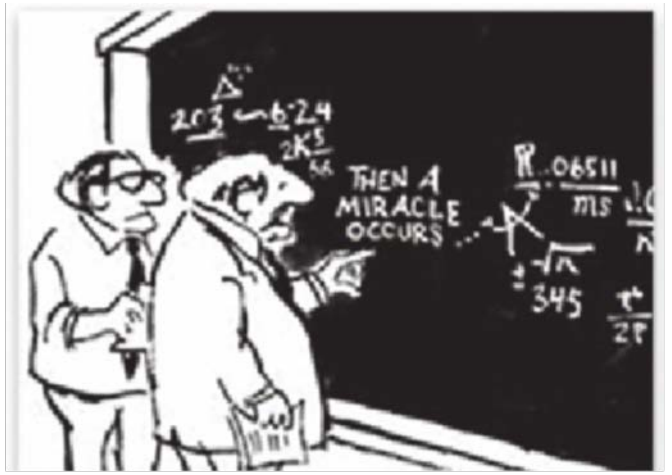
Process: stage-gate

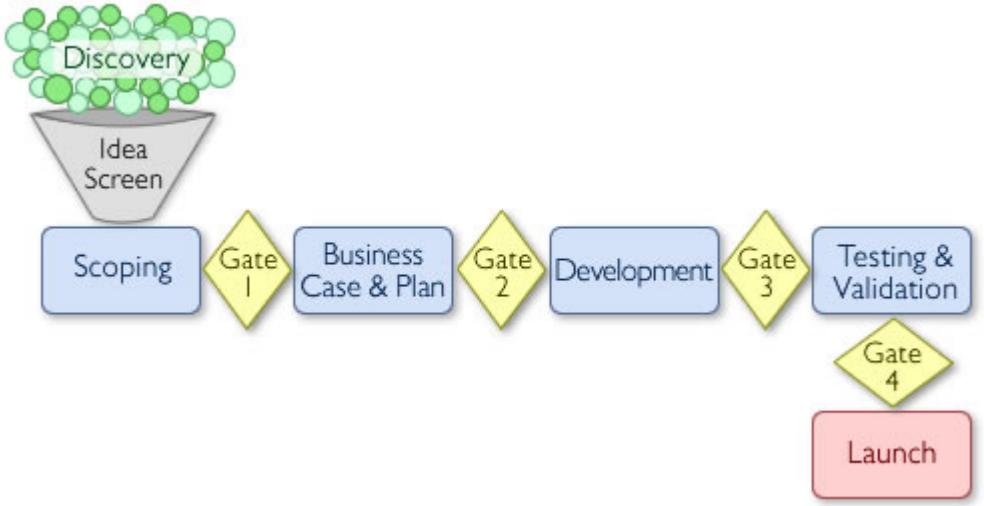
- Stages and gates
- Effectual and causal logic
- Gate criteria



"Connecting customer needs with technology solutions "

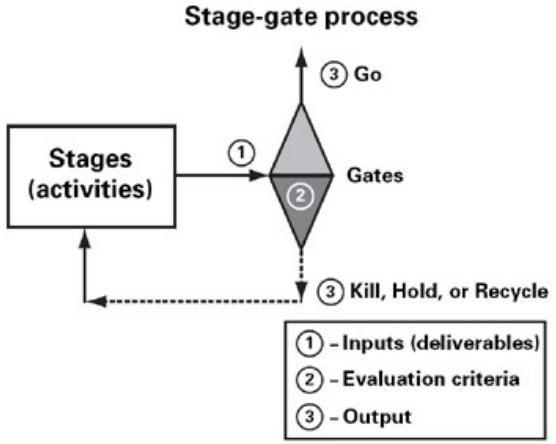
Stage Gate Process

- A process for project selection involving successive decisions to reduce risk and increase investment
- Presumes a well spring of good ideas (invention records)
- Early stages are typically more exploratory and divergent
- Each stage typically covers all important aspects of the business but with progressively increasing precision
- Logically consistent with effectuation



