

**DECISION MODEL:**

**SELECTING THE BEST STRATEGY FOR IMPLEMENTING  
A CORPORATE WIDE ENTERPRISE RESOURCE PLANNING  
SYSTEM**

**The George Washington University  
Executive Decision Making**

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April 12, 2000

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## **ABSTRACT**

BellSouth Corporation is faced with the challenge of implementing a single Enterprise Resource Planning solution that will integrate the multiple autonomous Supply Chain Management systems of BellSouth's nine affiliates. BellSouth executives have engaged the BEST project team to develop an implementation strategy that will deliver the desired system within the shortest period of time, with the lowest possible cost, and with the fewest possible risks. The BEST project team will use the Analytical Hierarchy Process methodology to derive the appropriate priorities and select the best implementation strategy for BellSouth.

## **INTRODUCTION**

### **Definition of Supply Chain Management/Enterprise Resource Planning**

Activities within the business discipline commonly known as Supply Chain Management (SCM) include the processes required to procure, track and pay for the goods and services needed to run a business. Enterprise Resource Planning (ERP) software platforms provide the foundation for all SCM systems that are currently considered "world class" applications.

### **Realized Benefits of Supply Chain Management/Enterprise Resource Planning**

Companies who have implemented SCM/ERP solutions have benefited with dramatic gains in productivity and customer satisfaction. To date over 60% of the top thirty purchasing companies and over 40 % of the Gold Chip companies have completed a SCM/ERP transformation. Companies that have already benefited from a similar evolution include Compaq, IBM and Lucent Technologies.

### **Background**

BellSouth affiliates are currently burdened with an extremely complex supply chain environment. The tools now used by the nine BellSouth affiliates to manage material demand planning, strategic supplier relationships and the tracking of inventories have in many cases been in place more than twenty years. As the Corporation grew, numerous affiliate companies have been formed, each developing a unique approach to the management of the supply chain. Today, numerous methods and data systems are loosely laced together in an effort to manage demand planning, supplier relationships and the control of inventories. Current supplier relationships are focused on transactions rather than innovation and competitiveness. Existing systems lack the ability to manage internal consumption, purchasing compliance, customer service and product availability.

The SCM business case presents compelling strategic and economic reasons for the implementation of an end-to-end consistent corporate wide solution. Implementing a corporate SCM/ERP platform will provide benefits to BellSouth by streamlining the supply stream, decreasing time to market, and providing direct access to a wealth of real time operating

information. The BellSouth SCM/ERP restructuring is required to meet the needs of both a growth business and an increasingly competitive environment.

BellSouth executives understand the urgency driving the modernization of current SCM systems. The order in which existing legacy systems will be replaced has become a major issue with respect to the implementation strategy. Numerous benefits associated with this business plan are attained when the most complex implementation is completed. BellSouth Executives have challenged the BEST project team to formulate an implementation strategy that will deliver benefits in the shortest period of time and at the lowest cost. The issue at hand is how to accelerate achievement of the benefits while controlling costs and holding risks to reasonable levels. In short, the goal of the project team is to select the best implementation strategy.

Designing, implementing and enabling improved SCM processes through leveraging a proven technological solution will assist BellSouth in meeting its objective of becoming operationally excellent. Improved SCM/ERP systems will streamline procedures and data administration while providing direct access to a wealth of real time operating information.

BellSouth must transform its fragmented approach to managing material and supplier relationships into an integrated SCM/ERP process that spans asset classes and organizational boundaries. Integrated ERP systems link the activities and partners (suppliers, customers and third parties) associated with moving goods and services from the supplier (and his supplier) through to the end customer in a seamless stream. Successful supply chains include the information systems necessary to monitor and optimize the activities required to manage cash flow, information, and material throughout all procurement and asset management processes.

BellSouth will accomplish the implementation through a four pronged approach:

- Institute standard professional ERP process for planning and forecasting, sourcing, inventory and distribution through Project BEST.
- Develop and optimized material distribution network to reduce instances of inventory facility requirements while ensuring timely product delivery.
- Institute strategic sourcing to reduce the total base to “best in class” suppliers, developing business relationships appropriate to the value each company brings to BellSouth.
- Implement an integrated SCM Business-to-Business (B2B) infrastructure through the BellSouth Enterprises Supplychain Transformation Project (*Project BEST*).

Project BEST will implement the systems and processes required to process and monitor transactions, support tactical strategic decisions for material and supplier management and provide for electronic integration with the processes of our suppliers. The project is comprised of two major activity phases. The first phase involves implementation of an E-Procurement platform that will streamline internal procurement processes and integrate our purchasing activities with strategic partners. The second phase implements an all-inclusive ERP system. The second initiative will enable BellSouth to sustain and increase the benefits from process distribution and sourcing redesign efforts. Without the second phase, the initial phase would simply become an event that would have to be periodically repeated to gain additional benefits.

Determining the best implementation approach for the ERP System is critical to the strategic success of BellSouth. Transition to a single platform ERP system involves the migration of numerous existing systems, processes and organizations. The sequential steps required to transition all affected companies are affected by three primary variables: implementation costs, derived benefits and inherent risks. These variables have a direct affect on the implementation approach, each factor generating unique constraints.

## **ENVIRONMENT OVERVIEW**

BellSouth spends over \$9 billion on goods and services annually. This annual rate of spending requires effective management of both new purchases and existing assets to ensure efficient customer service and financial return. BellSouth's current operating systems do not adequately meet the needs of both a growth business and an increasingly competitive environment. The following describes the current state of SCM practices and systems at BellSouth.

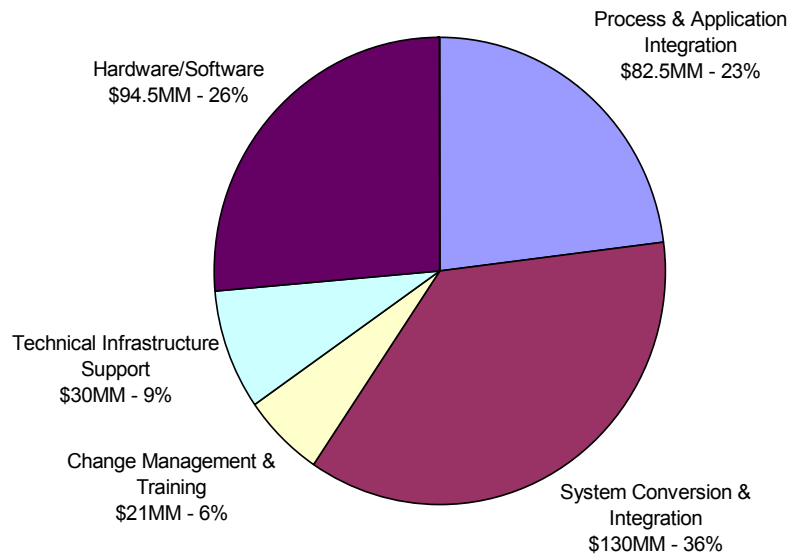
- Fragmented and redundant material storage and distribution networks and practices across affiliated companies.
- Millions of dollars of available inventory in storerooms, vehicles and work centers are not visible.
- Excess investment in inventory throughout the business to compensate for lack of demand planning and inventory management.
- Over 90,000 suppliers with 82% under \$10,000 in annual spending, driving invoices processed to over 1.5 million annually.
- Supplier selection often based on today's price, not contribution to BellSouth value.
- Little focus on strategic suppliers to drive emerging technology and cost improvements.
- Limited integration of suppliers to capabilities to reduce cost, increase efficiency and develop new products or services.
- Existing systems and interfaces make BellSouth a difficult customer with which to do business, increasing suppliers costs and ultimately product prices.
- Little focus on leveraging corporate purchasing volumes with suppliers.
- Impossible to insure purchases are made with approved suppliers at contracted prices.
- Lack of consistent methods for managing inventories, sourcing strategies and purchasing activities.
- Fragmented archaic information systems are limited in terms of scalability and functionality. Multiple systems cannot aggregate data across the enterprise.
- Systems limitations impact BellSouth's ability to ensure supply and satisfy customer needs.

