



White Paper
Intel Information Technology
Computer Manufacturing
IT Business Value Measurement

Measuring IT Success at the Bottom Line

At Intel IT, we've changed our IT investment decision making process to a customer-focused, data-driven model that demonstrates IT's impact to the bottom line. Our IT business value (ITBV) program provides a framework for measuring and evaluating IT products, services, and support in terms that reflect business benefits.

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IT@Intel

Executive Summary

Intel IT has shown that investments we manage with the ITBV program have delivered more than USD 5.5 billion in business value since the program's inception in 2002, representing a 33 percent growth of business value, year over year.

Intel's IT business value (ITBV) program has shifted our IT investment decision making process to a customer-focused, data-driven model that demonstrates the impact of IT on Intel's bottom line. Intel IT has shown that investments we manage with the ITBV program have delivered more than USD 5.5 billion in business value since the program's inception in 2002, representing a 33 percent growth of business value year over year.

We implemented the ITBV program to assess both the forecasted value of IT solutions and the actual business value delivered to our internal customers and to Intel as a whole. We forged close alliances with our internal customers and developed methods and metrics for tracking IT benefits, including:

- A standard set of financial measurements, which we call business value dials, that serve as a common language throughout the company and are based on customer business objectives
- A standard measurement methodology to determine the impact of IT solutions
- A common valuation process with Finance acting as an independent auditor
- A business value portfolio of the forecast and delivered results determined by customer-generated critical success indicators
- A set of ground rules used to define the program's operation and to drive accountability for the business value realized by our customers

By establishing this systematic approach to measuring IT's success in terms of dollar value contributions, we've shifted the perception of IT as a cost center to IT as a value center, moved to a data-driven IT investment decision making process, and changed the corporate attitude toward the value of investing in IT.

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Business Challenge

Organizations large and small face similar situations: scarce resources and constrained budgets. Choosing and deploying the right solutions to maximize an organization's performance, satisfy customers, and make and maintain a profit has never been more critical.

IT is often overlooked as a major success factor in helping organizations achieve strategic objectives because it is not predominantly considered to perform a function integral to achieving business objectives. IT organizations are perceived as cost centers, not the competitive differentiators they have the potential to be. Consequently, budgets are squeezed year after year.

At the end of 2001, Intel challenged the IT organization to measure the impact of IT on Intel's business results—to identify not only the cost, but the business value of IT investments. Delivering IT solutions in a technology company intensified the scrutiny of IT's value, making data-driven proof a requirement. To meet this challenge, we established the ITBV program to assess both the forecast value of IT projects and the actual value they delivered.

Business units across the enterprise worked with us to apply standard metrics and methods for capturing forecast and actual value. Whether in the factory, among design engineers, or in a

standard office setting, we quantified IT's impact, provided traceable benefits, and forged closer alliances with our internal customers.

Establishing metrics and processes was only half the challenge. Changing behaviors within IT and across Intel's business groups was the other half.

Over the past five years, numerous IT projects with clear, measurable business value have given our chief information officer (CIO) proof of bottom-line impact. As a result, we have witnessed a behavioral change across IT to actively identify, forecast, and measure the business value of IT projects, and we have created a new mindset for IT and the corporation: that IT can and should create competitive advantages and increase shareholder value.

This program continues to help us understand how IT capabilities add business value, resulting in more-informed IT investments and enabling allocation of resources in the most essential areas of the corporation.

Building a Business Value Foundation

Our ITBV program stresses the importance of aligning IT spending with the goals of the corporation and encourages us to work closely with our internal customers to understand how IT products, services, and programs impact Intel's bottom line.

In the past, some of Intel's business units perceived the IT organization as being out of touch with their needs and not contributing to making better quality, more successful products.

We measured our success like many IT shops, in terms of uptime, number of service calls answered, and so forth. These technology and operations measurements didn't provide insight

into the usefulness of our solutions from our internal customers' perspectives or give us a way to compare different solutions based on the value the solution might provide to Intel.

ITBV has expanded our success metrics to include those related to an improved bottom line: faster time-to-market for Intel® products, increased revenue, capital purchase avoidance in the factory, and measured improvements in employee productivity. Investment justifications include value creation, customer demand, and detailed metrics plans.

Executive sponsorship has motivated Intel IT's employees to think in terms of business value rather than just IT value, supporting a bottom-up drive for identifying business value. Our CIO sets annual business value targets as part of our strategic objectives, making organizational leaders responsible for achieving these goals. Prior to ITBV's inception, few new investments claimed business value as an attribute. Today, it's the trend.

