



Case study

Prioritizing through the crash

Portfolio modeling and project selection at Applied Materials, 2007–2009

fastDecision series.

How two Applied Materials organizations turned hundreds of competing projects into ranked, executable portfolios — and why that discipline paid off when the 2008 financial crisis hit the semiconductor equipment market. The engagement used the AHP decision modeling lateralworks now provides as fastDecisionAI.

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Overview

Abstract

Between 2007 and 2009, lateralworks helped two of Applied Materials' largest organizations turn sprawling collections of hundreds of programs and projects into ranked, executable portfolios. The engagement combined facilitated strategic planning, portfolio mapping, and decision modeling built on the Analytic Hierarchy Process (AHP) functions of fastDecision, the toolset lateralworks ships today as fastDecisionAI.

The work began in Global Operations (GO), the multi-thousand-person organization responsible for manufacturing Applied's semiconductor equipment. GO had a three-year plan and ambition to spare, but no shared picture of how its hundreds of projects added up to a strategy. lateralworks facilitated a top-down strategy map, ranked the initiatives against weighted business objectives, and put the gap in plain numbers: the initiative absorbing much of the organization's energy contributed less than 10 percent of the total benefit, while the top two initiatives, worth 64 percent of the benefit, were starving for resources.

The second act made the method earn its keep. In September 2008, lateralworks facilitated the Applied Global Services (AGS) three-year strategic plan — a vision to grow the services business past \$4 billion by 2011. Six days later, Lehman Brothers failed. The semiconductor equipment market, already down 31 percent in 2008, would fall another 46 percent in 2009. On October 8, 2008 — barely three weeks into the crisis — AGS leadership had a rebuilt decision model ranking all 73 programs in its portfolio against recession-weighted success criteria. When Applied announced a global cost reduction program in November 2008, AGS leadership held a ranked, defensible basis for deciding which programs to protect, which to slow, and which to stop.

Core thesis. A project portfolio is a standing decision about where scarce resources go. The organizations that navigate downturns best are the ones whose planning survives contact with bad times. A portfolio built on an explicit decision model can be re-run in weeks when the world changes. A portfolio built on accumulated commitments cannot.

01

The setting

A three-year plan meets a one-year storm

Applied Materials is the world's largest supplier of semiconductor manufacturing equipment. In 2007 it was a company of roughly \$9.7 billion in annual revenue [2], and two of its organizations were mid-transformation.

Global Operations (GO) — responsible for manufacturing across Texas, California, and a growing footprint in Asia — had embarked on a three-year plan to cut manufacturing costs and become more competitive. Applied Global Services (AGS) — the segment that services, upgrades, and supplies the installed base of Applied tools worldwide — was planning to grow beyond \$4 billion in revenue by 2011 by shifting from parts-and-labor toward composite, solution-based products.

Both organizations had done real planning work. What neither had was a way to connect strategy to the project level: a shared, explicit answer to the question *which of the hundreds of things we are doing matter most, and are our people actually working on those?*

Then the environment collapsed. Worldwide semiconductor equipment sales fell from \$42.8 billion in 2007 by 31 percent in 2008, then by another 46 percent in 2009 to roughly \$16 billion [1]. Applied's revenue dropped from \$9.73 billion in fiscal 2007 to \$8.13 billion in fiscal 2008 to \$5.01 billion in fiscal 2009 [2, 4]. In November 2008 the company announced a global cost reduction program that would remove roughly 12 percent of its workforce [3].

Every project portfolio in the company was suddenly wrong. The question was who could fix theirs fastest.



Figure 1. The engagement against the market, 2007–2009. The AGS prioritization model was rebuilt 23 days after Lehman Brothers failed.



The engagement ran inside the operating reality of a working equipment manufacturer: live factories, live customer commitments, and — from September 2008 — a market in free fall. The portfolio discipline described in these pages was built and used under production pressure, not in a planning retreat.

Process chamber hardware, from the original 2007 engagement case documentation [5].

02

The problem

Hundreds of projects, one resource pool

The engagement opened with an assessment of GO's "as-is" project landscape: hundreds of programs and projects in progress, planned, or under discussion. The detail was impressive. The lab realignment initiative alone involved consolidating 60–70 semiconductor tools into two buildings. The Global Development Capability was standing up manufacturing in China. Solar was pulling the organization into an entirely new industry.

But three problems ran through everything.