## **PROBLEM SCENARIO**

The challenge that the BEST project team now faces is to determine the shortest, safest successful path to achieving full SCM/ERP integration among the nine BellSouth affiliates. While reaching the point where full benefits are attained is important, a paradox is introduced in terms of both cost and risk. The shortest path to full benefits is reached by implementing the

SCM/ERP solution at the largest and most complicated affiliate first. If successful, implementing the new systems at the largest affiliate first will provide the earliest delivery of all attainable benefits. The largest affiliate also provides the highest probability of project failure and the least attractive environment in which to attempt problems resolution.

**Implementation Costs by Category**  
**Total: \$358MM**



**FIGURE 1: IMPLEMENTATION COSTS**

The overall costs of the project implementation are displayed by cost category in the pie chart:

**Hardware and Software** – The cost of servers, drives, tapes, facilities, barcode scanners, software, support systems and material reference catalogs.

**Process & Application Integration** – The cost of application and new process designs, application setup, systems integration testing, user acceptance testing and post-implementation support

**Technical Infrastructure** – The purchase of required hardware and software, maintenance of the development environment, preparation of the production environment and desktop maintenance.

**Change Management & Training** – The cost of developing the design of organizations within the new operating environment, communications with the affected organizations, development of user procedures and delivery of required training.

***System Conversion and Integration*** – The cost of transferring data from the old systems to the new system, purging unnecessary data and performance testing prior to changing to a new production environment.

## **ALTERNATIVES**

The BEST project team is currently considering three alternative approaches for implementation of a fully integrated SCM/ERP solution for the nine BellSouth affiliate. The alternatives are as follows:

**Alternative One:** Implement ERP Systems from Smallest (L. M. Berry) to Largest (BellSouth Telecommunications) Affiliate Company. This approach is the most risk averse (pro), but significantly delays the delivery of benefits (con).

**Alternative Two:** Implement ERP Systems from Largest (BellSouth Telecommunications) to Smallest (L. M. Berry) Affiliate Company. This approach delivers the most benefits in the shortest period (pro), but requires the replacement of highly complex software applications, representing the highest opportunity for failure to the project stakeholders (con).

**Alternative Three:** Implement ERP System in BellSouth Cellular followed by BellSouth Telecommunications, then smaller Affiliates. This alternative is relatively risk averse regarding the replacement of systems (pro), but may not represent sufficient savings to convince executives that it is a logical first choice implementation (con).

## **DECISION IDENTIFICATION**

The primary focus of the decision-makers will be to review the three alternatives and determine the implementation approach that will deliver as many benefits as are feasible in the shortest period of time. While the overall objective is to maximize the benefits to BellSouth, due consideration will be given the costs and risks inherent in each of the alternatives considered.

## **SIGNIFICANCE OF DECISION**

While determining the best implementation strategy, three primary variables will be considered. The three primary variables are:

- **Costs** –Include all costs incurred over the duration of the project. The distribution of costs will change with each of the alternatives considered. Costs incurred upon completion of the project (ongoing maintenance and future enhancements) will be considered constant across all alternatives and therefore not included within this analysis.
- **Benefits** – Consider all benefits attained over the duration of the project. The distribution of benefits will change with each of the alternatives considered. Benefits attained at the completion of the project (benefits that recur annually) will

be considered constant across all alternatives and therefore not included within this analysis.

- **Risks** – The level of risk will vary with each of the implementation alternatives considered. The level of risk varies within each of the companies considered and is a function of the complexity of the systems to support SCM activities, the regulations under which the company must operate and magnitude of the undertaking.

The impact of the variables specified above will be considered for the project period only. In each of the alternatives considered, it will be assumed that the ERP System will be implemented in all companies within the project period. The project duration will be assumed to remain constant, only the sequence of events within the project time frame will change.

### DECISION MAKING APPROACH

As stated earlier within the problem scenario description, the project team has been challenged with determining “*the shortest, safest successful path to achieving benefits*”. In order to analyze approaches to the implementation, three basic scenarios were developed. The project team developed three scenarios on the basis of the size of the nine affiliates considered, their intuitive knowledge of the system complexities within each company and judgements relative to the costs that would be incurred to each.

Affiliate Company	Total Annual Expenditures	Projected Recurring Annual Benefit	Estimated Project Implementation Costs
<i>BellSouth Corporate</i>	\$427,000,000	\$46,970,000	\$16,673,866
<i>BellSouth Telecommunications</i>	\$6,097,000,000	\$670,670,000	\$238,080,934
<i>BellSouth Cellular</i>	\$1,722,000,000	\$189,420,000	\$67,242,147
<i>BAPCO/Stevens</i>	\$303,000,000	\$33,330,000	\$11,831,806
<i>BellSouth Public Communications</i>	\$218,000,000	\$23,980,000	\$8,512,653
<i>BellSouth Entertainment</i>	\$174,000,000	\$19,140,000	\$6,794,503
<i>BellSouth Dot Net</i>	\$75,000,000	\$8,250,000	\$2,928,665
<i>BellSouth Long Distance</i>	\$92,000,000	\$10,120,000	\$3,592,496
<i>L. M. Berry Publishing</i>	\$60,000,000	\$6,600,000	\$2,342,932
<b>Total</b>	\$9,168,000,000	\$1,008,480,000	\$358,000,000

FIGURE 2: SUMMARY OF IMPLEMENTATION COSTS & ANTICIPATED BENEFITS

In reviewing the table displayed in Figure 2, the team members observed some natural “break points” in terms of the size of each affiliate company. The team followed the natural division and categorized the companies into the three categories of small, medium and large. The initial divisions were made in terms of total dollars spent on goods and services, but additional analysis indicated that the spending activity also correlated reasonably with both the projected



benefits and implementation costs. The project team prorated both benefits and costs based upon the proportionate spending activity of each affiliate.

While the division may appear simplistic at first glance, the project team is aware of the significant complexities within each of the established categories. Because the pro-rata modeling might later raise concerns, the approach was submitted for review by the team to the project owners. Subject matter experts managing the project business plan confirmed the approach and went on to classify the model as within the range of budget estimates (+/- 10%). The cost and benefit categories confirmed by the project owners appear in Figures 2 and 3.

The amount of time to deliver solutions to each of the categories is a factor, but numerous other variables affect the overall project schedule. There is a significant “up-front” effort required to condition the large and medium affiliates for the transition to the new systems and processes, but that effort is currently scheduled to occur prior to availability of the replacement software. While those activities are a consideration, the work will be completed and costs incurred prior to the implementation within any affiliate.

#### Category 1: “Large” Affiliate

BellSouth Telecommunications (BST) generates two thirds of the total annual spending activity within the Corporation and was made the sole occupant of the “large” category. In addition to being the largest purchaser of goods and services, BST is also the oldest of the affiliate companies and has the most complicated network of SCM Systems.