Under ITBV, we have changed our relationship with our customers from being a support organization to becoming business collaborators, requiring us to quantify our results in terms that the rest of the corporation and our shareholders understand. We have teamed with our internal customers, the Human Factors Engineering group, and Finance to develop a common language and a standard measurement process, methodology, and toolkit for building a business value portfolio of hundreds of IT projects.

Organizing the ITBV Team

Looking at value from our customers' viewpoints requires a high level of objectivity, a new way of approaching measurements, and a need for new alliances. By working with colleagues who see the benefits and measurements in an independent light—not directly vested in a particular result—we have achieved more accurate and credible results. Key members of our ITBV team include Intel's

finance managers, human factors engineers (HFEs), and selected project managers.

Intel's Finance department manages validating the numbers and developing the final financial calculations of value delivered. Finance keeps IT project owners and the program focused on the value of cash. Return on investment (ROI) models, depreciation, net present value (NPV), and traditional finance methods have become key tools in assessing the true value of IT. Finance validates and re-validates the metrics and measures we use and any related calculations that result in dollar claims. To maintain objectivity, IT project owners work with finance teams within individual business units for additional analysis of the final numbers, requiring business units and IT project owners to agree on the value delivered.

Typically, HFEs optimize user interface designs and other aspects of the human-technology interface. For measuring business value, our HFEs also collect, calculate, and ultimately demonstrate the impact of what are traditionally seen as "soft benefits." Employee productivity, for example, is one of the most challenging factors to measure and prove. Our HFE team interviews, surveys, and observes the impact of IT solutions to capture the real-time productivity impact of any given IT project. The data they collect provides the basis for calculating the time savings IT brings to user groups. Our HFEs supply the objectivity needed for defining the productivity improvements that IT delivers to Intel—showing the business units and Finance that the value of productivity is tangible.

Our experienced project managers pull the details together. They help IT project owners with their plans and strategies, and integrate project activities through the exploration, planning, development, and deployment phases of the program life cycle. They work with specific customer groups to identify potential benefits, coordinate with the HFE team as it prepares its work, and make certain that design, development, data quality principles, testing, and solution

deployments are in accordance with business needs. The project managers ensure that Finance has all the data it needs to develop the solution's financial results and, along with Finance, they work with the customer groups to validate the outcomes and monitor the actual results over time. Finally, the project managers report the measurement plans and results to IT management.

Developing a Common Language

Instituting a new program requires precise language to describe goals and results. Clarity is critical when addressing business value and its associated metrics. One common mistake IT organizations often make is not speaking the language of the business owner. To successfully measure the value of IT, we had to overcome this barrier and create a common language that everyone in the company could understand.

Defining Business Value

At Intel, we agreed on a definition of the term "business value":

The benefit, represented in dollar terms, for Intel business groups that is a result of Information Technology solutions or services, as evidenced by one or more of the following:

- Direct contribution to the corporation's market position or revenue
- Deliverables and results that support solving customer business needs and challenges
- Financially derived from customer cost savings or benefits
- Examples of technology investment that advance the industry

IT employees and the ITBV team use this definition of business value to inform IT project owners on how their projects fit into our focus of measurement. For each project, we also make sure Intel business unit owners agree that they anticipate finding IT value-added benefits within this definition.

Establishing Standard Metrics: Value Dials

Defining and using standard indicators establishes a common language for describing specific, observable, and quantifiable elements of business goals. Along these lines, Intel Finance developed the concept of "value dials," which are standard indicators and financial measurements of business value that map to the bottom line. Value dials form a framework for measurement activities associated with assessing the value of IT projects and a framework for IT professionals to understand and articulate how we quantify IT benefits.

Based on a review of over 100 key projects, we initially defined over 15 types of value, each with a metric or equation that financially quantified the return. Some values were "soft" and extremely difficult to measure, such as employee productivity. In these cases, we called upon our HFEs and industrial engineers to observe and measure the time savings and output improvements of technology solutions. Over the last five years, we have made some refinements to our initial list of value dials, but we have worked hard to stabilize these dials so that we can chart progress over the years. Table 1 on page 8 shows our current value dial definitions and examples of equations.

Establishing the Measurement Process

We worked with several groups within Intel, including Finance, to develop a repeatable business value measurement process, as shown in Figure 1. Although not every IT solution develops according to this process, we view these steps as the best possible progression. This process has evolved over time, and is currently used as a best known method (BKM).

The first step of the measurement process requires understanding our customers' needs and identifying which IT products and services require business value metrics, as not all do. For example, assessing the value of using a telephone versus

mailing a letter will not provide much insight into potential IT improvement, even though telephony is an important part of many IT organizations.

