Transforming the Culture of Strategic Decision-making for a Biotech Organization

Decision Analysis Affinity Group

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Agenda

Introduction

- Training
- Tools
- Tales
- Conclusions





Baxter is a global, diversified healthcare company applying innovative science to develop specialty therapeutics and medical products that save and sustain patients' lives.

- Seventy-five years of market leadership driven by a well-recognized global brand
- \$12 billion global market leader
- More than \$2.5 million invested in R&D every day
- Over 50% of sales and earnings outside the United States
- Approximately 70% of sales from products with leading market positions







Baxter's business portfolio consists of three divisions

- Balanced, global portfolio with strong franchise depth and expertise in medical devices, pharmaceuticals and biotechnology
- Well-recognized global brand that drives market leadership
- Focus on essential therapies for life-threatening conditions
- Core competencies across businesses to provide high quality, cost-effective products and services



BioScience

al Transforming Culture 4

The BioScience Strategic Portfolio Management Group has three primary roles

- 1) Manage the annual R&D Portfolio Process
 - Help BioScience managers understand strategic priorities
 - Meet the requirements of the corporate R&D Prioritization process in order to obtain approval/funding for R&D projects
- 2) Chair the monthly R&D decision forum
 - Drive strategic decisions (typically cross-functional in nature) impacting the BioScience pipeline using advanced/customized analytical models that link choices/outcomes to shareholder value
- 3) Support the Division in key strategy questions

For all three roles, BioScience employs the principles, processes, and tools of DA

- Decision Analysis uses a set of mathematical techniques to explicitly address risk, uncertainty, and complexity in decision-making.
- A formal process provides a common language for thinking and communicating about decisions within a multidisciplinary team.

Since decision analytics is not top-driven, our approach is:

- Build awareness
- Fit into existing processes
- Springboard from team connections
- Demonstrate added value
- Depend on reputation

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The Strategy/Portfolio group in BioScience is educating the organization on DA principles

Title: Value-Based Decision-Making

- Intensive 2-day course with lecture, class exercises, and case study
- Target audience is Global Project Management, the team leaders for R&D projects
- Offered on demand-basis only
- Not part of internal training program...no requirements to attend
- Course feedback positive

"The best course I have ever taken!"

In the past 6 years, we have delivered 18 seminars to about 300 participants

Training Participants By Year

The class is designed for a cross-functional group

- Participants are at all levels (analyst VP)
- Participants come from many functions
 - Proj Mgmt, Finance, Marketing, Manufacturing, R&D, Regulatory
- Class exercises and a detailed case keep them engaged

- We see changed behavior after taking the course
 - Some apply the techniques to their own problems
 - Most are better participants in strategic decision analysis projects

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Decision analysis tools support Baxter's portfolio management process

- Like most life sciences organizations, Baxter BioScience performs an annual R&D portfolio review in which projects are prioritized and their budgets determined
- Historically, this process was supported by ad-hoc tools
 - An Excel NPV model for each project
 - A portfolio spreadsheet where everything was "rolled up"
- Five years ago, Baxter BioScience identified the need for a portfolio system to improve:
 - Project analytics
 - Handling of uncertainty
 - Strategic alternatives
 - Data management
 - Data flow (other than emailing spreadsheets, copy/paste, etc.)
 - Data archiving
 - Portfolio analytics and reporting/visualization

In designing a portfolio tool, we faced conflicting objectives with difficult tradeoffs

- Simplicity vs. Comprehensiveness
 - We want a system that's simple, but not so simple that key assumptions are obscured by aggregation
- Flexibility vs. Standardization
 - We want the ability to make the model fit the project, but not a free-for-all in which wildly different models make comparisons impossible
- Valuation-focused vs. Creative
 - How much effort should go into the decision alternatives within each project, vs. just understanding value/risk in the base case plan and the portfolio level decisions among the projects
- Spreadsheet-based vs. Bulletproof
 - Excel-based systems are familiar and transparent, but not as robust as systems based on a more locked-down platform

SPRINT is our web-based & desktop tool that manages project data and does portfolio analysis

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SPRINT's analytic capabilities allow us to look at the influences of substantial drivers of value