#### Category 2: “Medium” Affiliate

BellSouth Cellular Communications (BSCC) is the second largest of the affiliates. From the perspective of this project, BSCC is the only occupant of the “medium” category. BSCC has not been in existence as long as BST but has had sufficient time to develop and install complex SCM systems. While the SCM systems currently used within BSCC are moderately complex, the number of programs in use is small (5) and the interfaces to other operating systems are simple.

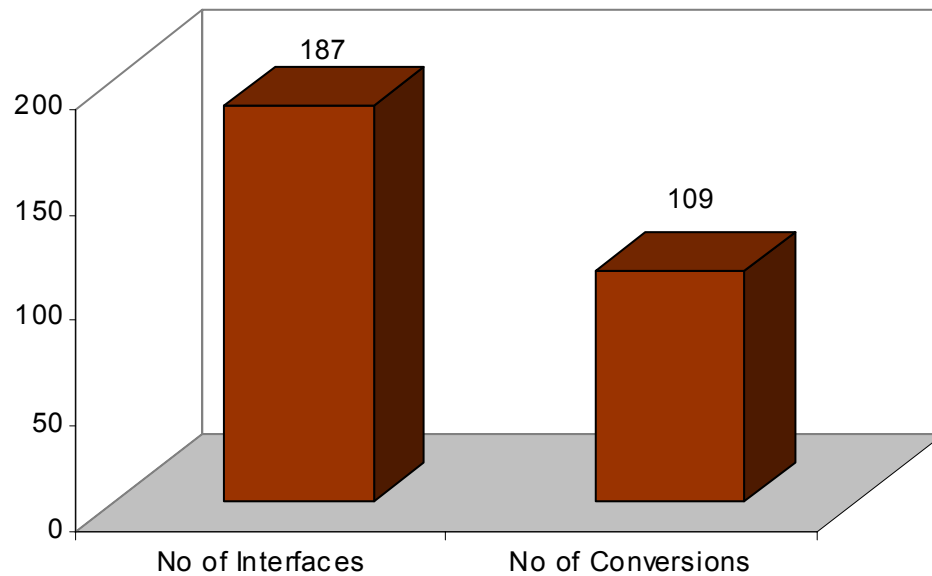
#### Category 3: “Small” Affiliate

The remaining companies are all categorized as “small” affiliates. Assignment in this category implies characteristics in three distinct dimensions. First, the current level of purchasing activity is relatively low. These companies are expected to grow, but current purchasing levels are not expected to change significantly during the course of the project. Second, the SCM systems in each company are either very simple or non-existent. System replacement is more straightforward. Third, the amount of resource required for implementation is much lower than in the “large” and “medium” affiliates.

	Hardware & Software	Process & Application Integration	System Conversion and Integration	Change Management & Training	Technical Infrastructure Support	Total by Affiliated Company
<b>BellSouth Corporate</b>	\$4,401,342	\$3,842,441	\$6,054,756	\$978,076	\$1,397,251	\$16,673,866
<b>BellSouth Telecommunications</b>	\$62,845,386	\$54,865,020	\$86,453,970	\$13,965,641	\$19,950,916	\$238,080,934
<b>BellSouth Cellular</b>	\$17,749,673	\$15,495,746	\$24,417,539	\$3,944,372	\$5,634,817	\$254,754,799
<b>BAPCO/Stevens</b>	\$3,123,200	\$2,726,603	\$4,296,466	\$694,045	\$991,492	\$11,831,806
<b>BellSouth Public Communications</b>	\$2,247,055	\$1,961,715	\$3,091,187	\$499,346	\$713,351	\$8,512,653
<b>BellSouth Entertainment</b>	\$1,793,521	\$1,565,772	\$2,467,277	\$398,560	\$569,372	\$20,344,459
<b>BellSouth Dot Net</b>	\$773,069	\$674,902	\$1,063,482	\$171,793	\$245,419	\$2,928,665
<b>BellSouth Long Distance</b>	\$948,298	\$827,880	\$1,304,538	\$210,733	\$301,047	\$3,592,496
<b>L. M. Berry Publishing</b>	\$618,455	\$539,921	\$850,785	\$137,435	\$196,335	\$6,521,161
<b>Total</b>	\$94,500,000	\$82,500,000	\$130,000,000	\$21,000,000	\$30,000,000	\$358,000,000

FIGURE 3: IMPLEMENTATION COSTS BY AFFILIATE AND SPEND CATEGORY

*The number and complexity of the legacy systems drive the cost of migrating to new systems.*

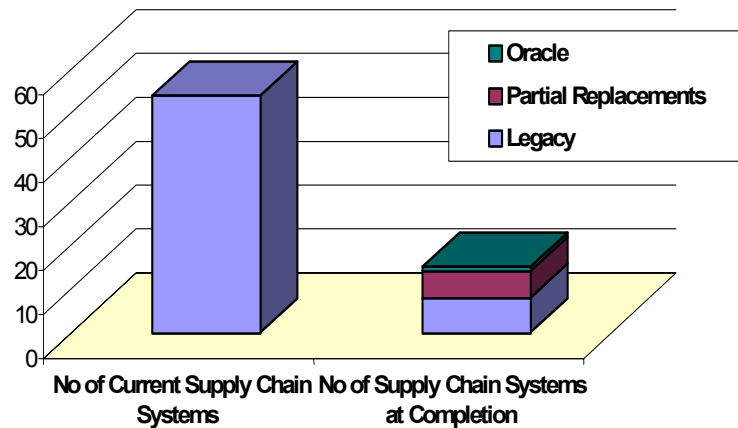


**FIGURE 4: NUMBER OF INTERFACES AND CONVERSIONS (TOTAL PROJECT)**

	<b>Total Programs</b>	<b>Average Days to Develop</b>	<b>Total Days</b>	<b>Percent of Total</b>
Permanent Interface Programs	187	40.2	7,525	9%
Temporary Interface Programs	35	49.7	1,738	2%
Conversion Programs	109	34.5	3,757	4%
Extension Programs	60	39.7	2,379	3%
Report Programs	135	25.1	3,384	4%
Implementation, Patch Testing, Tools			5,225	6%
Design, Build & Test Conversion Extracts (All Affiliates)			19,720	24%
Testing (System and Inter-Operability)			10,297	12%
Conversion, Data Cleansing, Mock Conversion			21,089	25%
System Decommissioning			6,332	7%
Data Warehouse, Production Support			3,672	4%
Total Reports, Interfaces, Conversion and Extension Estimate			85,118	100%

**FIGURE 5: ESTIMATION OF PROGRAM & SYSTEM CONVERSION EFFORT**

***Numerous autonomous SCM systems will be replaced by a single SCM platform.***



**FIGURE 6: “BEFORE & AFTER” VIEW OF SCM SYSTEMS**

The number of affiliates, complexity of systems, achievement of benefits, management of costs and mitigation of risks are all factors affecting the ERP implementation strategy. When the probability of achieving a goal is affected by a large number of variables, the decision making approach becomes critical in ensuring all mitigating factors are considered.

In order to facilitate the decision, the Analytical Hierarchy Process (AHP) and Expert Choice software will be used. Utilizing the AHP will provide a basis for formulating and evaluating criteria affecting the decision. The Expert Choice software provides a means of modeling the complex decision landscape, providing visual illumination of factors affecting the decision, the evaluative criteria and the considered alternatives.