We map our ITBV project managers to each department within the IT organization; they then meet with their contacts within the organization to understand internal customers, the top projects planned for the year, and the expected results from those projects. For each IT project, we ask some fundamental questions:

- How does this project contribute to IT's customer results or help address the customer's business needs or challenges?
- Does this project help justify investing in IT applications, infrastructure, and operations?
- How is the solution tied to IT's organizational goals?
- Does the solution focus on value to IT?
- Is the solution new and innovative for Intel?

Once we identify a candidate project, we begin working with customers and project owners to fully comprehend the business problem and proposed solutions. This step has been crucial in changing our focus from tech-centric to customer-centric. Too often, solution providers have missed the true business value of IT programs due to their historically tech-centric view.

We then develop success indicators for the project and link them to the success of our

customers. By linking our indicators to those of our customers, we form alliances based on true business value. Examples of potential success indicators include increased sales calls, increased capacity, and decreased vendor support calls.

Prior to solution implementation, we develop baseline metrics and financial impact forecasts. We establish which specific value dials to include in the baseline metrics for each project. In instances where multiple value dials are identified for a single project, we focus on the top one or two. After fully assessing the customer's business problems, we determine baseline metrics for the current state in a variety of ways. Here are some examples:

- **Factory environment.** We measured a project in assembly test manufacturing designed to optimize the automation software of a functional CPU tester.
- **Employee productivity.** We measured the impact of personal digital assistants (PDAs) in a manufacturing start-up site and also their impact inside the factory cleanroom.

Sometimes an ITBV team member discovers additional or different benefits when establishing a baseline. This advantage comes from an improved understanding of the business problem and the customer's processes. When engaging the customer, we may find that the baseline provides valuable data for making a decision between

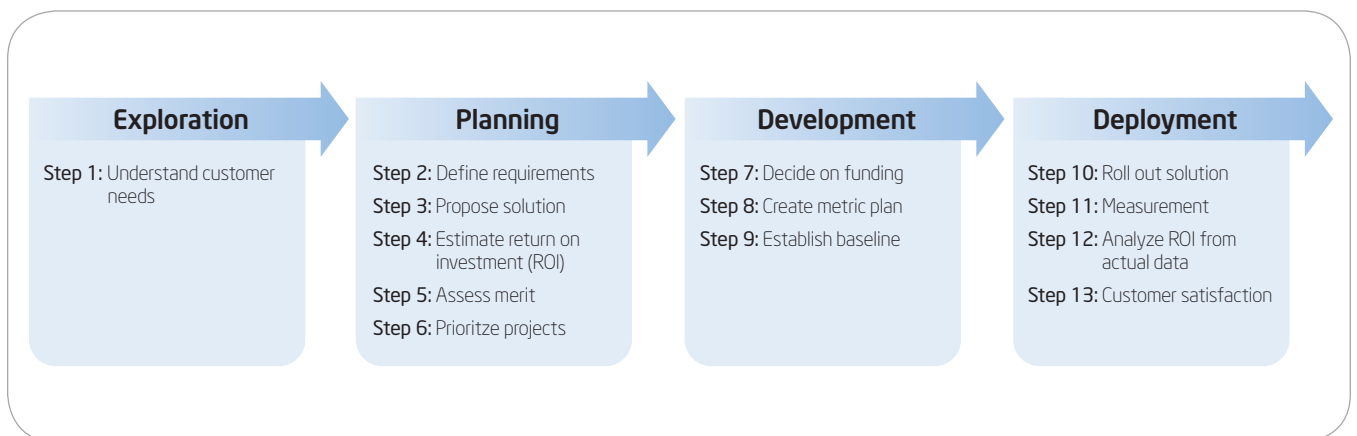


Figure 1. Intel's process for measuring IT business value.

