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# THE 7 STEPS TO CALCULATING DATA WAREHOUSING ROI

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Data mart/data warehousing projects have become critically important staples of decision-support architectures for many organizations. For some, the benefits are immediate and distinct, with users obtaining analytical reports that were never before accessible. For others, benefits are less distinct, but at least as valuable: management information is more robust; executive decisions better informed.

Data warehouse/data mart implementations can make sense out of the volumes of data that populate operational databases. They can cut through to meanings and implications behind the raw statistics gathered every day. They can give knowledge workers at all organizational levels powerful tools for testing theories and contrasting research results. They can help one organization win out over another by supplying strategic competitive advantage via effective information analysis.

But data warehouses and data marts do not represent blanket solutions to the general decision-support needs of all organizations. Neither are they simple answers to what are typically highly complex questions. Each data warehouse and data mart must be planned and constructed according to each organization's specific objectives, resources and limitations.

And, increasingly, each data warehouse or data mart must play a role within a larger, enterprise-wide decision support framework. No longer are data warehouses and data marts the exclusive property of far-flung line-of-business users; more and more, they are brought to the attention — and within the responsibility — of CIOs, CFOs, and even CEOs.

Companies are committing more capital for data warehouse/data mart development; they are escalating planning to a more strategic level. Rather than let each LOB define its own data mart requirements, for instance, central planners are more likely to advocate an architectural approach for the LOB efforts; and they are necessarily asking for more formal evaluations of data warehouse/data mart justification. Increasingly, they look to ROI (Return On Investment) modeling as a means of evaluating data warehouse/data mart projects.

As a pioneer in the burgeoning distributed data warehousing market, Informatica has led partners and customers through important industry milestones: Informatica developed the first integrated tool suite for designing off-the-shelf data marts, and the company introduced the first fully metadata-enabled distributed data warehouse architecture.

Now Informatica is bringing its experience to bear on another important industry quest: ROI modeling. To produce this white paper, Informatica researched past efforts at defining and calculating data warehousing ROI, then added new insights gleaned from its work in the lab and in the field, helping some of the world's greatest organizations improve their decision support infrastructures. Informatica hopes that, through this work, new firms in virtually all industries will benefit from a fresh look, and a fresh approach, to data warehousing ROI.

## ROI: Benefits and Limitations

ROI modeling is valuable for several reasons. First, it supplies a fundamental cost-justification framework for evaluating data warehouse/data mart performance. Second, it encourages (actually, mandates) advance planning among all appropriate parties, from IS to users and executive management. Third, it helps organizations clarify and agree on the benefits they expect, and in that process helps them set realistic expectations for data warehouse/data mart performance.

But ROI modeling does have limitations. It can predict measurements for only those benefits that are tactical and therefore tangible, such as dollars saved, hours reduced, or reports generated. It can't convey

the value of what might be more far-reaching, strategic benefits: gaining better, faster access to customer information, or making better informed business decisions.

For many, however, the value of ROI modeling will overcome these limitations. Moreover, once ROI modeling is underway, companies can use their experience to fine tune models regularly, replacing assumptions with actual statistics. Over time, ROI modeling can thus become increasingly accurate and effective.

## Defining ROI

ROI, or Return On Investment, is a traditional measure of corporate-resource value. Although variations exist, ROI is essentially employed as a tool for weighing expected benefits against the costs of a specific project. The resulting ROI calculation measures the return on investment for the project.

The models discussed in this white paper will employ the four most common formulas. They are:

- Cash flow analysis — A method for projecting positive and negative cash flows for the anticipated life of the project. Typically, ROI measurements use the cash flow formula to depict results.
- Net present value — A method for evaluating cash flow according to the long-term value of current investment. Net present value shows how much capital would have to be invested currently, at an assumed interest rate, in order to create a stream of payments over time. For instance, to generate an income stream of $500 per month over six months at an interest rate of eight percent would require an investment — a net present value — of $2,311.44.
- Return on investment — This calculates net present value of total incremental cost savings and revenue divided by the net present value of total costs multiplied by 100. This type of ROI calculation is also frequently referred to as return of equity or return on capital employed.
- Payback — A calculation for determining how much time will pass before an initial capital investment is recovered.