This analytical process assists the decision-maker in modeling alternatives and organizing variables to ensure a thorough and balanced analysis. The steps in the process are:

- 1. Problem Definition and Research**     Articulating the goal, determining primary objectives and investigating various alternatives.
- 2. Selection**     Completing review and eliminating unfeasible alternatives.
- 3. Decision Model Development**     Constructing the decision in a hierarchy that includes the goal, objectives, sub-objectives and alternatives.
- 4. Evaluation and Prioritization**     Establishing significance of each objective by completing a relative (pair-wise) comparison. The evaluation and prioritization should consider objective and subjective criteria.
- 5. Measurement**     Measuring the alternative’s contribution at the lowest level, up to and including sub-objectives when they are used.
- 6. Review and Verification**     Performing sensitivity analysis against the initial decision to determine if changes in the relative weight of the criteria reveal any significant changes in the decision.
- 7. Documentation**     Recording the rationale that formed the basis of the decision and the model.

## DECISION MODEL

**Goal:** Select the best implementation strategy for a common platform Enterprise Resource Planning (ERP) system to be installed sequentially across nine affiliates companies within BellSouth Corporation.

### Primary Objectives:

- **Costs** – Keep costs as low as possible without introducing significant delay to the project schedule or to the implementation of BellSouth Telecommunication.
- **Benefits** – Take all steps necessary to deliver the most benefits attainable in the shortest period of time. Pursue implementation of BST to attain related benefits.
- **Risks** - Only introduce risks that can be addressed with a mitigation strategy and avoid delays unless necessary to keep risks at a reasonable level.

### Secondary (Sub) Objectives:

- Analyze the impact of the implementation strategy on the following *Cost Sub-Objectives*:
  - **Hardware and Software:** Delivery of both to support the implementation.
  - **Technical Infrastructure (Network) and Support:** The cost of establishing the communications networks required in the new operating environment.
  - **Systems Conversion and Integration Effort:** The cost of transferring data from existing systems to the new operating environment.
  - **Change Management:** The oversight effort required when managing the transition and coordinate systems process integration efforts.
  - **Process and Applications Integration Effort:** The cost of reengineering existing processes and building interfaces to applications that support other organizations and business processes.
- Consider the impact of the implementation strategy on the *Benefit Sub-Objectives*:
  - **Elimination of Legacy Systems:** Reducing the costs of operating numerous autonomous systems.
  - **Reduction in Excess Inventory Carrying Costs:** Improved SCM systems will reduce inventory and the associated costs for property tax, storage, overhead, etc.
  - **Increased Reuse of Previously Purchased Capital Equipment:** Improved SCM Systems will increase visibility of available capital equipment.
  - **Strategic Sourcing with Suppliers:** Strategic Sourcing will allow for economies of scale regarding purchase activity and improve our negotiating position with selected vendors.
  - **Reductions in Facilities, Personnel & Equipment:** As the systems are improved and the numerous legacy systems are replaced, logistic networks,

warehousing and organizations will be changed to reflect the streamlined operating environment.

- Consider the impact of the implementation strategy on the *Risk Sub-Objectives*:
  - **Failed Implementation:** The impact if the implementation strategy fails to deliver a system to a production environment.
  - **Squandered Finances:** The financial loss to the Corporation if the strategy selected does not succeed in delivering a new system.
  - **User Acceptance:** The impact if the system is delivered but fails to work due to lack of user acceptance.

## RESULTS AND ANALYSIS

Prioritizing Objectives:

The pairwise assessment process within the Expert Choice software application was used to determine the relative importance of each of the primary and secondary objectives with respect to the goal of determining the best ERP implementation strategy. The pairwise comparison technique allowed the evaluators to derive the priority (relative importance) of each objective and sub-objective while focusing on the ultimate goal. Structuring the complex scenarios using Expert Choice software facilitated the assessment of the objectives and the sub-objectives. Expert Choice utilizes a structuring component that assists with the creation of an Evaluation and Choice hierarchical decision model. The structuring process helped to organize the factors in a manner that promoted the organized consideration of all variables.

While costs are always an overarching concern in any large business, the pairwise comparison of the chosen variables within the Expert Choice application resulted in the lowest priority (0.169) being derived for cost with respect to the goal of determining the best implementation strategy. This is not to imply that the costs are in any way considered unimportant, rather it is to suggest that the implementation strategy employed has a low to moderate impact on the flow of expenditures.

Benefits were considered to be the most important factor in the implementation strategy, but it is important to understand that delivery of the benefits is directly associated with minimizing the risks of implementation. The pairwise comparison of the variables derived the highest priority for Benefits relative to the decision (0.443), followed closely by risks (0.387).

