

A Model for Gauging Opportunity: A Tool for Business Development

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Anyone who has ever tried to bring together an inventor and a large organization knows frustration is part of the process. I've sat on both sides of the table, as an officer of an advanced bioseparations company and as the new business development manager of a medical device company. The first was with a small company licensing out inventions and the second with a large organization seeking new product opportunities. Truly the process, with all its twists and turns, invokes a kaleidoscope of emotions. And then there is time. The time to get attention, the time to overcome inertia, to overcome the not-invented-here syndrome and the fears of being wrong . . . the time it takes to get things done.

Organizational complexity exacerbates the frustration. In their book, *Developing Products in Half the Time*, Preston Smith and Donald Reinertsen argue the cost of the "fuzzy front end." They contend that it is at the beginning of a project where time is needlessly squandered. It is here at the front end where direction is uncertain and the management handles of budgets and schedules are not yet in place. And it is this lost time that costs. Not the dollars wasted on salaries, but the time value of lost profits attributed to the delay. Nor is it simply a question of "make it now or make it later." The marketplace is an unforgiving arbiter. Too often the window of opportunity closes after the first player passes through. Contrary to Emerson's opinion, many a better mousetrap has languished because the one was already in the market worked fine. Wasted time can be very expensive.

The Business Opportunity Model is essentially a framework for evaluating the merits of a project or licensing deal. Companies work by creating value. Ideally, every activity or undertaking of an organization adds value to itself. So what is about to unfold is a *quick* and *easy* modeling method to calculate the net present value, NPV, of an opportunity.

The center of any organization understands the language of dollars and NPV. Opportunities need this perspective to be seen. Attribute a value to a project and it gets attention. Comparing the NPV of a project to a company's net worth bestows relevance. Weighing the NPV of one opportunity against another's establishes priorities. Unfortunately, too much time and wheel spinning pass before a NPV is hung on a project. Good projects may fall through the cracks and poor ones receive too much attention in the "fuzzy front end."

The Model is an agglomeration of other peoples' wisdom boiled down over the past twenty years and seasoned with my own view of how things work. Its purpose is to establish a *credible* net present value for an opportunity. This can be applied at any point in an innovation's life, from when it is a raw idea to a product ready for launch. Figure 1 depicts the five phases in the metamorphosis of an idea to a commercial reality. Each state is distinguished by the refinement of the prototype and is characterized by a set of overriding issues; the nature of the risks and a confidence level attached to the economics. The banner across the top is the development pipeline.

Figure 1: Development Pipeline/Phases of Development

Conceptualization	Crystallization	Venture Formation	Business Development	Operational Launch
Phase I	Phase II	Phase III	Phase IV	Phase V
Product Idea/ Renderings	Product Prototype/ Models	Premanufacturing Prototype	Manufacturing Prototype	Commercial Product
Issue: Need	Issue: Need/Cost	Issue: Cost/Price	Issue: Price	Issue: Sales/Profit
Risks: Open	Risks: Bound	Risks: Defined	Risks: Accepted	Risks: Known
Economics: +/-50%	Economics: +/-30%	Economics: +/-10%	Economics: +/-10%	Economics: +/-10%

A salient feature of the Business Opportunity Model is that it is quick to apply, at best a few hours or at worst a few days. It is so important to have an NPV early, a *walking around number* for generating buy-ins. But it is not the number alone that is so crucially important as is the individual that grasps the opportunity and begins winning support with the statement, “imagine if . . .” It’s this excitement, in part coupled with the walking around number, where champions and sponsors are born.

The Business Opportunity Model is an economic model of a business - its net cash flow - reduced to its net present value, NPV, using a fixed time horizon and a discount factor that reflects the risk of the undertaking. The value of an opportunity then is assessed by making reasoned assumptions within a set framework. I typically go with a four-year horizon. This will vary with industry, but I recommend keeping the time horizon short, between three and five years, and then staying with it. Be consistent with the horizon from one opportunity to the next. Figure 2 depicts the main elements of the Business Opportunity Model.

Figure 2: Elements of the Business Opportunity Model

- ◆ Delineate the size of the market from a string of facts and assumptions
- ◆ Approximate the rate of user adoption and hence market penetration
- ◆ Estimate a cash flow stream using comparable business economics
- ◆ Calculate NPV using the discount factor to reflect intrinsic risks

Figure 3: Innovation Imperatives

Technical Potency

Inventive Merit . . . a fundamental new combination of scientific principles.