No common goal. Though the detail had been worked out in many areas, it was unclear what the shared objective was and how each project contributed to strategic objectives. Programs related to each other — and to the business strategy — in ways nobody could state.

Everything was priority one. With little real prioritization, all projects drew from the same limited resource base. The major programs suffered chronic resource starvation. The organization did not lack people; it lacked a mechanism for saying no.

Effort tracked enthusiasm, not value. The assessment revealed that the areas absorbing the most focus and energy were not the areas that contributed most to the business objectives. Nobody had done the arithmetic that would make this visible.

None of this is unusual. It is the default state of large organizations: portfolios grow by accretion, every project has a sponsor, and the sum of local yeses becomes a global no — all projects late, because all projects are simultaneous.

The assessment defined the intervention: define the overall objective and timeframe; determine and prioritize the initiatives supporting it; define the strategies supporting each initiative; map every existing project under a strategy; and put an execution and reporting system in place to manage delivery.

The problem

Portfolios grow by accretion

**The sum of local yeses
becomes a global no.**

lateralworks engagement assessment
Applied Materials Global Operations, 2007

03

The approach A map everyone could argue with

lateralworks facilitated GO's leadership to consensus on the organizational mission — *Advance Global Operations Competitiveness*, a three-year vision — and the six initiatives supporting it: globalize the supply chain, deploy “build, test and ship,” reduce asset footprint, expand into emerging markets, enable one-company infrastructure, and exhibit environmental leadership.



Figure 2. GO's top-level map: the three-year vision at the center, six initiatives around it, each with a goal statement [6].

The top-down structure did two jobs. It enabled a gap analysis — *what they wanted to achieve* versus *what they were doing* — and it acted as an umbrella under which every one of the hundreds of existing projects could be hung, each under a strategy, each strategy under an initiative, each with a named owner.

Working with groups across Texas and California, the team built the map out level by level. The Globalize the Supply Chain initiative alone resolved into four strategies and more than fifteen projects.

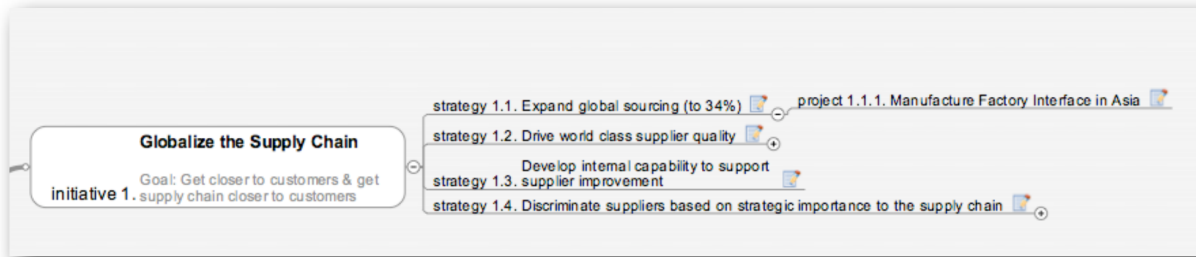


Figure 3. One initiative resolved into strategies and projects — the structure repeats for every branch of the map [5].

The finished map put the whole portfolio on one page. That page was large — but for the first time, a leader could trace a line from any project on the floor to the vision at the center, or discover that no such line existed.