Table 1. Value Dial Definitions and Equations

Value Dial	Definition	Sample Calculation
Days of Inventory	Solutions that reduce days of inventory, leading to value in finished goods, work in process, or raw material inventories.	$(\text{value of 1 day}) \times (\text{days of inventory removed}) \times 15\%$ (weighted average cost of capital)
Days of Receivables	Solutions that allow Intel to receive payment from customers faster, minimizing the time spent waiting for payment.	$(\text{dollar value of receivables}) \times (\text{days of receivables removed}) \times 15\%$ (weighted average cost of capital)
Days of Payables	Solutions that allow Intel to maximize the time before payment to suppliers.	$(\text{dollar value of payables}) \times (\text{days of payables added}) \times 15\%$ (weighted average cost of capital)
Headcount Reduction or Avoidance	Solutions that reduce human resource requirements or absorb business growth without growing headcount. Intel can move employees to areas of greater business value or onto new projects.	$(\text{number of headcount reduced or avoided}) \times (\text{average burden rate for region and job type})$
Employee Productivity	Gains in headcount efficiencies or effectiveness. Employees produce more through these gains due to additional time-based efficiencies.	$(\text{number of employees affected}) \times (\text{time}) \times (\text{average burden rate}) \times (50\%)$
Employee Turnover	Solutions that reduce undesired employee turnover and realize significant cost savings by avoiding the costs interviewing, hiring, and training replacement employees.	$(33\% \text{ of annual burden rate and region and job type}) \times (\text{number of headcount turnover avoided})$
System End-of-Life	Removing unnecessary IT support and maintenance costs as a result of new system upgrades or consolidation of multiple systems. This dial includes the benefits of removal.	<i>cost of maintaining legacy system</i>
Materials Discount	Solutions that result in strategic advantages for our material purchasing process that both Intel and our suppliers can use.	$(\text{prior material pricing}) - (\text{current pricing})$
Capital Hardware and Software Avoidance	Avoiding purchases in hardware or software as a result of strategic decisions or consolidations. Modifying methods or systems can reduce, avoid, or delay the need for installing new hardware and software.	<i>total cost of the hardware or software avoided</i>
Unit and Other Cost Avoidance	Unit cost avoidance focused on lower-cost manufacturing features or per-unit production cost. Other cost avoidances are those that may take place but are not captured in the other dials.	<i>actual unit cost reduction and/or quantified increase in margin, or total of actual costs avoided</i>
Factory Uptime	Solutions that keep the factory machinery up and running more hours of the day, with a focus on optimization rather than factory downtime avoidance and increasing productive factory hours. The value of uptime varies based on the production process, whether it is assembly test manufacturing or fabrication, and whether the factory is running at capacity.	$(\text{value of product}) \times (\text{volume increase})$
Scrap Reduction	Solutions that reduce scrap or waste in product manufacturing or development. Scrap usually occurs as a result of errors, waste, or planning processes.	$(\text{total value of scrap reduced or avoided})$
Risk Avoidance	Process, business continuity, and security controls that minimize costly errors or double payments, or help ensure Intel's business runs constantly without data or production loss. Some risk can impact Intel's ability to operate as a public company, which would impact shareholder value.	$(\text{value of risk}) \times (\text{probability of occurrence})$
Time-to-Market	Improvements that help ensure and accelerate Intel's technology leadership in the marketplace by making sure products get to market first or ahead of schedule. Any solution that reduces time-to-market is calculated under this dial.	$(\text{value of increased market segment share}) \times (\text{number weeks accelerated to market})$
Open New Markets	Solutions that give Intel access to a new market that was previously unreachable.	$(\text{increased volume}) \times (\text{average selling price})$
Optimize Existing Markets	Solutions focused on increasing or adding revenue or units shipped to a current market share segment.	$(\text{increased volume}) \times (\text{average selling price})$
Cross-Selling	Solutions that enable the selling of one product to facilitate the selling of another complementary product. Also, systems may enable sales teams to sell horizontal and vertical solutions across the company.	$(\text{increased volume}) \times (\text{average selling price})$
Vendor of Choice	Solutions that support the competitiveness of Intel's business by helping to create greater satisfaction for Intel's products, providing greater security in a specific market share segment.	<i>value of positive ratings that assures Intel's security in a particular market</i>
Direct Income	Total amount of revenue generated by IT-developed products and services.	<i>total amount of income generated by the sale of an internally developed product and service to external companies</i>

competing solutions or that the IT project will not provide the expected benefits. At either of these points, the customer can change the direction of the proposed program prior to substantial investment of dollars and people.

Using baseline data, we build a forecast ROI model. We use an NPV discounted cash-flow (DCF) analysis to measure a solution's impact to the corporation and its shareholders. Once we complete the ROI NPV calculations, the business value metrics teams and the IT project owners seek buy-in from the customer on the value returned to Intel, an important step in setting expectation levels for all stakeholders on the proposal's DCF impact. Once all stakeholders buy into the project's value to Intel, we use the agreed-upon ROI model to compare forecasts with actual returns.

At times, people can become very enthusiastic about new technologies and solutions without truly assessing the need for and timing of the projects. Anecdotal evidence often obscures the true business value. With proper baselines and cost/benefits analyses, a DCF assessment may show that the project is not currently warranted. When this situation occurs, the project manager has the data to reassess the business value or move on to a positive cash-flow project.