## Recommended: A Seven-Step Approach to ROI

Informatica has constructed a seven-step approach to modeling data warehouse/data mart ROI. This approach draws from — and builds on — work conducted by expert consultants and executives.

These include:

- International Data Corporation (Canada) Ltd., in a report by Stephen Graham entitled The Foundations of Wisdom: A Study of the Financial Impact of Data Warehousing;
- KPMG Peat Marwick LLP; in a presentation by Kelvin Womack entitled Practical Techniques for Measuring Return on Investment;
- NationsBanc Services, Inc.; in a presentation by Duncan M. Witte entitled Data Warehousing Project Economics;
- Patricia Seybold Group; in a report by Pieter R. Mimno entitled Cost-Justifying a Data Warehouse.

The Informatica approach reflects some key assumptions. First, organizations should look well beyond the 90-to 120-day project scope to take a long-term view toward ROI, and should invest initial resources in developing a multi-year deployment map that articulates certain agreed-upon attributes. Time spent in enterprise deployment planning will pay substantial rewards later, both in ROI accuracy and in project success.

Second, risks as well as costs and benefits should be entered into the ROI equation, and quantified as precisely as possible. Only by managing the interplay among benefits, cost and risk can organizations gain a realistic perspective of data warehouse/data mart ROI.

Third, even the best ROI model will convey only quantifiable results. It is up to each organization to realize which strategic (and typically immeasurable) benefits are important as well, and if possible to assign values to them.

**Figure One**

## International Bank enterprise deployment map

| BASE ATTRIBUTES | YEAR 1 | YEAR 2 | YEAR 3 | YEAR 4 | YEAR 5 |
|---|---|---|---|---|---|
| # of Data Marts | 1 | 2 | 4 | 6 | 6 |
| No. of Sources | 3 | 6 | 3 | 3 | 3 |
| Type of Sources | DDA | Loans | mortgages | credit cards | trust |
| Physical Location | CORP | CORP | EUROPE | ASIA | AUSTRALIA |
| LOB Organization | Retail | Retail | Comm | Comm | Retail |
| Subject Area | MKTG. | SERVICE | FINANCE | SALES | SALES |
| Size of Data Base | 100 | 200 | 500 | 800 | 1000 |
| # USERS | | | | | |
| Corporate | 50 | 100 | 200 | 300 | 400 |
| Europe | 10 | 20 | 30 | 30 | 30 |
| Asia/Pacific | 10 | 20 | 40 | 80 | 160 |
| Total Users | 70 | 140 | 270 | 410 | 590 |

### Step One: Build an Enterprise Deployment Map

Through tactics that range from formal surveys to offsite meetings and enterprise modeling, organizations should begin the ROI model by creating a map showing likely enterprise-wide data warehouse/data mart deployments over a reasonable period of time.

The accompanying chart (**Figure One**) shows enterprise deployment for an international bank. Key attributes include numbers, types, and other details about the data warehouses/data marts that might be developed over a five-year timeframe, as well as expected user numbers and types of analytical tools.

As difficult as long-term planning can be — especially in large, decentralized organizations — this process aids substantially because it creates a dialog among constituencies that will be instrumental in the long-term success of the data warehouse/data mart.

This dialog should be maintained throughout, with updated information entered regularly into the enterprise deployment map, and hence into the ROI model. For instance, in year two of the figure, the bank's retail group may decide it wants to accelerate the schedule for the Australian data mart, initially proposed for year five. Thanks to the enterprise deployment map and the organization's ongoing dialog, this information can help to update the ROI model — and to alert appropriate individuals and departments.

**Figure Two**

Tangible Benefits

- Reduced inventory days from 90 to 30 days
- Increased sales by 30%
- Eliminated 240 weekly reports
- Lowered development costs by 6 person years
- Reduced response time for report requests from three weeks to three days
- Reduced the number of data extract programs maintained
- Increased market share by 1%

Intangible Benefits

- Faster more informed decision making
- Improved data accuracy, quality, consistency
- Improved customer service
- Faster delivery of products to market
- Migration from product focus to customer focus
- More efficient management of suppliers
- Improved quality of products and services

### Step Two: Analyze Potential Benefits

Analyzing expected benefits would seem to be a simple task, but it can be extremely challenging — and rewarding.