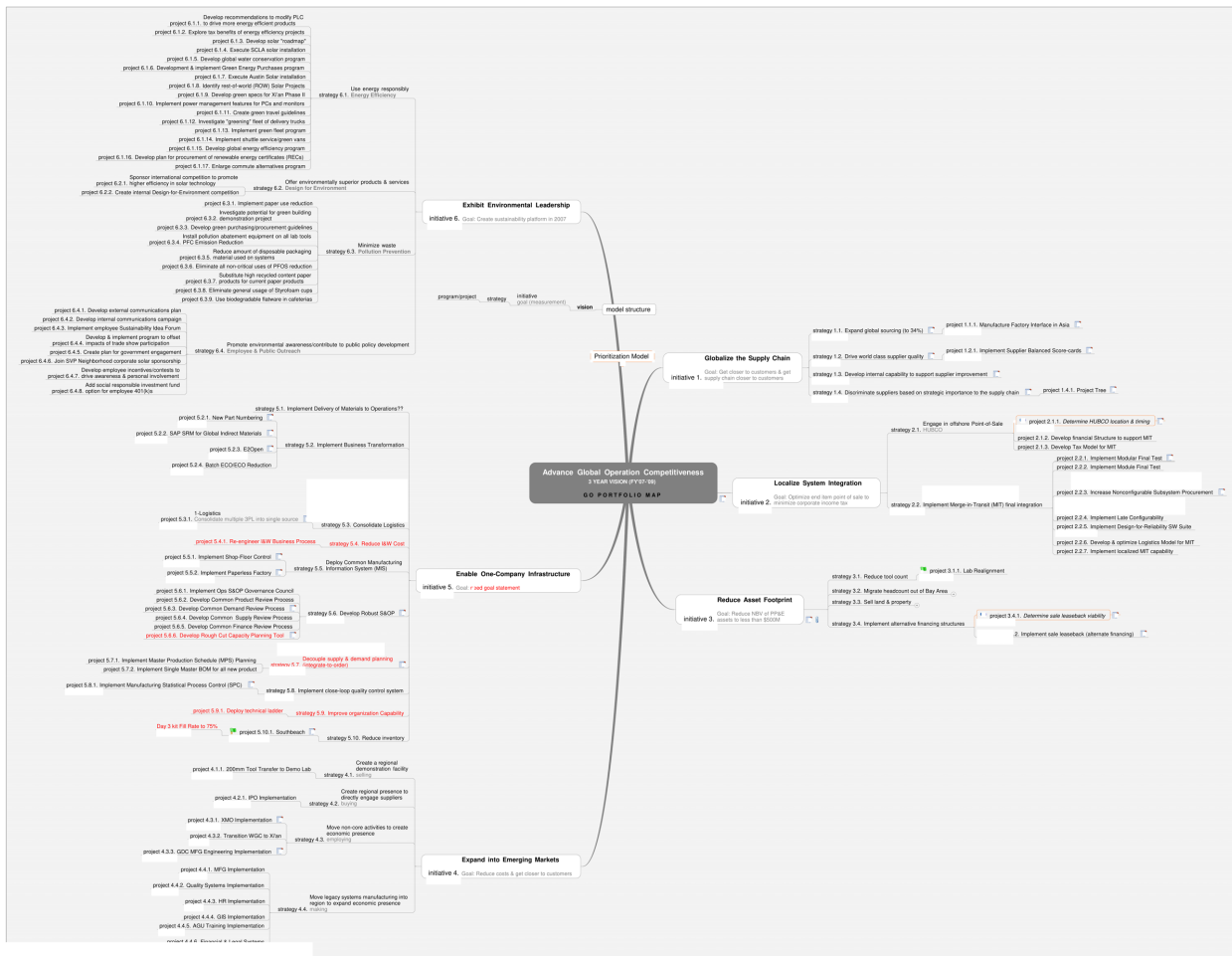


Figure 4. The full GO portfolio map, August 2008: one vision, six initiatives, and every strategy and project beneath them. Owner tags have been removed for publication [6].

04

The decision model Ranking initiatives against the objectives

A map organizes; it does not decide. The next step was to prioritize the initiatives by how much each contributed to the prioritized business objectives — using the AHP functions of fastDecision to structure the judgments of the leadership team into explicit, auditable weights.

AHP does not replace judgment; it structures it. Leaders compare objectives against each other in pairs — a far easier judgment than ranking a whole list at once — and the mathematics converts those comparisons into consistent weights, exposing any contradictions along the way. Rate each initiative against each weighted objective, and the portfolio ranks itself from the leadership team’s own stated priorities.

The business objectives were weighted first — in GO’s model, tax reduction carried a weight of .403, reducing the material cost of the mainstream 300mm product lines .209, asset expense .188, and manufacturing cycle time .112, with installation and warranty, burden, and period costs making up the rest [6].



Figure 5. GO’s prioritized initiatives as ranked in the original model: the top two carry 64 percent of the total available benefit [5].

The result reshaped the conversation. Globalize the supply chain (.332) and Localize system integration (.311) together carried 64 percent of the total available benefit. Expand into emerging markets came fourth, at under 10 percent — yet the assessment had shown this was where a disproportionate share of the organization’s effort, focus, and energy was going. The gap between “should be” and “as is” was no longer an impression; it was a number.

05

Portfolio analysis Cost meets benefit

Ranking by benefit is half the picture. The model then joined each project's benefit score to its cost, producing a portfolio-level cost-benefit analysis of 18 strategic projects totaling \$308 million [6].