Once we show that a project has a positive ROI, is technologically feasible, and solves a business problem, it moves to the approval process, where it is compared to other positive-ROI projects and prioritized by IT management as part of the budgeting process. ITBV drives our IT project managers to collect the data that decision makers need for comparing and contrasting project values. When decision makers receive a full assessment of the business value of competing projects, they can make decisions that best align their IT spending with the goals of their organizations and the corporation they support.

After rolling out a project, the ITBV team works with the IT solution providers to measure the impact of the change. This important step enables Intel IT to

continuously improve the results we deliver to the corporation. By conducting post-implementation ROI analyses, we improve our forecasting methods and future implementation plans, and further tailor IT solutions to our customers' needs.

Making Business Value Measurements

By using the skills and techniques of HFEs in making observable measurements and involving Finance teams in validating all financial calculations, we can translate the data we collect into accurate, objective business value measurements. Our ITBV teams have developed and adopted some tools to simplify and facilitate our measurement and decision making processes.

Human Factors Approach

Decision makers at Intel realized that HFEs have advanced training and methodologies that can help us gather data for measuring aspects of business value related to productivity. The HFE team focuses on two main areas in support of these efforts. First, the team evaluates deployed technology solutions and documents business value. Second, it determines how to evaluate the business value of future technology solutions. To this end, the HFE team has adopted a strategy that allows the objective framing of measurement questions across a wide range of settings. The framework is focused on end users and how technology solutions affect them, with an understanding that other factors impact business value, such as:

- **Context.** The value of time as determined by the environment into which the organization will deploy the technology solution.
- **Variables.** Items that the organization has operationally defined for measurement (for example, business value dials).
- **Timeframe.** The period of time within which the measurements will occur. For comparison purposes, that period must be long enough for at least two separate measurements.

Figure 2 shows this framework.

To use the framework, the team reduced the concept of user productivity to a set of basic elements that help evaluate IT's business value at Intel:

- Reduce or remove user errors
- Remove the activity a user performs
- Reduce the time it takes to complete an activity
- Reduce time to proficiency for an activity
- Restructure the nature of the activity to eliminate all or a portion of the activity

Individually or combined, these basic elements can capture user productivity in most settings.

Context leads our overall approach for measuring user productivity. It determines the ease or difficulty of collecting data to support a business value proposition. We focus mainly on user productivity, a context that allows us to account for the changing value of time across settings, job types, and user activities. For example, a time savings of five minutes for one user might have a significantly different value for the company than it would for another user, depending on differences in hourly pay, how easily a particular user can apply the time savings to another task, and so forth. Figure 3 gives an overall breakdown of how we attempted to deal with this issue.

The figure shows that small gains in some settings, such as manufacturing, may be valuable, but that the same gain in another setting, such as an information worker context, can be difficult to measure. We must understand the context to determine the productivity impact area and then assess the relative productivity opportunity of the technology solution.

The discussion of how to define and measure variables goes beyond the scope of this paper. The focus of our ongoing work at Intel is to reduce the number of things we measure and to operationally define those things we do measure.

Our ITBV process includes defining variables that make up user productivity in terms of the techniques we use to measure those variables in the identified context. Our goal is to move from abstract concepts to concrete, measurable terms. Within each context, we attempt to define variables that are reliable—consistent over time and valid. In short, we want to measure the right things. For example, to measure productivity in a workgroup, we must first define productivity in operational terms. Is productivity the number of invoices a person can process, the number of minutes saved during boot-up, or some other observable, quantifiable measurement? How we define such concepts determines how and when we measure them.

In terms of objective measures for user productivity and business value, we have determined that data should be collected at two points in time: one for baseline data and another for post-implementation data. Baseline data is information on the activities that the technology solution will impact. For the post-implementation data, the same information is collected again after implementing the technology solution. The timing of these activities may vary. For example, if the introduction of the technology results in the removal of the current system, we must capture the baseline data prior to introduction. If the two systems are deployed concurrently, it is possible

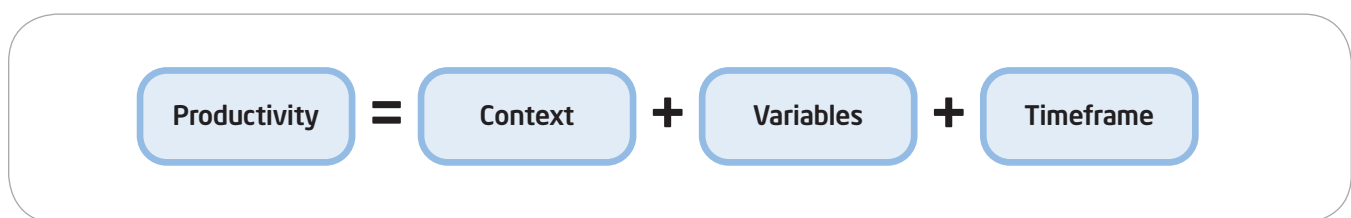


Figure 2. Productivity framework.

to collect both data sets at the same time. The difference between these data sets provides the basis for identifying user productivity. We can then integrate this data into other business value measures to identify the solution's overall business value impact.