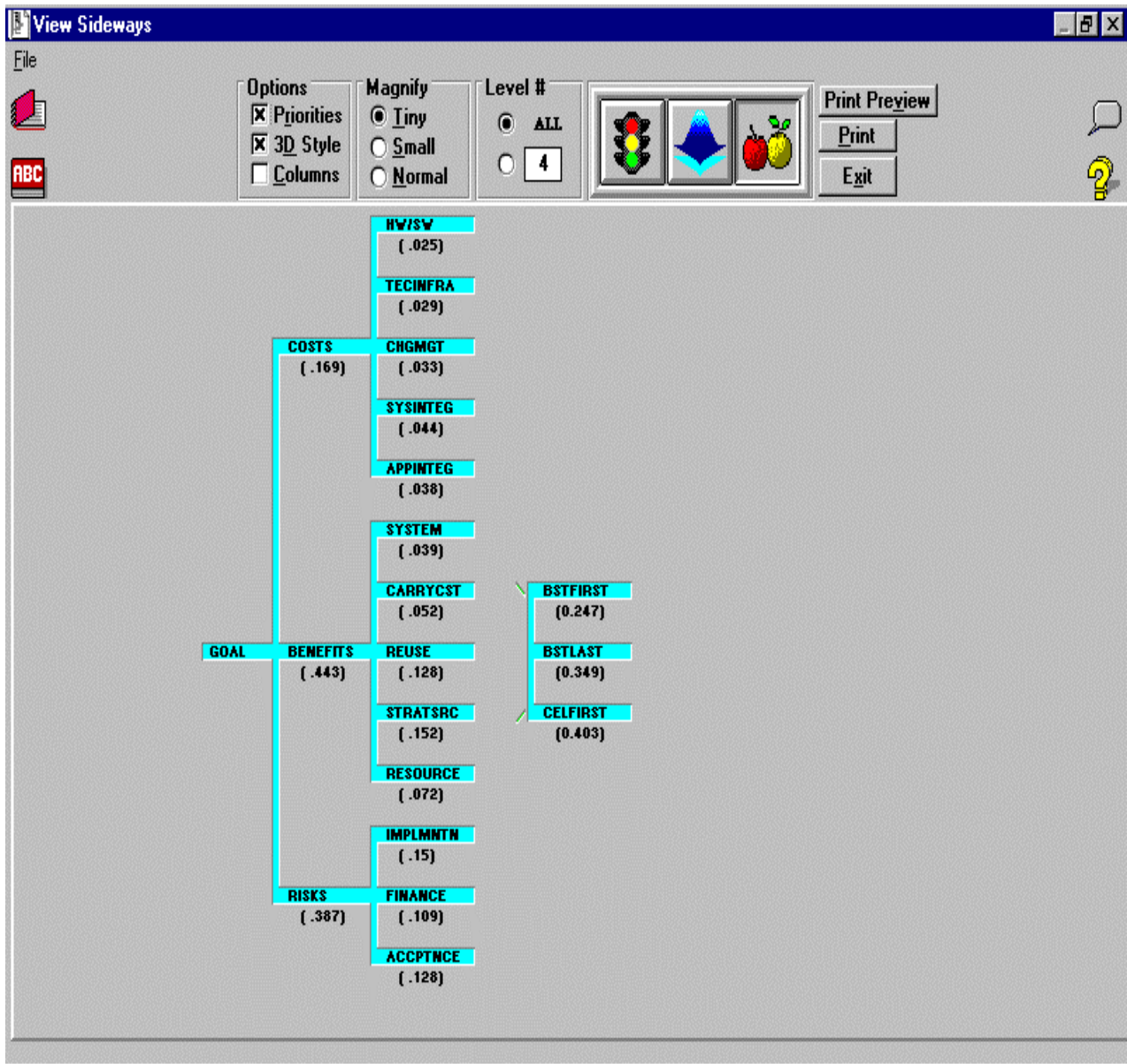


FIGURE 7: DERIVED PRIORITIES FOR PRIMARY & SECONDARY OBJECTIVES

The sub-objectives of each objective are discussed in more detail in following sections.

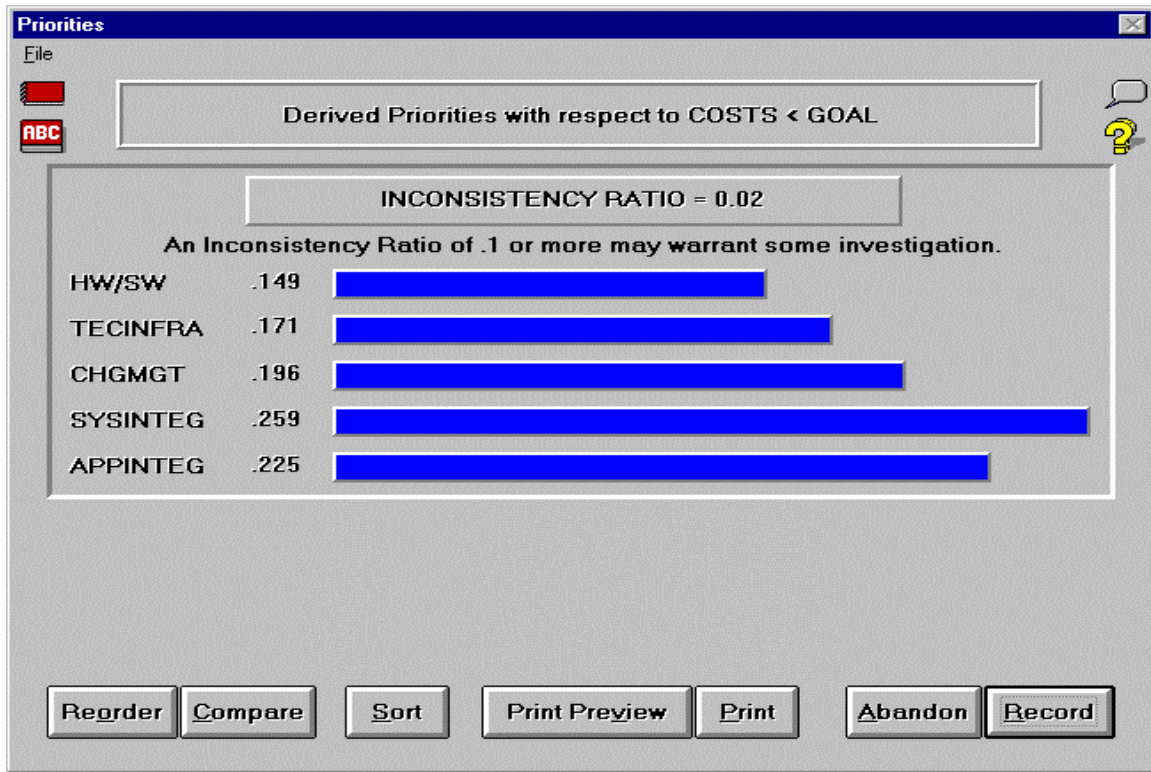
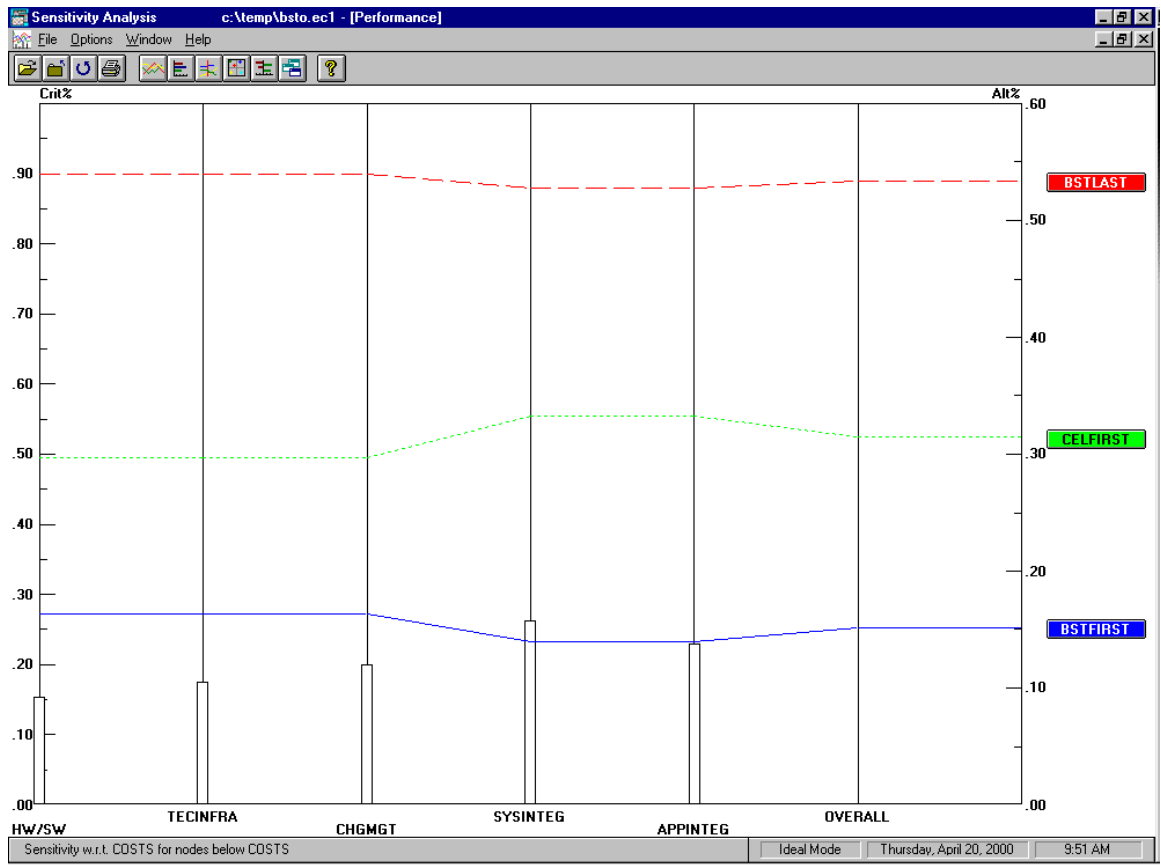


FIGURE 8: PRIORITIES FROM THE COST<GOAL PAIR-WISE COMPARISON

The pair-wise comparison of cost sub-objectives resulted in the highest priority being derived to Systems and Applications integration, followed closely by Change Management. The relative importance of each sub-objective is consistent with the both the participants’ intuition and what previous successful implementations considered most important.