For some organizations, determining benefits is straightforward: a baseline is both simple and clear cut ("The average analytical report takes two weeks to process and deliver to the user. We want to cut that time to one day.")

But for most, benefits are not so clear. One group may feel that the most important benefit involves obtaining faster access to customer records for the purpose of cross-selling services. But another group might say that the most important benefit is the increased market share that would result from this cross-selling. Yet another group may argue that the more strategic (and less tangible) benefit — that of being able to better serve customers — outweighs the other two.

To aid the benefits analysis process, it is valuable to first differentiate between tangible and intangible benefits, then to prioritize both groups relative to their impact on actual business goals. **Figure Two** shows examples of tangible and intangible benefits.

In order to predict and measure tangible benefits, a baseline analysis should be conducted to serve as a "before" snapshot. If improving report response time is a high priority, the actual pre-data warehouse response time should be measured by a standard set of rules, and then documented; that way, post-data warehouse improvements will be both measurable and credible, since they will be determined using the same measurement rules.

Applying numerical measures to strategic, intangible benefits is, of course difficult or, for most, impossible. This is unfortunate because strategic value is really the primary driving force behind data warehouse/data mart implementations. As Stephen Graham said in the IDC report, "...the true benefits of the warehouse lie in the decisions that it enables." Graham goes on to list other important strategic benefits. These include managing the total customer relationship/opportunity;

creating value-add for the customer; building organizational empathy; reacting quickly to volatile controls and opportunities; managing both the macro and micro perspective; and improving managerial ability.

Once the expected benefits are grouped into tangible and intangible (tactical and strategic) sets, the organization should then prioritize them according to their impact on real business goals. For instance, reducing the number of paper reports might be important as an aid to saving administrative time and costs, but it's not nearly as meaningful from a business-goal perspective as, say, generating a 50 percent increase in sales.

### Step Three: Calculate Net Present Value for all Benefits

An effective ROI model should put all findings in terms of current dollars. This means it must employ a formula for expressing future dollar benefits in meaningful, current-value terms.

To do this, the organization must allocate benefits defined and quantified in Step Two over a period of time (preferably five years). Here, the enterprise deployment map is valuable in helping managers and users project their hoped-for benefits over time. **Figure Three** shows an example where costs remain stable while incremental revenue rises substantially, as the organization feels the effects of anticipated gains in market share.

**Figure Three**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| BENEFIT SIDE | | | | | | | |
| Incremental Revenue | | 1000000 | 4000000 | 12000000 | 20000000 | 25000000 | 62000000 |
| Net Present Value of Incremental Revenu | | $48,244,161 | | | | | |
| Cost Savings | | 0 | 100000 | 100000 | 100000 | 100000 | 400000 |
| Net Present Value of Cost Savings | | $331,213 | | | | | |
| Total Benefits | | | 4100000 | 12100000 | 20100000 | 25100000 | 62400000 |
| Net Present Value of Total Benefits | | $48,575,373 | | | | | |

### Step Four: Define Overall Costs

For the cost part of the ROI model, the organization should assess the dollar impact of 10 fundamental cost components:

- Hardware — Includes target database servers, desktop PC upgrades and related hardware. As Pieter R. Mimno points out in the Patricia Seybold Group report, "During the pilot phase, companies may be able to reduce costs by running the warehouse on an existing in-house server. However, most companies run their production data warehouses on dedicated servers, with the exception of companies that have excess capacity on their DB2/MVS mainframes."
- Networks — Although unusually complex network connections might call for inclusion in an ROI model, networking equipment costs typically fall within the realm of organizations' IT infrastructures. Because of this, we have not included network costs in the ROI model examples shown in this white paper.
- RDBMS software — Licensing costs for the database products that will be used as the data warehouse/data mart storage facility. If the organization maintains an enterprise-wide licensing program, this cost may be minimal.
- Back-end tools — Data-modeling and data cleansing tools fall into this category. Tool costs may rise substantially in companies with complex organizational structures and/or diverse modeling requirements.
- Query/reporting tools — Include data access and analysis software such as OLAP/ROLAP/MOLAP, data-mining and other tools. In the Patricia Seybold report, Pieter R. Mimno points out that "Most companies buy three or four different types of tools to support various groups of users. Distinct user groups are: (1) programmers, (2) business analysts, (3) executives, and (4) line-of-business and product managers."
- Metadata repository — Although the metadata repository may be implemented as an inexpensive, tightly confined set of tables or document that shares space on an existing server, in most cases the repository will require a dedicated database. Because of this, repository hardware and software should be included as a distinct cost component.
- Internal labor — Includes database administrators, project managers, programmers, and other employees associated with the project.
- External labor — Includes outside consultants, systems integrators, contract programmers and

other non-employee help.

- Ongoing support — Includes Help Desk and other forms of support, often difficult to assess accurately because of the formal/informal nature of most company support structures.
- Training — Training is a critical function, necessary for ensuring that end users and programmers gain easy familiarity with data warehouse/data mart query tools, administrative tools and programming languages. The importance of training cannot be overlooked, since ultimate success will depend on the willing participation of users and programmers.

**Figure Four**

| | Five-Year Data Warehousing Cost of Ownership Model - | | | | |
|---|---|---|---|---|---|
| ENTERPRISE DM STRATEGY | Base Economic Cost Justification | | | | |
| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
| Informatica PowerCenter 1.0 | | | | | |
| Base License (Class II UNIX) | 300,000 | | | | |
| Addn' Source & Target | N/A | | | | |
| Lab License (Class II UNIX) | $100,000 | | | | |
| | | | | | |
| PowerMart 4.0 Network Edition (Unlimited S & T) | | | | | |
| Base Enterprise License (UNIX), Unlimited Targets | $60,000 | $120,000 | $60,000 | $ 60,000 | |
| Enterprise Lab License | $20,000 | | $20,000 | $20,000 | $ 40,000 |
| Total Licensing Fees | $420,000 | $60,000 | $140,000 | $80,000 | $100,000 |
| | | | | | |
| Implementation Services (10 days/org | $11,145 | $ 22,290 | $11,145 | $ 11,145 | $ 11,145 |
| Training (3 days per org and geo) | $5,400 | $ 10,800 | $5,400 | $ 5,400 | $ 5,400 |
| Total expenses | $6,000 | $ 12,000 | $ 6,000 | $ 6,000 | $ 6,000 |
| | | | | | |
| Total Cost | $442,545 | $105,090 | $162,545 | $102,545 | $122,545 |
| Applicable Volume Discount (15%) | $44,255 | $0 | $0 | $0 | $0 |
| Net Cost | $398,291 | $105,090 | $162,545 | $102,545 | $122,545 |
| Net Present Value of Net Cost | $ 806,430 | | | | |