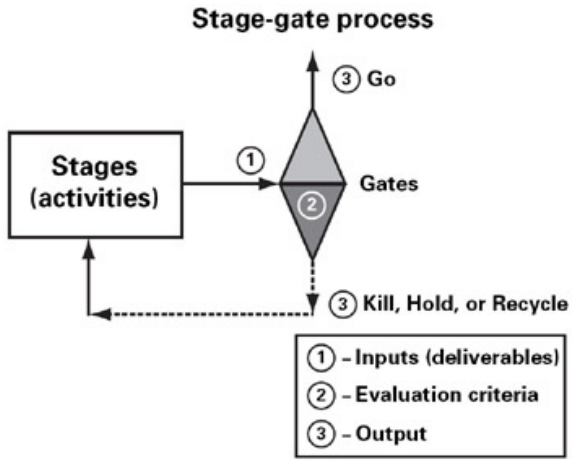
Stages

- Break the process into stages with prescribed activities and outcomes
- Outcomes defined in terms of the most critical information needed for subsequent investment
- Activities designed to provide the critical information to drive down risk
- As uncertainty decreases investments can increase

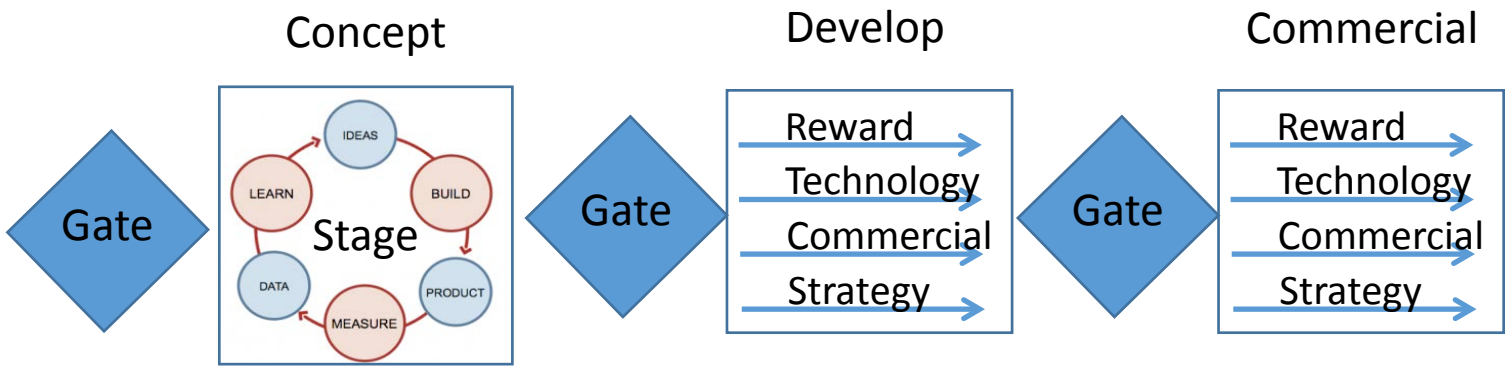


Gates

- Proceed staged activities
- Quality control check points (i.e. criteria)
- Cross functional view (discipline and geography)
- Participants have the authority to provide resources
- No decision without cutting a check
- Either authorise or kill/ recycle projects
- Approve outcomes and timelines



Gates: effectual and causal logic



Experimentation

- The ideation stage is creative and intuitive.
- However, the development process should require evidence to support decisions. Experiments cost time and money but the consequences of uniformed decision generally either fail to realise the full potential of an idea or cause wasted investments in late stage developments.
- Experimentation applies scientific methods to generate knowledge that test an idea's feasibility (i.e. can the idea be transformed into a viable product or service) and elasticity (i.e. potential reach).
- Experiments need to be an integral part of work conducted close to the application and not a specialised function.
- An appreciation for the value of evidence and an understanding of the basics of experimentation need to be ubiquitous (e.g. a handbook for experimentation).
- The experiment might address unknowns related to customers, benefits relative to current solutions, channels, technical feasibility, business model, etc.
- The process of experimentation improves with practice.