Hardware, technical infrastructure and change management all received a lesser priority based upon the judgement of the individuals assessing the strategy. While problems do occur within these objectives on all projects, the problems have to be addressed prior to moving any new system forward to a production environment. Because the problems are routinely addressed and corrected prior to implementation, these three categories were considered less critical to successful implementation.





**FIGURE 9:** PERFORMANCE SENSITIVITY WITH RESPECT TO COSTS FOR NODES BELOW COSTS

The performance sensitivity analysis in Figure 9 helps to illuminate the result of the pairwise comparison completed on the sub-objectives included under the primary objective of Cost. The performance sensitivity graph illustrates a strong preference for completing the largest affiliate company (BellSouth Telecommunications, or “BST”) last when cost is the only factor considered.

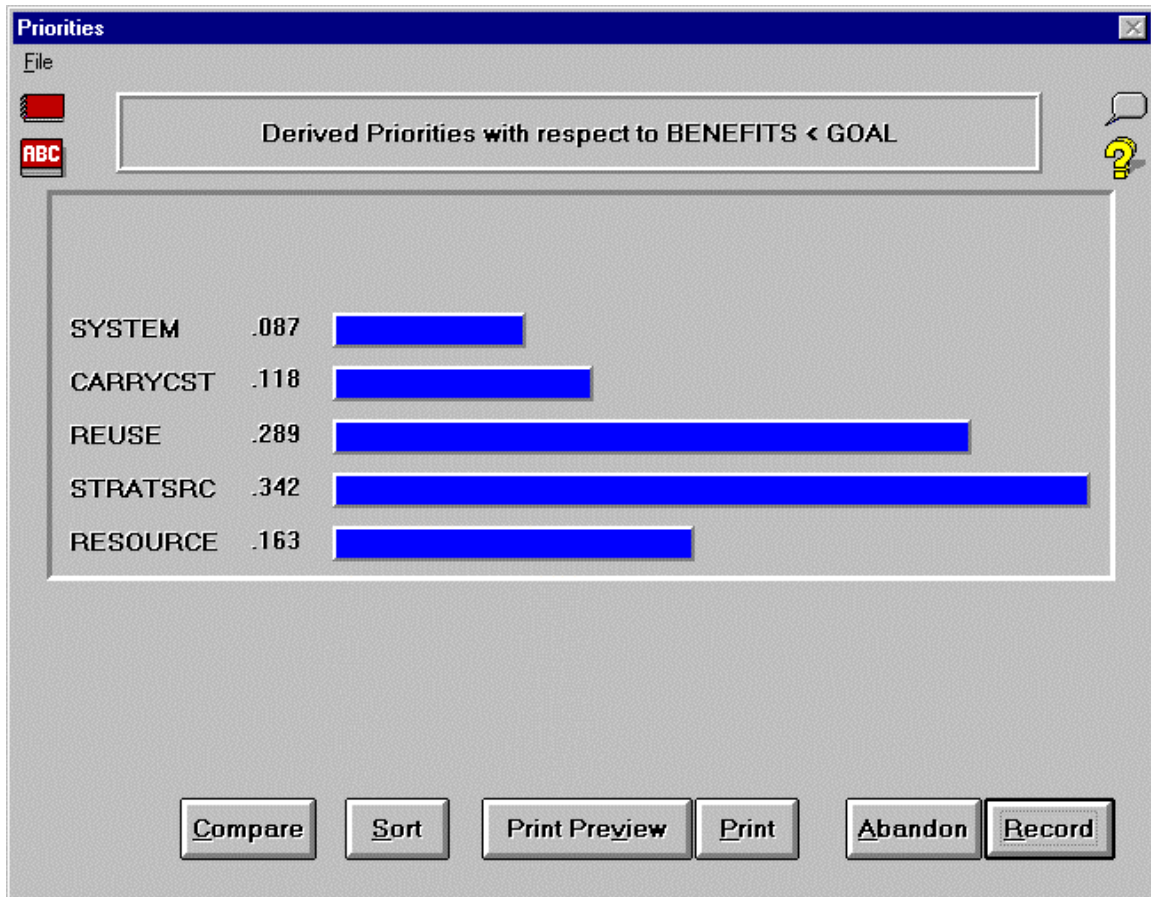


FIGURE 10: PRIORITIES FROM THE BENEFITS < GOAL PAIR-WISE COMPARISON

Note that “Strategic Sourcing” is considered the most important sub-objective benefit with respect to the goal. This sub-objective revealed a critical factor when considering the three alternatives. Negotiating strategic alliances with a limited number of suppliers attains this benefit. BST is the focal point for the negotiations and will enjoy the strategic sourcing benefits regardless of when the SCM/ERP solution is implemented. The remaining affiliate companies gain access to the strategic sourcing benefits as the SCM/ERP solution is implemented.

This particular anomaly resulted in BSCC being judged as the most beneficial implementation in terms of benefits. Conventional wisdom had led all of the participants to believe that implementing at BST first would have generated the most benefits in the earliest time frame.