- ◆ Relieves or avoids major constraints in the practiced /previous art
- ◆ Constraints inherent in the new art

Embodiment Merit . . . physical form now possible

- ◆ Dilution vs. enhancement of assessed value
- ◆ Scope for improvement
- ◆ Business Advantage

Operating Merit

- ◆ Impact on how product is made and/or distributed
- ◆ How it effects business practices

Market Merit

- ◆ Final demand potential
- ◆ Revenue/profit potential
- ◆ Market dynamics - leadership/concentrations
- ◆

The product and its need

This is the first focus that results in a list of facts and assumptions about the opportunity. They are in answer to questions such as: What is the product? What need does it fill? How is the need being fulfilled now? How is this different from the products now filling the need? In assessing the product or process opportunity ask what are its features, competitive advantages and user benefits? There are three reasons why people buy things . . . they're newer, better or cheaper than what is out there now. This runs the gambit from crutches to central venous catheters. As consumers or users become accustomed to a product it becomes the way of fulfilling that particular need. That is why so much hangs on being first to market as the winner typically commands the greatest market share over the long haul. But the design features have to be right to become the *dominant design*. In the early stage of a market's formation a new design that offers marginal advantages or benefits over the product that crystallized the market can capture the leadership position. Once that design has ensconced itself in the minds of the users, a paradigm takes hold and what was once "one possible solution" now becomes the "only solution." Opportunities to unseat the dominant design do occasionally and wonderfully show themselves. So much for newer and better. Look at the proliferation of "me-too" products in the world. They're working the "cheaper" side of the equation as competition blunts the idea of one product being "better" than the other. Breakthroughs in production, however, where there are clear cost advantages over the competition, can be significant. Here "better" is not sacrificed for "cheaper." In summary, are you dealing with a new solution to an old problem or a solution to a new problem? These answers are important, as we'll see later for figuring out rates of market penetration. Figure 3, Innovation Imperatives, was distilled primarily from an article by George R. White, then with Xerox and Margaret B. W. Graham a professor at Harvard University.

Proprietary Position - The issue of a patent is part and parcel to a product opportunity. Has an application been filed? What is its status? How sound are the claims? Do they provide a solid commercial franchise? For example, if a patented device uses a disposable supply is that too covered? Or will commercializing the product create an installed base for the competition to service? Subject to counsel's review, how have tests of utility, novelty and unobviousness been addressed?

The Marketplace

Again, this is addressed by a list of facts and assumptions about the opportunity. How big is the potential market? Is this an established market or one that would be developing? Of whom is it comprised: Every man, woman and child in America? Plastic surgeons? And then: How many are there? How many units per year would each user or consumer require? How much is the product worth to them? What will people pay? Asking these questions quickly focus the potential for an opportunity. On the supply side: Who are the players? How concentrated is the market? How entrenched are they? Generally, any *earnest* new player can gain 3% of a market by showing up. Gaining 30% of an established market is bloody tough. So, what are the prospects of gaining serious market share?

Figure 4: Market Diffusion on Model

Market Segment	Contribution	Cumulative
Innovators	2.5%	2.5%
Early Adopters	13.5%	16.0%
Early Majority	34.5%	50.5%
Late Majority	34.5%	85.0%
Laggard	15.0%	100.0%

Market Penetration

The idea of market diffusion is an extension of work with product life cycles by the Boston Consulting Group and others. It flows from the classic product S-curve tracing a product from its launch through growth on to maturity and then into decline. Here the market segments by customer buying behavior. While this is a gross simplification of many studies, the similarities are significant enough for our purposes to give us a rule-of-thumb. Figure 4, the Market Diffusion Model, gives the contribution of each type of buyer makes to the market. The **innovators** are those types that are game to try anything new. These are the discoverers, who will often modify products to fit their own fancy. God bless 'em; these are our inventors. The next group, the **early adopters** will respond to conceptually good ideas. They are the word of mouth types responding to individual endorsements. A few technical articles in the trade or industry press and they are ready to try a product. Typically these people are authors and those that present at trade conferences. Gaining the support of this segment is imperative for introducing any new product. The **early majority** are those that need endorsements from several sources before they will buy. They respond to articles and testimonials from their peers. They are the focus of most advertising. Then there is the **late majority**. These are the individuals that have to read about it in Time or Newsweek. If it is a technical item they need to be able to read about it in the textbooks. They are the “no risk” types, responsive to guarantees and things that are proven. Finally there is the **laggard**. While an individual may have a proclivity to a particular type of behavior, it doesn't necessarily mean it is applicable to all markets.

The next step is to approximate how long it is going to take to surmount each segment as defined by the Market Diffusion Model. This is essentially the time it takes to reach each segment in the manner in which they are responsive. Mostly the transitions are sequential. Where one enters the progression, however, depends on the nature of the product. Does it create a new market or is it a substitute for product with an established market? The many different models that have been developed to explain both consumer and industrial buying behaviors are but variations on the theme of stimulation.

Figure 5: Development Matrix and Corresponding Discount Factors

Market Experience	Technology or Service Embodied in Product		
	Fundamental	New/Familiar	New/Unfamiliar
Fundamental	Internal development of core product technology or Base service Acquisition 20%	Internal product development Acquisition Licensing 30%	Non-traditional joint venture 40%
New/Familiar	Internal development — marketing Acquisition Joint venture 30%	Internal venture Acquisition Licensing 40%	Venture capital investment Externally funded research 50%
New/Unfamiliar	Joint venture 40%	Venture capital investment Externally funded research 50%	Venture capital investment Externally funded research 60%

Development Strategy as Indicated by Market and Technology Factors

Levels of knowledge or expertise within a corporation and the consequential strategy for entering a business organic response and reaction. As one study puts it “awareness, trial, reinforcement.” Knowing that each segment has to be approached in its own particular manner and then needs time to digest the information, begins to put the time it takes to penetrate a market into perspective. Knowing the size of a market, having an idea of what people will pay and what share of a market can be sold, boil down to an order-of-magnitude estimate of revenues.

