Metrics Definition and Reward / Recognition Systems
- Project and Portfolio Planning, Alignment and Management
- Resource Allocation and Management
- Monitoring and Reporting Mechanisms
- Process Formalization and Training
- Market Research and External Environment / Trend Monitoring
- Strategic Planning and Scenario Planning Sessions
- Culture Establishment and Maintenance Activities
- Develop Learning Tools, Knowledge Management System and Training Curriculum
- Develop External Partnerships
- Align All Operational Business Systems With Innovation Management:
  - Strategy
  - Technology
  - Finance
  - Marketing & Sales
  - Human Resources



American Institute for Innovation Excellence

Appendix B – Commonly Used Innovation Management Process Artifacts

- Strategic Roadmap
- Current State Process Map
- Interview / Survey Questionnaire
- People Roster
- Organizational Charts
- Commitment Contracts
- RACI (Responsible-Accountable-Consulted-Informed) Charts
- Training Plans and Supporting Materials
- Change Management Plan
- Idea Selection Criteria
- Idea Scoring Chart
- Risk Analysis
- Risk Management Plan
- Financial Cost / Benefit Analysis
- Financial Budget
- Financial Spend Plan
- Business Case
- Project Charter
- Project Scope Definition Document
- Performance Measurement Matrix
- Metrics Reporting
- Status Reporting
- Dashboards
- Balanced Scorecard
- Communications Plan
- Implementation Plan
- Work Breakdown Structure
- Task Plan
- Project Schedule
- Portfolio Diagram
- Reward & Recognition Plan
- Process Maps
- Policies & Standards
- Templates & Forms
- Idea Board / Story Board / SCRUM Board
- Problem Identification Analysis / Root Cause Analysis
- Scenario Plans
- Trend Analysis
- User / Customer Ethnography Analysis



American Institute for Innovation Excellence

NOTES: