

S 2 I NEWS

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S2I News is a bi-monthly publication of Strategies 2 Innovate. It aims to present information on topics important to today's business leaders. We hope these articles will help you develop a clear framework useful for guiding your organization's innovation and strategy.

This new series examines the Innovation Pentagon™ framework introduced in the last series discussing challenges organizations will face over the present decade in the area of innovation.

Strategies 2 Innovate

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info@strategies2innovate.com
www.strategies2innovate.com

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The Innovation Pentagon™ & Product Development: Pt1

Have you ever asked the question: How much does it cost to produce one product concept that has a high chance of success? The answer to that depends on what management processes you are using to guide your product development efforts.

The Stage-gate Process

The Stage-gate method is a useful tool^{36,59} popularised by Dr. Robert Cooper that partitions the development process into a number of conceptually sequential steps, such as:

Stage 1: Idea generation.

Stage 2: Preliminary concept investigation.

Stage 3: Detailed investigation and business case development.

Stage 4: Development & testing.

Stage 5: Production and market launch.

After each stage is completed, the project is reviewed against a number of criteria to determine whether it merits progressing to the next stage, i.e., assigning development dollars for the next stage. A key purpose of the stage-gate model is to weed out projects that are more likely to fail. Since each stage represents a larger investment than the preceding one, it stands to reason that potential failures should be weeded out as early as possible.

Based on this concept it is easy to see that the purpose of each stage is to select the few projects that are most likely to succeed while discarding those that are likely to fail.

We can say that each stage has a pass ratio P equal to the number of projects that pass the gate review of that stage N_p divided by the number of projects that enter that stage N_e . Mathematically, we can state this as follows:

$$P_i = N_{pi} / N_{ei}$$

where i is the stage sequence identifier.

We should note that the value of P increases as we go further into the development pipeline. In other words, as each project passes a stage and goes to the next stage, we become more confident that it will be successful.

Also, we can state that each stage requires a particular amount of effort to execute its assigned activities, which we'll call E_i . Using the stage gate philosophy, the amount of effort required for each stage increases as the project moves forward. For example, the idea generation stage may take only an hour, the preliminary investigation stage may take 10 to 20 person days, the detailed investigation may take 20 to 40 days and so on.

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LARRY VAN DEN BERGHE, Ph.D.

Larry van den Berghe is the Founder and Principal of Strategies 2 Innovate. He has 20 years international experience in the aerospace and information and communications technology industries in England, Australia, Singapore and Canada. He has been an active manager and contributor in R&D and new product development in electronics, VLSI and software. He holds two US patents, one UK patent and has a number of publications. He is a Chartered Engineer (UK) and a Fellow of the Institute of Electrical Engineers.

Larry is also an adjunct professor for the Management of Technology @Distance graduate program at the University of Waterloo and a past faculty member with the Technical University of British Columbia. He has developed courses in new product development, strategic management of innovation and technology, entrepreneurship and knowledge management. His recent research on core competencies examined the adoption of emerging technologies for product innovation within the Canadian information and communication technology industry.

He holds a Ph.D. in Management Sciences (Management of Technology) from the University of Waterloo, an M.Sc. in Microelectronics (with Distinction) from Middlesex University, London, U.K. and a B.Appl.Sc. in Applied Physics from Curtin University, Perth, Western Australia. Larry has served as Chairman, Board of Directors and is a member of a Toastmasters International Club.

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Now let's go back and show an example of how our question can be answered. We want to know how much effort it will take to produce one high quality product concept that has a high likelihood of success, i.e., one project passing out from the detailed investigation - business case development stage.

To calculate we'll need to make some assumptions regarding P values and these will be a dependent on each specific business.

For example, we can start from the end and work backward as follows.

Let's assume that $N_{p3} = 3$,

$P_3 = 0.75$, and $E_3 = 30$ person days. Therefore, $N_{e3} = 3/0.75 = 4$ and

Total effort for stage 3 equals

$$E_{3T} = 30 \times 4 = 120 \text{ person days}$$

For Stage 2, let's assume

$P_2 = 0.60$, $N_{p2} = 4$ (the number entering stage 3), and $E_2 = 10$ person days, then

$N_{e2} = 4/0.6 = 6.7$. Since we can't have a fractional project, we round this up to 7.

Total effort for stage 2 equals

$$E_{2T} = 10 \times 7 = 70 \text{ person days}$$

Finally, for Stage 1, let's assume

$P_1 = 0.30$, $N_{p1} = 7$ (the number entering stage 2), and $E_1 = 0.125$ person days, then

$$N_{e1} = 7/0.3 = 23.3, \text{ rounded to } 24.$$

Total effort for stage 1 equals

$$E_{1T} = 0.125 \times 24 = 3 \text{ person days}$$

The total effort to create three worthy project concepts for business investment is $E_{1T} + E_{2T} + E_{3T} = 3 + 70 + 120 = 193$ or 65 person days per business concept!

In our May/June 2005 issue we will look at more issues related to product development.

See you then!

Larry van den Berghe

For more information and for references to the literature as identified by superscripts notations (e.g. ¹) please visit our innovation strategy knowledge portal www.strategies2innovate.com and follow the links to "Knowledge References."

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