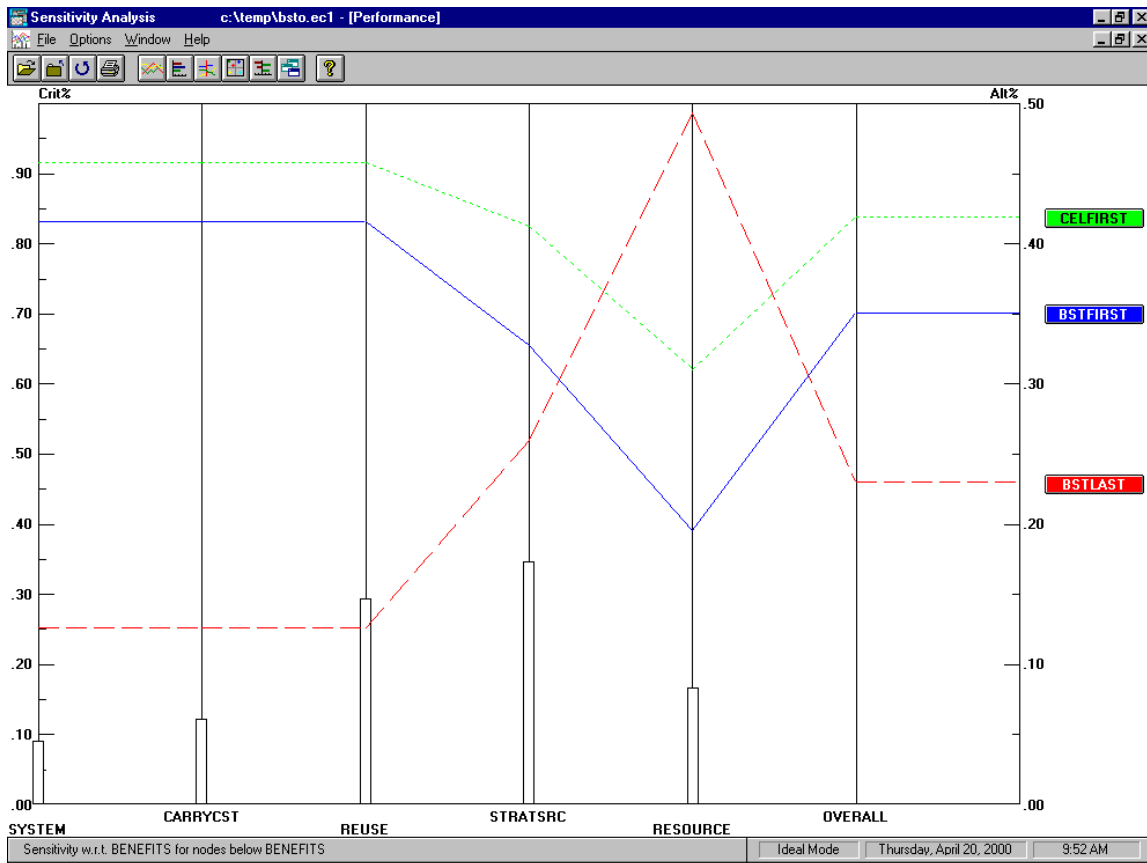


FIGURE 11: SENSITIVITY WITH RESPECT TO BENEFITS FOR NODES BELOW BENEFITS

The performance sensitivity analysis illustrated in Figure 11 helps to illuminate the result of the pairwise comparison completed on the sub-objectives included under the primary objective of Benefits. When benefits are considered in this manner, completing the implementation of the ERP system at BellSouth Cellular is most favorable in all sub-objectives except “RESOURCE”. The resource sub-objective considered the amount of effort required to implement the ERP solution under each alternative. Completing BST last was considered most preferable in this subcategory because deferring the implementation at the largest affiliate company would increase opportunities for level loading of required personnel.

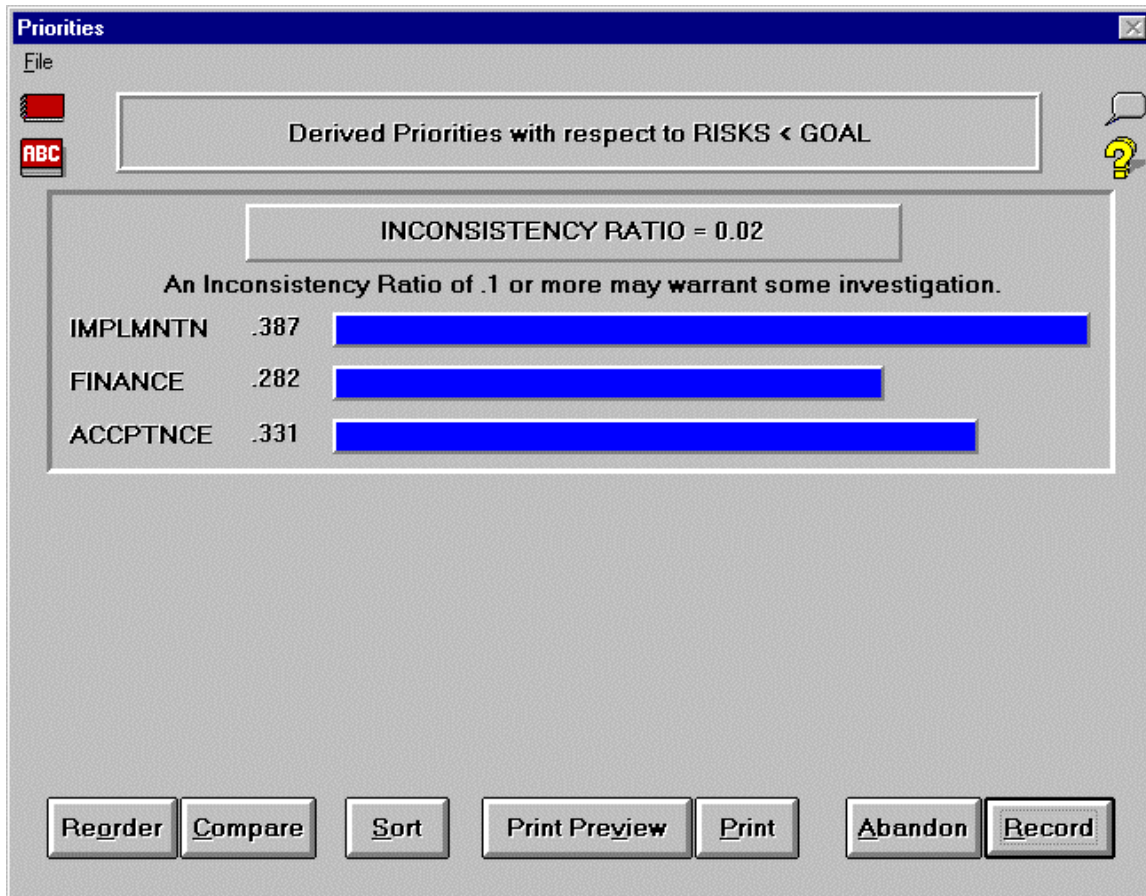
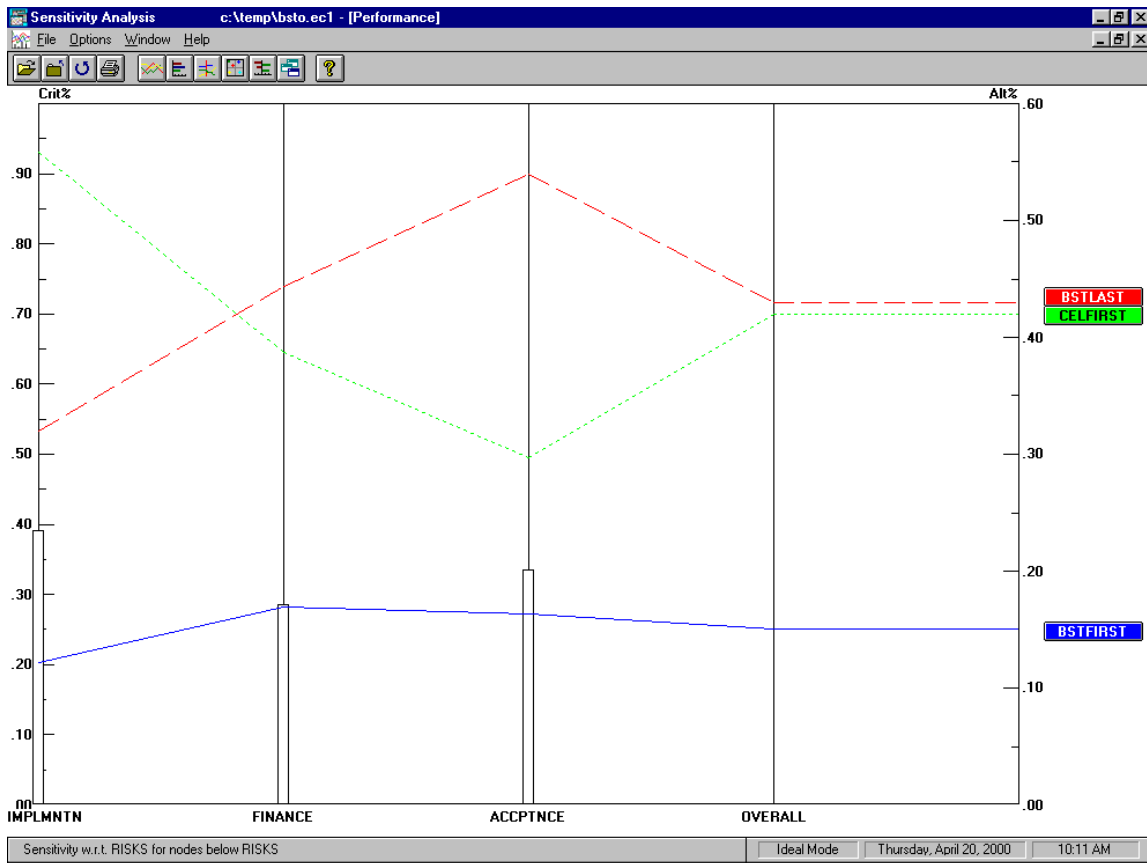