**Figure Five**

| | Five-Year Data Warehousing Cost of Ownership Model - | | | | | | |
|---|---|---|---|---|---|---|---|
| INDEPENDENT DATA MART STRATEGY | Base Economic Cost Justification | | | | | | |
| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Total Cost | |
| PowerMart 4.0 Standalone Edition | | | | | | | |
| Base License (Class II UNIX) | $100,000 | | $ 135,000 | $ 100,000 | $ 100,000 | $435,000 | |
| Additional Source Types | $45,000 | $ 45,000 | $110,000 | $ 55,000 | $ 55,000 | $310,000 | |
| Additional Target Instances (UNIX) | $0 | $ 60,000 | $ 300,000 | $ 150,000 | $ 150,000 | $660,000 | |
| Lab License (Class I UNIX) | $40,000 | | $40,000 | $ 40,000 | $ 40,000 | $160,000 | |
| PowerPlugs | $10,000 | | $10,000 | $ 10,000 | $ 20,000 | $50,000 | |
| | | | | | | | |
| Total Licensing Fees | $195,000 | $ 105,000 | $ 595,000 | $ 355,000 | $ 365,000 | $1,615,000 | |
| Implementation Services (10 days/org an | $16,500 | $ 33,000 | $16,500 | $ 16,500 | $ 16,500 | $99,000 | |
| Training (3 days per org and geo) | $5,400 | $ 10,800 | | $ 5,400 | $ 10,800 | $32,400 | |
| Total Expenses | $6,000 | $ 12,000 | | $ 6,000 | $ 12,000 | $36,000 | |
| | | | | | | | |
| Total Costs | $222,900 | $ 160,800 | $ 611,500 | $ 382,900 | $ 404,300 | $1,782,400 | |
| Applicable Discount | $11,145 | $8,040 | $31,725 | $38,290 | $40,430 | $189,630 | |
| Net Cost | $211,755 | $152,760 | $579,775 | $344,610 | $363,870 | $1,592,770 | |
| | | | | | | | |
| Net Present Value of Costs | $1,339,861 | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Maintenance (20%) | $39,000 | $60,000 | $90,552 | $212,852 | $281,774 | $684,178 | |
| Net Present Value of Maintenance | $548,270 | | | | | | |
| | | | | | | | |

## Step Five: Calculate Net Present Value for all Costs

Once these components are quantified, the organization can then calculate net present value for costs, as a means of filling in the cost side of the ROI model. This can be accomplished by either of two methods, actual cost and percentage. Each has advantages and disadvantages that must be weighed by the organization.

The actual cost method requires detailed estimates for all cost components, projected over the enterprise deployment map timeframe. Once in place, these costs can be entered into the net present value formula, as shown in **Figure Four.** Although the actual cost estimates can be tedious and time-consuming to generate, they do reflect a relatively accurate assessment of projected costs.

Alternatively, the organization can employ a type of shorthand by assigning percentage-of-cost values to these components, then projecting them into more broadly estimated costs. This requires use of basic assumptions for cost breakdowns — shown in **Figure Five** are percentages developed by Informatica, based on research and field experience.

With the percentage cost method, an organization can roughly estimate project costs quickly, by calculating a single cost component via the actual cost method, and then projecting relative costs of other components according to their percentage values. The advantage is time saved over the more laborious actual cost method; the disadvantage is reduced accuracy. Depending on the circumstances, however, percentage-based costing may ideal for creating initial ROI snapshots.

## Step Six: Assess Risk, Adjust Costs and Benefits

A key element in the Informatica ROI approach is risk assessment; by identifying and evaluating potential project threats — those that may cause serious budget or time overruns — organizations can take proactive preparatory or avoidance actions. Types and areas of

project risks can be difficult to identify and evaluate, but each organization should strive to generate a realistic assessment of risks that are potentially most harmful. Some of the major risks are:

- Scope creep — Frequently, data warehouse/data mart projects tend to grow in scope — user numbers, storage size, report numbers and so on — with accelerating pace as users gain familiarity with their capabilities. Users may start out requesting simple analytical reports, for instance, then progress to more complex requests once they see the analytical potential. Also, new, unanticipated users may be encouraged to try out the new data warehouse/data mart when they see their peers' analytical efforts. Scope creep causes performance to suffer as the data warehouse/data mart is asked to go beyond the bounds of its original definition.

  **Solution:** Thorough planning and tightly defined project parameters can guard against scope creep.

- Integration complexity — It is difficult to assess the time and cost required for integrating complex sets of data warehouse/data mart tools and other components, since complex systems integration projects frequently run over time and over budget.

  **Solution:** Addressing the "build vs. buy" decision early in the project life, and standardizing on vendors with integrated product sets, can reduce the threats associated with integration overruns.

- Architectural strategy — An inappropriate architectural strategy can prove disastrous, since architecture is the foundation upon which the decision-support systems will be built.