Reducing the revenue stream to net cash flow is the next step toward calculating the net present value of an opportunity. The use of industrial comparables is sufficient for our purposes. What profit margins and cash flows do other businesses in a similar market experience? Annual reports and indexes of financial ratios published by various services are sources for this information. Applying the appropriate ratios and making adjustments for up-front capital requirements result in a cash flow stream ready for discount.

The Risks of the Venture

The interest we earn on our money reflects the risks we take in putting it to work. The Treasury bill rate established at auction, historically around 7.2%, is the return for the safest investment. Companies typically look for 20-25% returns on capital invested in their on-going businesses. Venture capitalists on the other hand have historically looked for returns of between 40% and 60%. So in selecting a discount rate for the Business Opportunity Model, we need to factor in the risks of achieving the cash flow that has been predicted. The Development Matrix, Figure 5, deals with development strategy as a function of a business’ core competence. The discount factor assigned to each box within the matrix reflects the level

of risk associated with an undertaking of that nature. Clearly familiarity with the technology and the market of a given opportunity reduces the risks of the undertaking.

Figure 6: The Montgomery Model

The Product		
	Unique	Me-too
Seller well known to Buyer	Buys 10%	Buys if presentation is impressive
Seller not well known to Buyer	Buys if presentation is impressive	Does not buy

One last adjustment is warranted before applying the appropriate discount rate to the Model. Robert T. Davis and F. Gordon Smith in their book “Marketing in Emerging Companies” described work by David Montgomery of the Stanford Business School. His aim was to predict the outcomes of the buying decisions of a large client organization. His predictions are reported to be 90% accurate. The Montgomery Buying Model, Figure 6, predicts buyers’ responsiveness as functions of their knowledge of the seller and the uniqueness of the product. Handicap the discount rate from the Development Matrix with the results from the Montgomery Buying Model by **adding** the two numbers together. Applying this adjusted rate to the cash flow projections, then, yields the NPV of the Business Opportunity. Figure 7 is an example of a Business Opportunity Model.

An estimated 25 out of 500 consumer product ideas ever it to market testing. Of these, one-third are launched nationally. Only one, however, will remain profitable after 10 years on the market. For commercial products the hit ratio is better, but mostly they represent incremental improvement over what is already in the market. In the pharmaceutical industry, only one in 5,000 drug compounds make to market, and that journey takes 12 years and costs an average of \$359 million. The message is quite clear. Define and stay within your stated fields of interest and waste little time culling through the opportunities. The Business Opportunity Model is one method to sharpen and prioritize your focus. And focus is the prerequisite for closure.

Figure 7: The Business Opportunity Model — an example

A Needle-less Anesthesia Manifold

The AIDS epidemic spurred the Occupational Safety and Health Agency to promulgate the blood borne pathogens rule to protect health care providers from secondary infection from contaminated blood. The rules stipulate that hospitals will adopt engineered solutions to prevent such events as accidental needle sticks. The medical device industry responded with a plethora of products to replace needles. Several approaches emerged as the dominant designs. As these began to satisfy the demand for needle safety and needle-less devices on a broad scale, niche opportunities became evident. This example was for a needle-less anesthesia manifold where different medicines could be injected into one iv-line during anesthesia without a needle.

1. Opportunity based upon response to OSHA regulation and infection control issues . . . began December '91.
2. 22.5MM anesthesia cases; 75% general, 12% regional.
3. Primary use — Balanced anesthesia (60% of general cases) requires 3 ports; Regional & IV Sedation (80% of these cases) requires 2 ports — total market then 35.5MM ports.

4. As of June '92; 50% of the market is available — 30% of the potential market will buy now. The market now is growing at 50% per annum.
5. Price is \$3.50 per three port (\$1.17 ea), cost is \$0.50 per port.
6. Assume market will ramp-up as expected, but has been delayed one year because of confusion over the OSHA rule and a lassie faire enforcement policy.
7. The annual report of company with similar type medical products reveals a 12% net after tax income. Depreciation is negligible. The investment in tooling costs is approximate.

Year	1	2	3	4
Units, M	415	1,080	1,800	2,640
Sales, \$M	1,450	3,780	6,300	9,240
NAT, \$M	174	454	756	1,109
Investment, \$M	400	-	-	-
CF, \$M	-226	454	756	1,109

8. This venture would take the licensor, who is versed in the anesthesia market, into new ground from a technical service standpoint. Consequently, the applicable Discount Factor from the Development Matrix is 30%. The product considered had no unique advantage over existing devices, so in conformance with the Montgomery Model the discount factor received no adjustment. It did, however, complement an existing product line.
9. NPV = \$735M