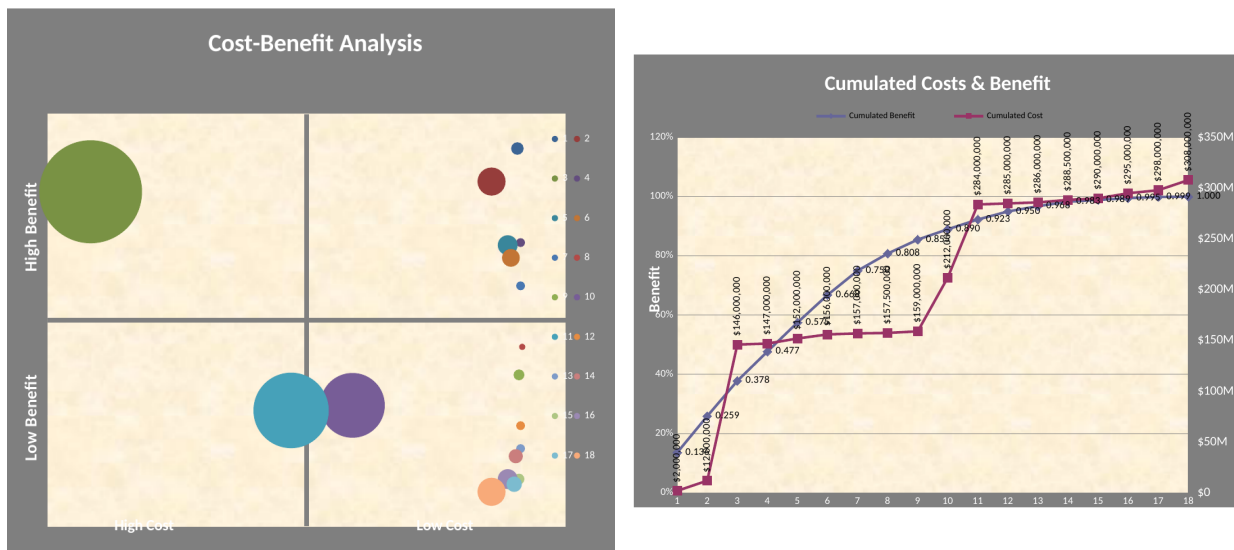


Figure 6. The original fastDecision portfolio analysis: cost-benefit quadrants (left) and the cumulated cost and benefit curves (right) across the ranked portfolio [6].

The cumulated curve told the sharpest story. The first eight projects — about half the portfolio's cost — delivered roughly 80 percent of its benefit. Beyond that point the curve went nearly flat while costs kept climbing: the last ten projects consumed \$150 million to add the final 20 percent. Some inexpensive projects punched far above their weight (a \$2 million logistics redesign carried the single highest benefit score in the portfolio), while some large commitments contributed benefit scores near the bottom of the table.

None of this dictated decisions. A \$72 million project can be strategically necessary even with a modest score; the analysis is an input, and leadership still decides. What it did was force every big-ticket item to justify itself against alternatives in the open, with the leadership team’s own weighted criteria as the standard.

Ideal mode		Priority			RATINGS	RATINGS	RATINGS	RATINGS	RATINGS	
AID	Map Key	Alternative	Total	Costs	Owner	reduce taxes (L: .403)	reduce 300mm mcos (L: .209)	reduce asset expense (L: .188)	reduce mfg cycle time (L: .112)	reduce installation and warranty costs (L: .045)
A0		IDEAL	0.0000							
A738		deploy one-logistics	0.1360	\$2,000,000	GMO	high	high	high	high	
A733		implement full merge-in-transit	0.1230	\$10,000,000	CAS	high	medium	high	high	high
A728		implement China operations	0.1190	\$134,000,000	AMO GMO PMO AMC	high	high	high		
A744		implement supplier performance management	0.0990	\$1,000,000	GMO	high	medium	low	high	high
A779		transition factory interface to asia	0.0980	\$5,000,000	AMO GMO	high	high	medium		
A724		implement global sourcing	0.0930	\$4,000,000	GMO	high	high			medium
A776		implement adv Sales and Operating Plan process	0.0820	\$1,000,000	AMO GMO	medium	high	medium	high	medium
A778		integrate to order	0.0580	\$500,000	AMO	medium	medium	low	high	high
A729		implement design for reliability	0.0470	\$1,500,000	Q&R	medium	medium		medium	high
A726		implement asset-lite (scenario 2)	0.0350	\$53,000,000	CAS GIS AKT PBGs	low		high		
A725		implement lab realignment	0.0330	\$72,000,000	CAS	low		high		
A727		implement applied-anywhere	0.0270	\$1,000,000	CAS FIN HR GMO PMO PBGs			high		
A737		reduce stock-to-floor cycle time (Southbeach)	0.0180	\$1,000,000	AMO			medium	medium	
A780		implement E2Open	0.0150	\$2,500,000	GMO		medium		low	
A743		implement paperless factory & ip data mgt	0.0060	\$1,500,000	AMO				medium	
A732		implement new BOM numbering schema	0.0060	\$5,000,000	AMO				medium	
A781		implement SAP SRM for Global Indirect Materials	0.0040	\$3,000,000	GMO					
A740		develop sustainability program	0.0010	\$10,000,000	CAS					