Finance Verification

From the beginning, Finance has participated in developing the ITBV program and the metrics process and validation. Making Finance personnel key stakeholders who hold shared responsibility for the program ensures not only their buy-in but also their assistance in developing a program that can accurately measure bottom-line impact. All ROI measurements regarding project value require sign-off by senior-level Finance staff to qualify for ITBV program inclusion. This requirement enables us to base our results on accepted financial guidelines.

Finance also assesses the materiality effect (that is, the financial significance) of projects. We measure high-impact projects first so we can understand maximum value. Prioritizing metrics plans by project materiality helps us avoid situations where the costs of measuring benefits are larger than the benefits themselves. By focusing on high-impact programs, we also encourage the entire IT organization to align resources where they will have the largest bottom-line impact.

ITBV measures both the direct and indirect values derived from IT actions. Many IT projects enable direct cost savings for our customers. For example, when our network team increased the speed of a factory's network, factory managers were able to avoid purchasing some planned capital equipment. We also use indirect measures to show the value of IT. One enterprising IT team shaved three months off our time-to-market by upgrading a file transfer system. Additionally, we study changes in user behavior resulting from new IT solutions that show how productivity time savings can contribute to an improved bottom line.

Tools

When we launched the ITBV program, we reviewed over 100 IT projects and uncovered a mix of ROI, value propositions, and benefit summaries for each project. This lack of consistency and common validation for capturing benefits and returns initially challenged the program. We therefore developed and adopted a series of tools that currently help us measure and compare IT initiatives and facilitate investment decisions that bring the most value to Intel and IT. These tools include the business value index (BVI), business value ROI templates, and supporting BKMs.

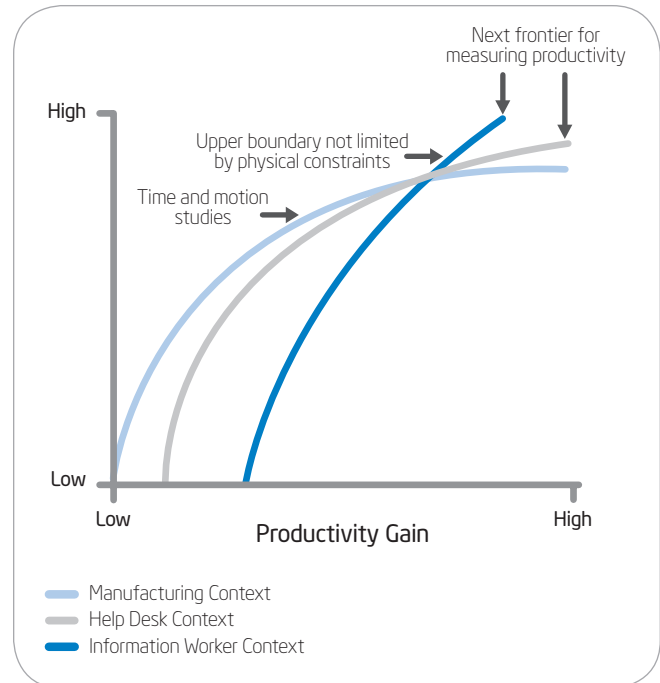


Figure 3. The productivity impact area.

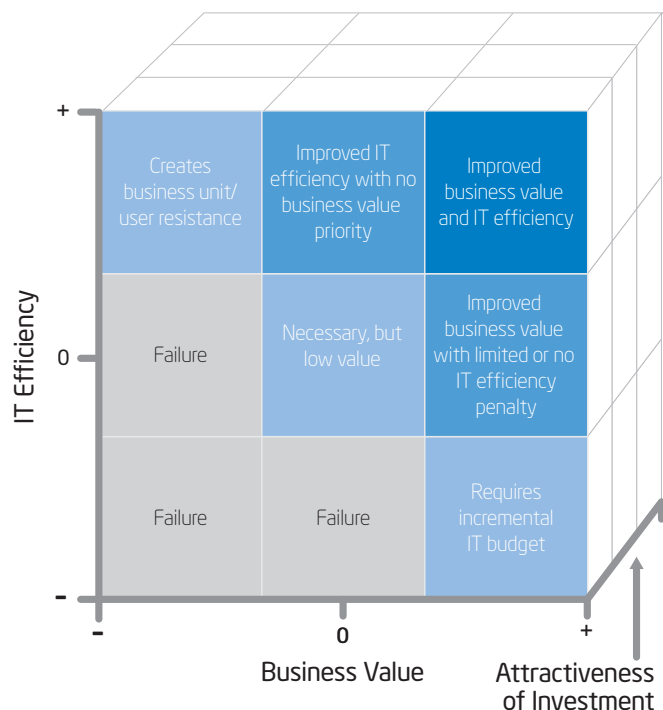


Figure 4. The business value index (BVI) evaluates IT investment benefits.