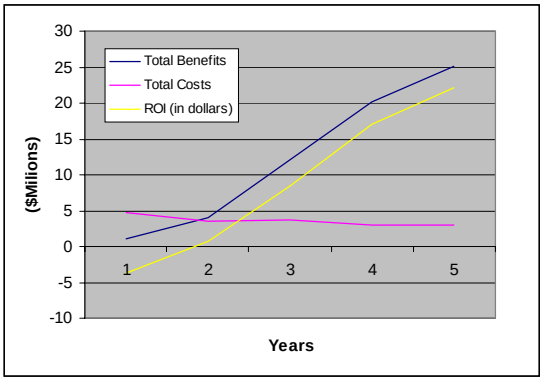
  **Solution:** Investigating the advantages and disadvantages of various architectural approaches — and overlaying these with the enterprise deployment map — will help organizations with accurate architectural planning. For instance, if the enterprise deployment map calls for multiple data marts to be built over time, the best architectural strategy is to begin with a distributed, dependent data mart framework such as Informatica's PowerCenter. That way, adding incremental data marts will be both simple and economical, since metadata synchronization and other elements of distributed architecture will be in place.

Other risks come from management or end users who may withhold project support; from the entanglements of internal politics; and from technologies that don't function as promised.

To deal with the human aspects of risk — reluctant managers and users, "political" problems — the best solutions involve thorough up-front planning, realistic expectations-setting, and establishment of processes for keeping managers engaged and users informed.

These are typically accomplished by honest effective communications, by maintaining regular "dialog" with management and end users. This way, managers won't harbor unrealistic expectations for their newly constructed data warehouse/data mart, and users, regularly solicited for input into the design process, won't feel neglected as query tools are configured and prepared for use. Also, particular care should be taken with data element definitions and data cleansing efforts in general, in order to avoid "Garbage In/ Garbage Out" problems.

**Figure Six**




As for technology risks, organizations should carefully assess the performance of their prospective vendors' products. And in some cases they should apply best case/worst case metrics to critical technology resources.

## Step Seven: Determine Overall ROI

With the preparatory calculations discussed in Steps

One through Seven now in place, the final step, calculating ROI, is largely a matter of activating the ROI formula: subtract net present value of total costs from net present value of (total incremental revenue plus cost savings). As shown in **Figure Six**, this delivers a total return on investment of 397 percent, with a payback of just over two and a half years.

This result matches closely the findings of the 1996 IDC report, The Foundations of Wisdom: A Study of the Financial Impact of Data Warehousing. Among approximately 50 companies in industries ranging from financial and manufacturing to retail transportation and government, this study found an average three-year ROI of 401 percent. Average payback for data warehouse applications was 2.3 years; average data warehouse cost was $2.2 million.

## ROI Insights from Informatica

But the IDC study also found that ROI can vary widely, so it does little good to over-value industry averages. Each organization must find its own best ROI, and each must carefully consider its own organizational makeup, personality and culture in determining what defines a successful data warehouse/data mart ROI.

Based on our own experience serving data warehouse/data mart applications for large and small organizations across a range of industries, Informatica can offer valuable insights into using ROI modeling to evaluate data warehouse/data mart feasibility.

*ROI is most effectively employed to compare and evaluate four fundamental business and architectural approaches to data warehouses/data marts.*

These include:

- Build vs. Buy — Here ROI modeling can help to uncover long term maintenance costs incurred for custom-coded or generator-produced systems that are sometimes hidden by conventional product evaluations;
- Standalone proof of concept — ROI modeling can give line-of-business users a snapshot of how a dedicated data mart might help them achieve decision support benefits;
- Independent vs. dependent data mart growth analysis — ROI can help guard against a short-sighted approach to building multiple data marts. For organizations planning for multiple data marts over time, it is far less costly to put the elements of an enterprise architecture — data cleansing and definition standardization, metadata synchronization, and network interfaces for distributed data marts — in place during implementation of the initial system. Many organizations today employ ROI modeling to contrast the differences between this approach and the more costly approach of creating after-the-fact data mart distribution.

*Organizational size, structure, complexity play significant roles in ROI level of difficulty.*

A number of factors can increase the complexities involved with determining ROI. Organizational scope is one: the more decentralized an organization's decision-making structure and the more dispersed its offices, the greater the difficulty in generating accurate multi-year plans. Another factor involves equipment and topological complexity: numerous legacy database systems and complex, multi-tier client-server networks can confound data warehouse/data mart planning substantially, and adversely affect ROI.