Valuing failure

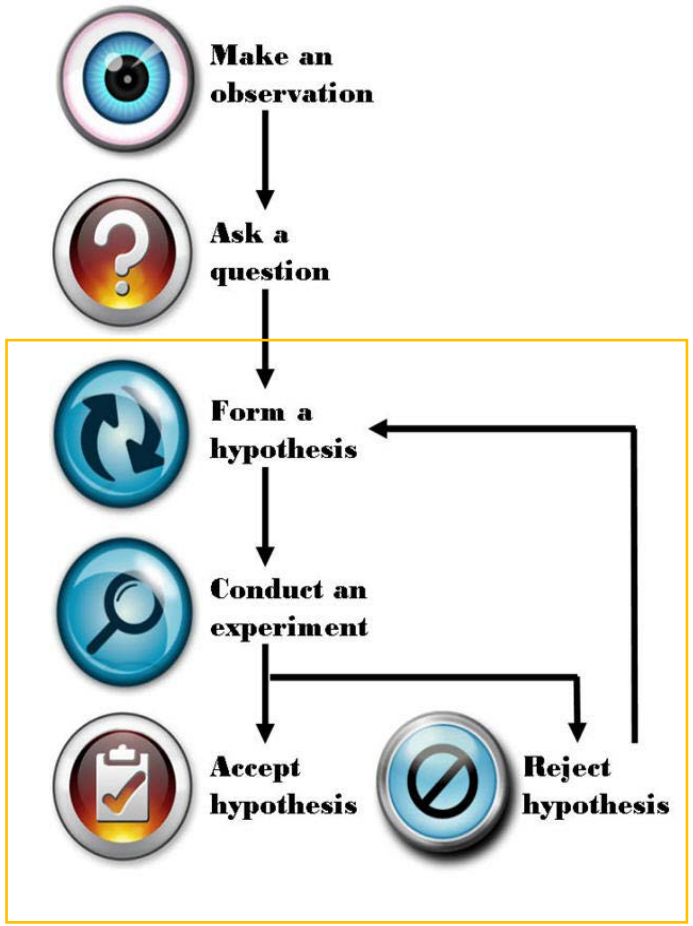
- Beware: Mature organisations, which are designed for optimum performance rather than learning, are risk adverse and have a tendency to avoid errors.
- Experiments often reveal unexpected results that should provoke unorthodox responses and creativity. Even when experiments don't confirm an hypothesis value learning.
- Unexpected information should challenge the inventor to refine their idea. Groups help refinement.
- Foster a culture of allowing failure and sharing while harvesting the learning.
- The experimental methods themselves can be subject to improvement. Capture and share information about how experiments are being used. Formalise post mortems.

"Fail often to succeed sooner" by Tom Kelly of IDEO

"I haven't failed. I've simply found 10,000 ways that don't work" by Thomas Edison

The Scientific Method

- Form a hypothesis. Check prior art (i.e. patents, publications, trade literature, etc.)
- Build prototypes/simulate (e.g. Google's Sketch up, finite element programmes, web sites, etc.)
- Design and conduct an experiment (test prototypes, survey, etc.). Identify dependent and independent variables. Apply cost/benefit and buy/build thinking.
- Collect data, analyse the results, apply statistical rigor, draw conclusions and make recommendations.
- Iterate as necessary or prudent.



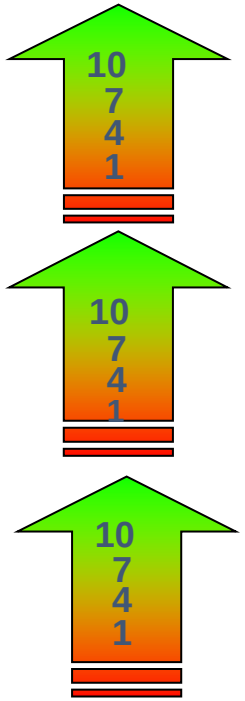
Gate criteria

Commercial Success

- **Response to critical need**
- **Response to important need**
- **Need underdeveloped**
- **Market underdeveloped**