Figure 7. The ranked project table from the model: every rating visible, every weight explicit, every project’s cost beside its benefit [6].

06

Execution

Fast-teams and internal consultants

By this stage the map identified the three-year goal, the initiatives, the strategies, the projects, and an owner for every node — plus which initiatives contributed most, and where the “should be” diverged from the “as is.” The remaining problem was execution: how do you get hundreds of projects properly managed without an army of outside consultants?

The answer was to build the capability inside. lateralworks designed an Internal Consultant (IC) program: a group of experienced program managers, trained to assess a project, bring it up on the Fast-Time-To-Market (FTTM) planning system, facilitate its workshops, and transfer the know-how onward to project managers. Each IC candidate trained on three live projects — so the training itself brought projects onto the system, most of them under the two highest-priority initiatives.

The distinction matters more than it sounds. For years lateralworks had rescued late programs and handed the process to program managers afterward — but keeping a healthy program healthy takes a different skill set from getting a sick one back on track. The IC program transferred the harder skill: the ICs typically engaged projects already in motion, learning to change the wheel while the car was moving.

Through the IC engagements, the resource rebalancing happened project by project rather than by decree. Bringing each project onto the system forced the tough decisions the portfolio analysis had identified — and the gap between should-be and as-is began to close from both ends.

The crash test

October 8, 2008

**Three weeks after
Lehman, every program
had a number.**

AGS program prioritization model
73 programs, seven strategies, four criteria

07

The crash test **AGS reprioritizes in three weeks**

In September 2008, the method faced a different scale of test. lateralworks facilitated the strategic planning for Applied Global Services — the AGS three-year vision, mapped on September 9, 2008: *grow to more than \$4 billion by 2011* by gaining market leadership in silicon, display, solar, and glass/web through composite, solution-based products [7]. Ten initiatives radiated from the vision, from “drive towards a solutions orientation” to “actively manage the product portfolio,” each with strategies, programs, and owners beneath it.

Six days after that map was drawn, Lehman Brothers failed.