- **SPRINT's** portfolio analysis console performs a decision tree analysis on each project, and produces these typical outputs:
 - Project incremental expected NPV's
 - Project and portfolio tornado diagrams
 - Portfolio risk/reward comparisons

Portfolio efficient frontier

SPRINT evolved from the bottom up

- Initially began in BioScience
- Word spread that it worked
- It was never mandated from above
- After success, adopted as company standard for all significant R&D projects
- Currently supports over 200 active users around the globe

			Medication	Corporate	No. of	No. of
	BioScience	Renal	Delivery	Portfolio	Projects	Users
2006	Rolled Out				25	75
2007	Refined				50	100
2008	Ongoing	Rolled Out		Rolled Out	100	150
2009	Ongoing	Refined	Rolled Out	Refined	125	250
2010						

Groups using SPRINT

SPRINT won an industry award in 2009

Decision Analysis Society	
THE DECISION ANALYSIS SOCIETY of the Institute for Operations Research and the Management Sciences presents the 2009 Practice Award to	
Phil Beccue and Christer for for A Decision Analysis based System for Healthcare"	
"SPRINT. A D Investments" Prioritizing R&D Investments J. Eric Bickel Chair, 2009 Practice Competition	
October 11	Sultur

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Success stories are the most effective means to promote decision analytics

- Demand for decision support has grown over time
- Team leaders request decision analysis support in times of trouble
 - New information causes delays or value reduction
 - Debate among team members on best way forward
 - Complexity (par. vs. seq.), uncertainty (int, ext), difficult tradeoffs
- Success stories spread through hallways
- Sr. Management is more comfortable with options, tornados, etc.
- Example projects include
 - clinical strategies
 - business development
 - manufacturing investments
 - demand forecasts
 - life cycle enhancements

This is an influence diagram for a typical clinical strategy decision

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In another decision analysis, we explored manufacturing and pricing alternatives

For an early stage project, we developed a set of ten criteria to differentiate the options

Parameter	Units	Score Levels				
		1	2	3	4	5
1 Immediate Efficacy	%	(100%)	90% CH / 90% AH *	85% CH / 80% AH *	80% CH / 71% AH *	
2 Dosing Frequency		q12h	q8h	q4h	q2h	
3 Safety		NONE	(0.5x10 ⁻⁹) *	(1x10 ⁻⁹) *	(2x10 ⁻⁹) *	
4 Price premium vs. Competitor 1	%	+ 300%	100%	=	- 20%	
5 Price premium vs. Competitor 2	%	+ 50%	+ 25%	=	- 20%	-50%
6 Time to Launch	%	<= 2013	2014	2015	2016	>=2017
7 Probability of tech. success	%	40%	23%	16%	10%	
8 COGS	\$/mg	17	34	50	61	
9 Collaboration (royalties)	% of sales	0%	5%	10%	15%	
10 Cost to Launch	\$m	108	180	198		

We then scored the options against the criteria, and documented the rationale

	Opt A	Opt B	Opt C	Rationale	
Immed.	4	3	1		Scores were converted to
Dose	4	2	3		Value-based measures
Safety	4	3	4		Bax 304 2nd Launch Suc NPV Suc Suc Suc Suc Suc Suc Suc Suc Suc Suc
Pr Prem	4	2	2		Bax 304 Strategy
Pr Prem	5	2	2		
Launch	1	4	4		B Decision C
Prob	1	4	4		1,000 900 800 7000 900 900 900 900 900 900 900 900
COGS	1	3	2		Accord Cpic 500
royalties	1	2	3		200 100 0 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026
Cost	1	2	3		

- Decision analysis integrates all aspects of drug development to help senior managers make high-quality strategic choices
- Over six years, decision analysis concepts and tools have improved the language and culture of decision-making at Baxter through
 - A training program designed to build awareness and skills
 - A portfolio tool which standardizes project valuation
 - Tales of clearer thinking on significant strategy projects that are spreading
- We have many areas of improvement, but have shown that decision analytics is necessary to face the challenges of complexity, uncertainty, organizational bias, and difficult tradeoffs in our quest to meet patient needs and improve shareholder value