For these reasons, the more care taken with the enterprise deployment map, the better. The enterprise deployment map is an opportunity to bring together dispersed resources and points of view, and to achieve agreement on fundamental business goals and other issues. Every hour spent on the enterprise deployment map may save hundreds of hours subsequently, when errors must be corrected in the heat of hardware and software implementation.

*The importance of "human" issues in determining success or failure must not be overlooked.*

The vision and commitment of management and the willingness and enthusiasm of end users play vital roles in accurate ROI modeling and in determining overall project success.

Any major project needs at least one executive-management advocate, and data warehouse/data mart implementation is no exception. But it is critical that such managers have realistic expectations — that they know the limitations as well as the potential benefits of the new systems — and that they remain engaged

throughout the project. It is up the project leader to maintain this engagement via regular and frequent communications, and to track closely changes in management attitudes.

Key end users must also be engaged to understand and work with the new system. Particular care must be taken with data cleansing and with implementation of query tools so users don't become disillusioned by "bad" data or difficult-to-use analytical tools. For this reason, user input should be included at every step of ROI planning and system implementation, and users should be guided carefully through report-building and subsequent processes. Needless to say, comprehensive support and training are vital elements, not to be overlooked in ROI modeling.

*Strategic benefits, while not immediately quantifiable, must be considered and valued.*

As mentioned earlier, one of the greatest difficulties in constructing an ROI model involves how (or whether) to value intangible, strategic benefits. Industry experts recommend at a minimum that strategic benefits be considered, and at a maximum that they be factored in as distinct elements of management-productivity analysis.

Yet another point of view comes from former Kmart CIO Dave Carlson, who was quoted in *Computerworld* (November 1, 1996): "I have always believed that in fact the most important systems are often those which are strategic and by definition have benefits which are not well understood. I suspect that American Airlines' Sabre system was not cost-justified but still changed the airline business forever."

Another sentiment in favor of strategic benefit comes from Howard Edels, senior vice president/CIO for CVS, quoted in the same *Computerworld* article. He said "Executives make key strategic decisions based on insight or gut. Then they use financial numbers to get a sense of cost benefit. But the cost will only guide how they will proceed, not if they will stop."

## The Benefits of Data Warehouse/Data Mart ROI

With ROI modelling, organizations can build strong internal support for data warehouse/data mart projects, and can put in place a credible yardstick for measuring the value of such endeavors.

Recent results from some Informatica customers bear this out. These customers, in industries ranging from banking and utility to education, defined ROI according to their unique objectives. Each went into production within six months of project start, and each determined that an architected approach to data mart distribution would produce the greatest return on investment.

For these companies, and for others now embarking on data warehouse/data mart projects, ROI modeling can bring substantial benefits. It may serve as a key to helping define data warehouse/data mart projects in ways that are most appropriate and valuable for the organization. And it may be the best means of satisfying even the most risk-averse CEO that the IS group is using scarce corporate resources as effectively as possible.

Sidebar:

## Assuring Success Through Proactive Risk Avoidance

During ROI modeling and project implementation, the data warehouse/data mart sponsor(s) should take any steps possible to minimize project risks proactively. Such risk-avoidance actions include:

- Assess closely the timing of various costs, since these have direct impact on payback ratios.
- Define baseline measurements as precisely as possible.
- Evaluate and monitor regularly executive involvement and end-user participation.
- Track corporate commitment/funding — does executive management consider this a "skunkworks" project or a strategic venture?
- Document assumptions, check and re-check expectations of appropriate individuals.
- Put processes in place to guard against and manage "scope creep."
- Regularly assess skill levels among the data warehouse/data mart project team.
- Calculate accurately the degree of data cleansing necessary to ensure consistent, meaningful reports.
- Determine quality and appropriateness of reporting tools for each end-user segment.
- Maintain effective internal data warehouse/data mart marketing via end-user training and Help Desk support.

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