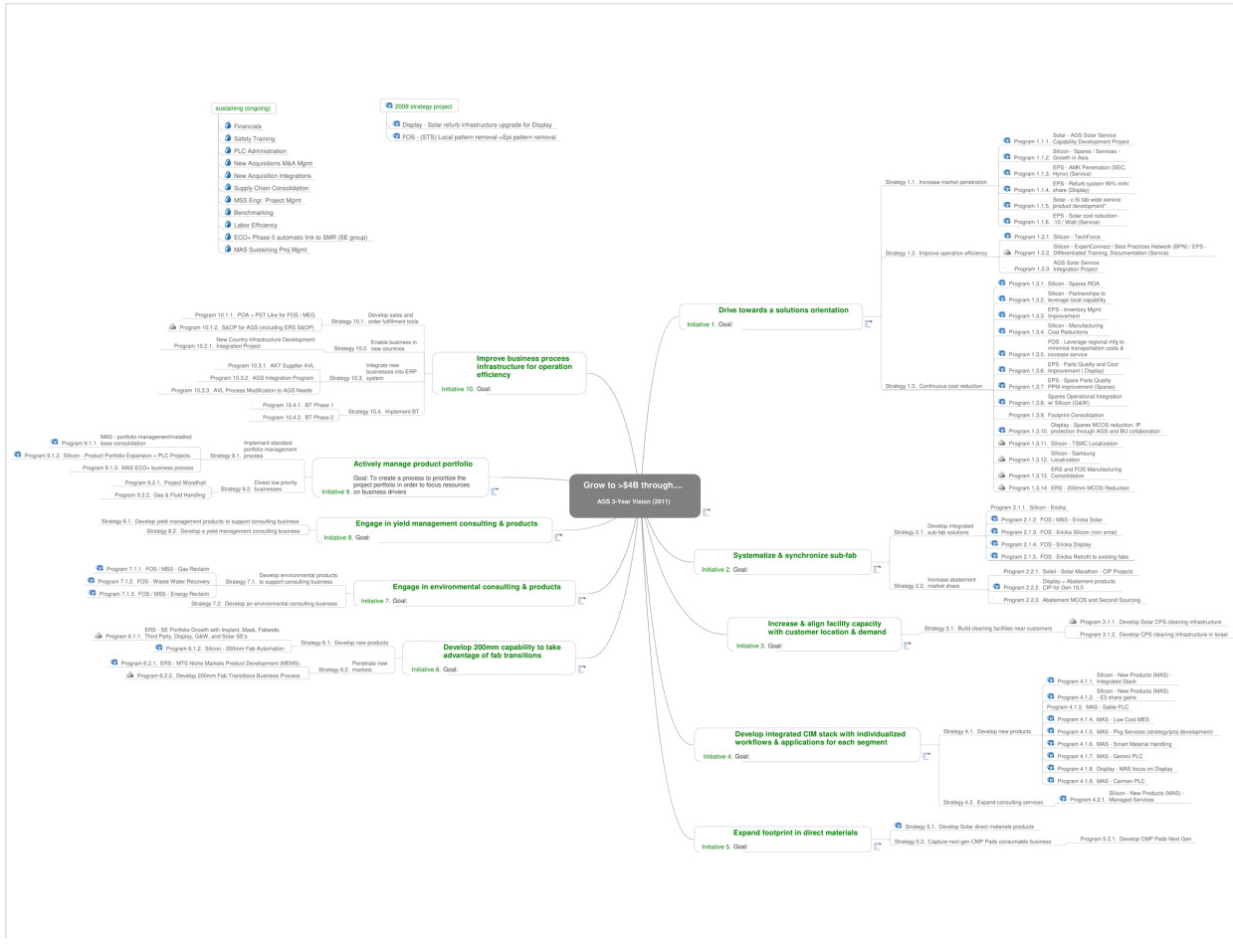


Figure 8. The AGS three-year vision map, September 9, 2008: ten initiatives around the “Grow to >\$4B” vision. Owner tags have been removed for publication [7].

What happened next is the reason this case study exists. Instead of freezing the plan or abandoning it, AGS put its entire program portfolio through the decision model. By October 8, 2008 — three weeks into the steepest downturn the equipment industry had seen — the model was rebuilt: 73 programs across seven strategies and all four AGS product groups, each ranked by contribution to four weighted success criteria [8].

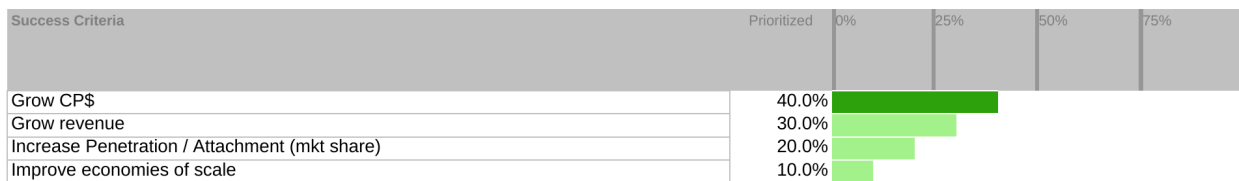


Figure 9. The recession-weighted success criteria in the original model, October 8, 2008 [8].

The weights encoded the moment. Growing contributed profit dollars — CP\$ in the model’s shorthand — carried 40 percent; revenue growth 30; market penetration 20; economies of scale 10. In a collapsing market, profitable survival outranked expansion — and every one of the 73 programs was now scored against that reality rather than against the assumptions of the boom.