- **No competition**
- **High barrier to entry**
- **Low barrier to entry**
- **Fast and Easy to follow**

- **Unique**
- **Key differentiation in FABs**
- **Differentiated in some FABs**
- **Me Too**



Technical Success

Gap

- Straight forward
- Challenging but doable, incremental
- Large gulf, new science
- “Order of magnitude” change

Resources

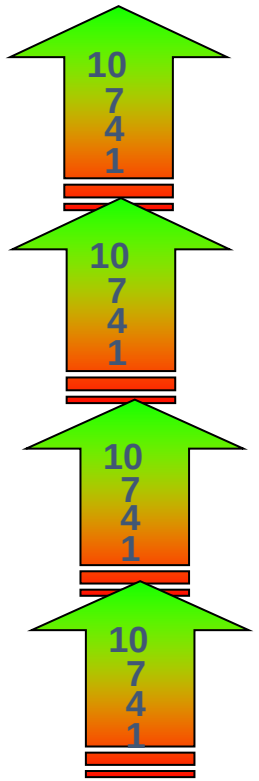
- Pre-production capable
- Pilot capable.
- Lab capable
- From scratch

Skill Base

- Widely practiced
- Selectively practiced
- Complement externally
- New to company

Manufacturing

- Capacity exists
- Minor modifications
- Major modifications
- New to company



Reward: Ultimate and next value point

Profitability

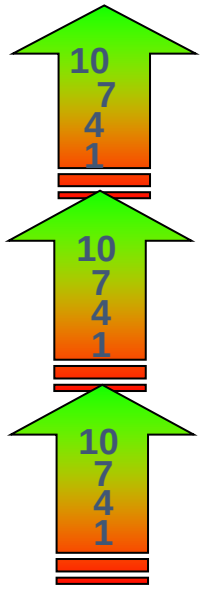
- <$ 1 Billion
- >$ 100 Million
- >$10 Million
- >$1 Million

Investment

- <$ 1 Million
- >$ 1 Million
- >$10 Million
- >$100 Million

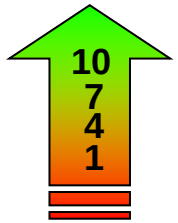
Time to 1st Commercial

- > 10 yrs
- > 5 yrs
- > 3 yrs
- < 3 yrs

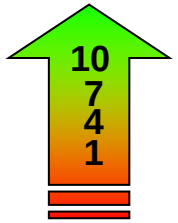


Fit with Business and Strategy

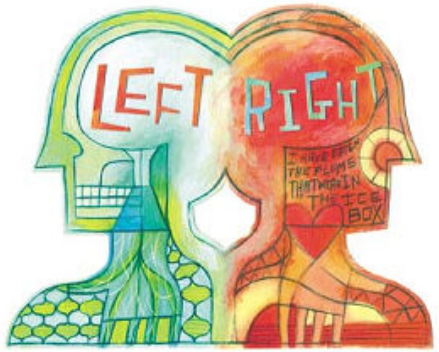
- Vital to business plans
- Good fit with key initiative
- Closely aligned
- Little or no alignment

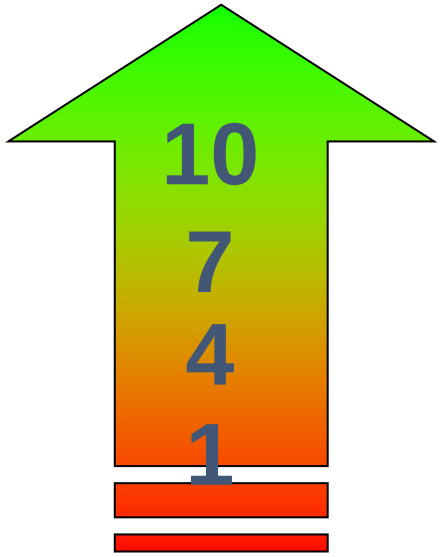


- Major success factor
- Significant factor
- Minor success factor
- Barely noticeable



X Factor: Right Brain





- Bet my career
- Go to the Mat
- Sit on the edge of my seat
- Sit back with arms folded