Intel Resources for Measuring the Business Value of IT

- Drawing from experiences at Intel and other organizations, David Sward’s book *Measuring the Business Value of IT* documents all aspects of Intel’s ITBV program and provides hands-on instruction targeted at helping other IT professionals measure the value of IT in their own organizations. It’s available from Intel Press at www.intel.com/intelpress.
- For more information on the business value index, see the IT@Intel white paper, “Managing IT Investments: Intel’s IT Business Value Metrics Program,” at www.intel.com/it. It’s also available to download with a BVI spreadsheet tool at www.itsharenet.com.
- For more information on the business value ROI template for SMBs, see the IT@Intel white paper, “Estimating the Business Value of SMB IT Makeovers,” at www.intel.com/it. A downloadable spreadsheet tool can be found at www.itsharenet.com.

Business Value Index

Intel’s BVI, illustrated in Figure 4, is a composite index of factors that affect the value of an IT investment. The BVI works by evaluating IT investments along three factors: IT business value (that is, impact to Intel’s business), impact to IT efficiency, and the financial attractiveness of an investment. All three factors use a predetermined set of defining criteria that include:

- Customer need
- Business and technical risks
- Strategic fit
- Revenue potential
- Level of investment required
- The innovation and learning that an investment generates

The criteria for each factor are weighted based on the ongoing business strategy and business environment. A change in business strategy could lead to a change in how the criteria are weighted for different factors.

The key characteristics that differentiate the BVI from other prioritization methods are that it:

- Forecasts the degree of an IT investment’s alignment with corporate strategy, its impact on IT efficiency, and its financial merit.
- Uses constant, pre-defined business value criteria to provide a level comparison of multiple investment options.
- Provides criteria-weighting that enables “what-if” analysis and rapid adjustment to changing business priorities.

The BVI highlights the most influential factors for assessing investments, indicates how each investment might add value to the company, and displays the results in a matrix that enhances comparative analysis of multiple investment opportunities. Using BVI methodology, our managers compare and contrast investments and then decide which investments align best with our business priorities.

Business Value ROI Template

The metrics team worked closely with Finance to develop a business value ROI template that includes value dials and the associated calculations. This tool helps IT project owners identify areas of benefit and move quickly to the related value dial for their projects. Finance previously used ROI analysis, which included traditional cost and benefit summaries, but we added value dials that were not common in the past, including soft benefits such as employee productivity and time savings.

The business value ROI template helps emphasize the importance of value measurements for each IT project and provides a consistent tool for tracking financial results until project completion. The before-and-after data helps Intel IT verify the accuracy of the original forecasts used for justifying the project and helps us gain experience over time so we can improve forecasts for similar projects in the future.

Business Value ROI Template for Small and Medium Businesses

As part of Intel's small and medium-sized business (SMB) IT Makeover program, we developed a

spreadsheet template to help measure the business benefits created by IT investments based on the business value ROI spreadsheet, simplified to fit a smaller business model.

Value Dial Calculations

Value dials provide more than just context and information about where IT projects deliver value—they also offer generic calculations. These calculations enable IT solution owners to predict and measure the value of their projects. Table 1, on page 8, shows examples of calculations for each respective value dial.

Results

With over five years of experience in managing Intel's IT investments with our ITBV program, we've demonstrated that IT can deliver significant business value: more than USD 5.5 billion in business value since the program's inception in 2002, as shown in Figure 5. This represents a growth in business value of more than 33 percent year over year.

The ITBV program has also helped us achieve some key accomplishments:

- We investigated hundreds projects to determine whether to include them in the program and then selected a subset to review in depth. Finance and the respective business units validated each project included in the program.
- We documented business value using primarily 11 business value dials.
- We developed standard measurement methods, standard valuation methods, training materials, and evangelized the program across the IT organization.
- We provided data to support data-driven investment decisions to maximize the business value delivered.