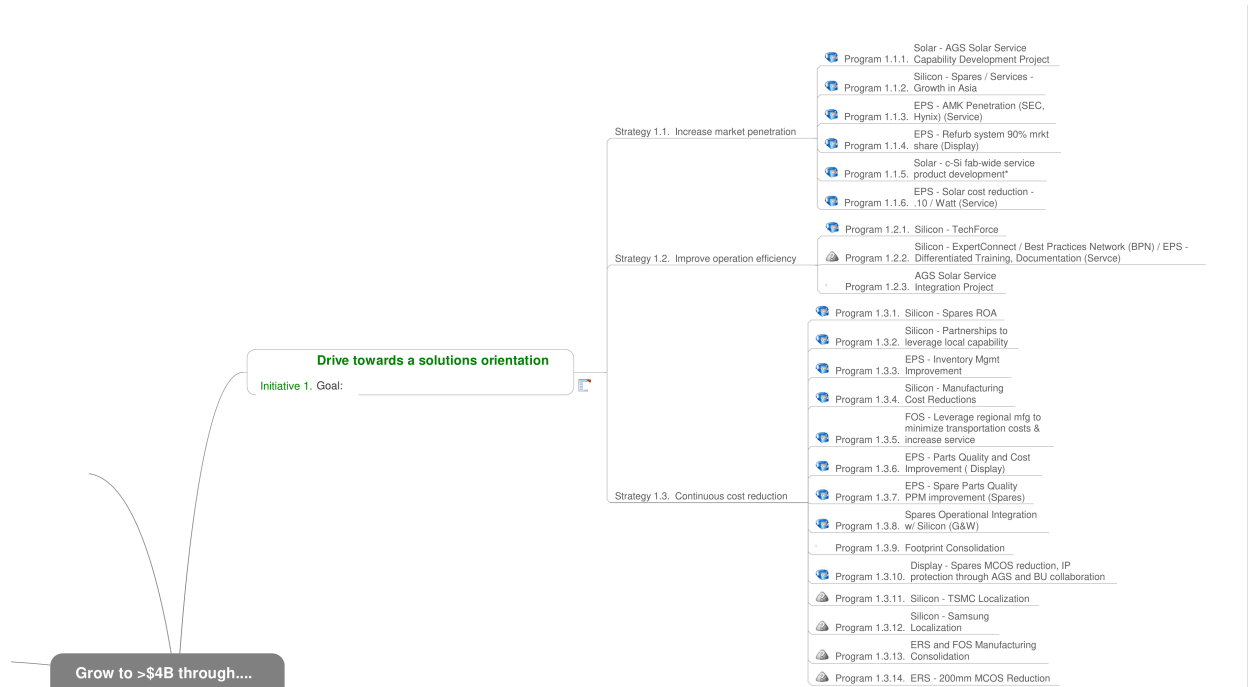


Figure 10. One AGS initiative built out: strategies, programs, and product groups beneath the vision [7].

The ranked list ran from 1.00 down to 0.05, a spread wide enough to make the resourcing conversation short. The top of the list concentrated on programs that defended profit in a shrinking market: solar cost-per-watt reductions, multi-supplier sourcing, spares efficiency, and the product releases closest to revenue. The bottom of the list was full of good ideas whose time was not now. Because the criteria, weights, and ratings were explicit, a program owner whose project ranked 60th could see exactly why — and exactly what would have to be true for it to rank higher.

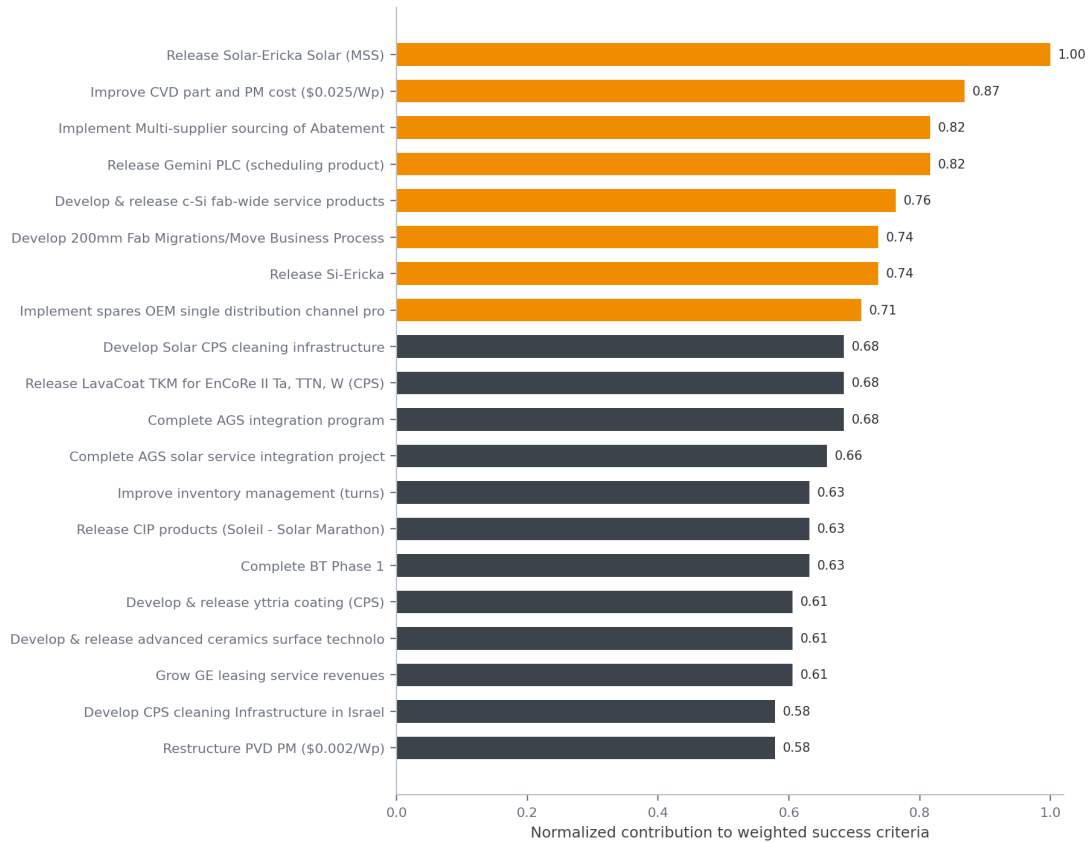


Figure 11. The top 20 of 73 programs, redrawn from the October 8, 2008 model. Orange marks the top band of the ranking; scores are normalized contribution to the weighted success criteria [8].

That is what let AGS move at the speed of the crisis. When Applied announced its global cost reduction program on November 12, 2008 [3], AGS was not starting a two-quarter replanning exercise. The portfolio was already ranked, and the limited resources flowed to the programs the model and the leadership team behind it had marked as highest value.

08

The benefits What the client got

A strategy everyone could see. One map per organization, from vision to project, with a named owner at every level. Strategy stopped being a binder and became an address system: every project had a place, or visibly had none.

Priorities with arithmetic behind them. AHP turned leadership judgment into explicit weights and auditable rankings. Decisions could be challenged at the level of criteria and ratings, which is a productive argument, rather than at the level of whose project survives.

The gap, quantified. In GO, the analysis showed the top two initiatives carried 64 percent of the benefit while a fourth-ranked initiative absorbed outsized energy; the cost-benefit curve showed 80 percent of portfolio benefit available for roughly half the spend. “We are working on the wrong things” became a measurable, fixable statement.

Projects killed on purpose. Projects were stopped or deferred deliberately — and this was counted as success. The alternative, attempting every project simultaneously with a shared resource pool, had been producing the predictable outcome: all projects late.

An execution system, not just a plan. Fast-team structures, FTTM project planning, and an organization-wide tracking system connected the portfolio decisions to weekly project reality. Many projects came in on time; the ICs reported that the process significantly improved internal communication [5].

A capability that stayed. The Internal Consultant program left behind a self-sustaining center of competence. The know-how to assess and rescue projects no longer walked out the door with the consultants.

Speed when it counted. The clearest benefit only became visible when the world broke. Because the strategy, portfolio, and decision model already existed as explicit structures, reprioritizing 73 programs took three weeks in the middle of a global financial crisis. When the company-wide restructuring arrived a month later, the replanning that typically consumes quarters was already on the table.

The decision engine used in this engagement — the AHP modeling functions of fastDecision — is the foundation of what lateralworks provides today as fastDecisionAI. The models in these pages were built by hand and workshop in 2008; the same discipline now runs in a fraction of the time. The premise has not changed: the model structures the decision, and the leadership team owns it.

Sources

References

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All client materials in this case study are drawn from the original engagement artifacts. Individual names have been removed from reproduced figures. Company and organization names are used with reference to a completed engagement now nearly two decades old.