By proving IT's financial impact to Intel's bottom line, we are changing the corporate attitude

toward the value of IT investments. IT project owners are more willing and better equipped to document, measure, and prove the value of their projects in customers' terms. Our success, though, is far from complete. We have measured only a small portion of Intel IT projects. What remains is our endeavor to capture, measure, and prove the value and benefit of every IT dollar that Intel spends.

Lessons Learned

After five years of working with numerous technology owners and dozens of Intel business groups and their respective finance representatives, the ITBV tem has learned many lessons:

- Linking business value concepts and milestones into the product development lifecycle used

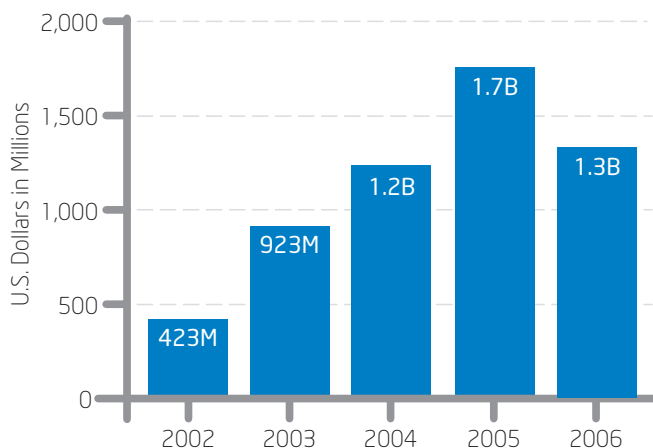


Figure 4. The business value index (BVI) evaluates IT investment benefits.

extensively within IT is critical for IT to realize the full value it is delivering.

- Identifying the key business value dials for each program and focusing on that subset is critical to quantifying business value.
- Employee productivity measurements require extra analysis, data collection, and partnerships with Finance and participating business units to verify the business value.
- Using a common language of business value, based on the needs of our customers, helps build a stronger partnership between the organizations.

Other outcomes from the program include published case studies and documentation of many of our methodology innovations. White papers and case studies are available through the IT@Intel program and we post BKM's on Intel's ITShareNet. Our ITBV program is also engaged with academic institutions, industry forums, and other organizations to help establish industry standards for measuring the business value of IT.

Program Weaknesses

When we launched the ITBV program, we decided not to attempt to measure business value contributions from existing IT solutions. Although this decision was appropriate at that time, it promotes a gap in our measurement capability. Like many IT organizations, Intel IT spends the bulk of its annual budget in maintaining existing capabilities; it is deeply unsatisfying to our IT organization and IT Finance not to see offsetting quantifiable business value. In general, the importance of these existing systems is not questioned, but it is perfectly legitimate to wonder about their value relative to newer innovations, and to want to see a more data-driven approach in deciding relative levels of investment in innovation versus maintenance. The practical effect of evaluating the business value of new programs, but not of old ones, might even perversely be to bias investment toward the old, since we have effectively created an extra hurdle for new programs to jump.

More broadly, we face ongoing work to make a focus on business value a key thread in the cultural fabric of Intel IT. IT employees are engineers and technical contributors who are passionate about technology for its own sake. Although we've made progress in building awareness of business needs, we still must work to align all our staff in the quest to move from being a technology-focused organization to becoming a customer-focused organization.

Conclusion

The future of Intel's IT investment decisions demands proven economic justification. We expect senior management to question every solution we deliver to Intel's employees. Precision, accuracy, and continuous measurement must remain a standard process for valuing IT.

Though the extra scrutiny creates more work for IT professionals across the enterprise, it also strengthens the benefits our businesses receive. Measuring the business results of IT investments improves the competitive advantage of the corporation and proves the value IT delivers to the bottom line. Focusing on the data and keeping the customer involved encourages business owners to invest.

We continue to evolve our program. Ongoing project measurement, attainment of annual

business value goals, and incremental methodology improvements sustain a large program that continues to align IT's priorities to those of Intel's business units and to gradually shift IT's culture toward a business focus. We are extending the lessons learned each year the program operates in hopes of measuring the value of every IT dollar spent at Intel. By furthering Intel's business results, we are stimulating future IT investment.

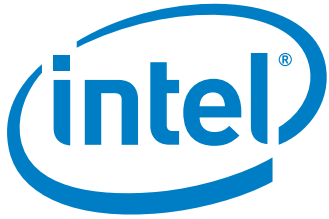
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Acronyms

BKM	best known method	ITBV	IT business value
BVI	business value index	NPV	net present value
CIO	chief information officer	PDA	personal digital assistant
DCF	discounted cash-flow	ROI	return on investment
HFE	human factors engineer	SMB	small and medium-sized business



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