FIGURE 12: PRIORITIES FROM THE RISKS < GOAL PAIR-WISE COMPARISON

Avoiding an unsuccessful implementation is considered the sub-objective that deserves the heaviest consideration. As in the previous objective, conventional wisdom would have led to inaccurate conclusions. There is little discernable difference between the smallest affiliate and the medium affiliate with respect to risk. While the medium affiliate is orders of magnitude larger, the variables driving risk are not only associated with its' size.

BSCC is a relatively new company and the systems supporting SCM activities are not complex. Because the SCM software in use at BSCC today is integrated into few other systems, the risk of replacement is low. The risk is driven even lower by the fact that there are not multiple SCM systems in use within the affiliate. This is not the case at BST or even within some of the smaller affiliates.

Users of the SCM systems at BSCC are also eager to implement the new process. The high degree of motivation registered by the user community will also help to mitigate the risk of associated with users rejecting the replacement system.



**FIGURE 13: PERFORMANCE SENSITIVITY WITH RESPECT TO RISKS FOR NODES BELOW RISKS**

The performance sensitivity analysis in Figure 13 helps to illuminate the result of the pairwise comparison completed on the sub-objectives included under the primary objective of RISKS. With respect to implementation issues, BellSouth Cellular is most attractive due to the relative simplicity of the software and process conversions involved. The FINANCE sub-category considers the probabilities of failure and the associated lost implementation costs. These risks are driven to the lowest level by implementing affiliates in “smallest to largest” order, as indicated by “BSTLAST” receiving the strongest ranking in the FINANCE sub-objective. While financial risks may be minimized by taking the most risk averse route, a by-product of selecting the BSTLAST alternative is also reduced benefits, as illustrated in Figure 11.

Similarly, the probability of user acceptance is highest when the “smallest to largest” alternative is employed. The ACCPTNCE sub-objective indicates the strongest preference aligns with implementing BST last. As was the case with the FINANCE sub-objective, the reduced risk also results in significant reductions in reward.

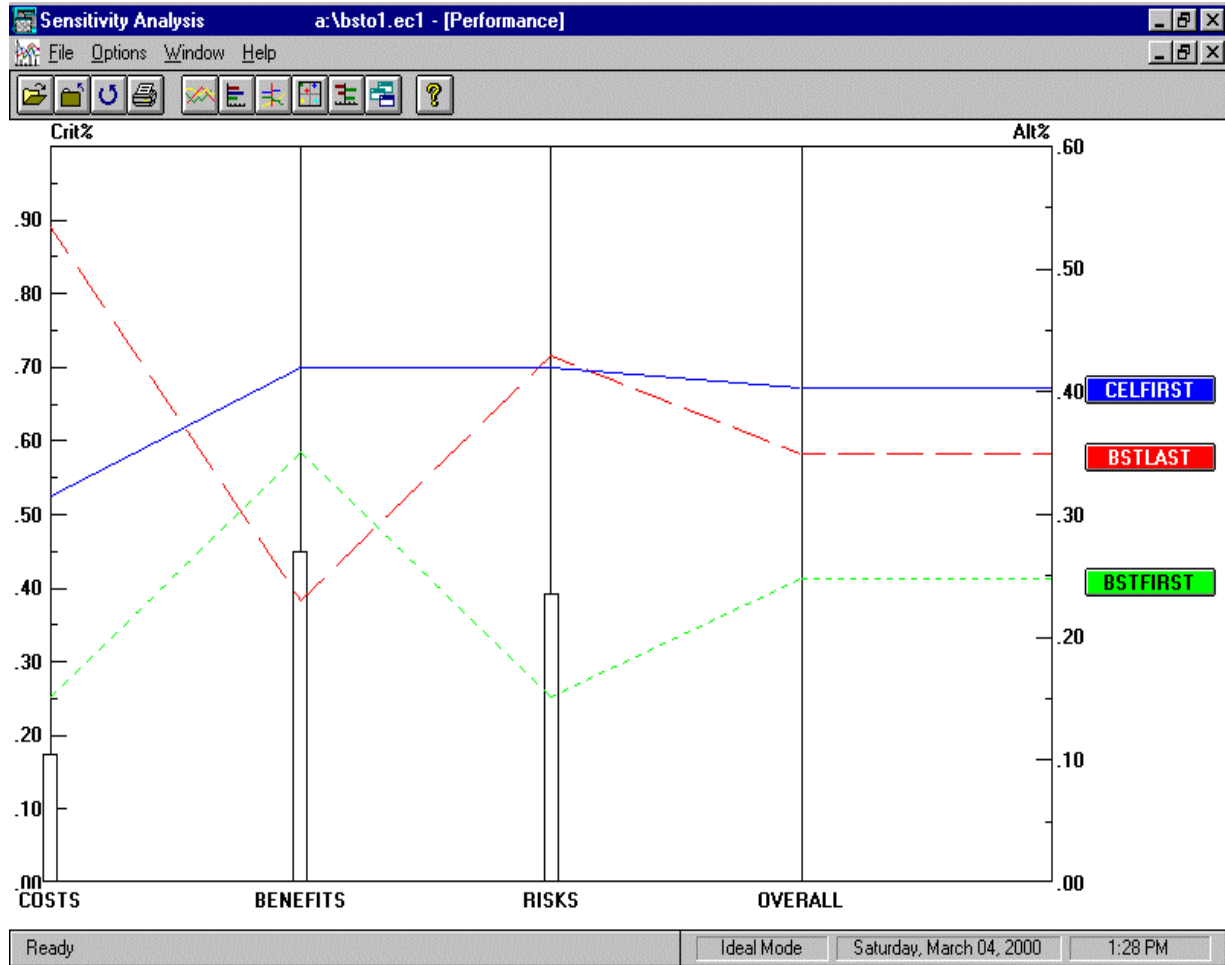


FIGURE 14: PERFORMANCE GRAPH

## CONCLUSION:

The Performance Graph Analysis in Figure 14 reveals the affect of considering all objectives while using a balanced and rational methodology. When costs are the only objective, implementation of BST last is the clear choice. If cost were the only factor, this approach would probably make a great deal of sense; however, the argument that encourages the maximization of benefits is quite compelling. When benefits are introduced as a second objective, BSCC is the preferred approach, driven by the fact that this company has the most room for improvement with respect to the processes and systems under consideration. When risk mitigation is introduced as the third objective, it becomes clear that implementing the SCM/ERP systems at BSCC first is the best overall approach.

This analysis was shared with the ERP Project Management team on Friday, March 3<sup>rd</sup>, 2000. The implementation strategy was approved and will be incorporated into the project plan. The Use of the Analytic Hierarchy Process in concert with decision support software provided the foundation for a defensible decision. Implementation of BSCC first is reinforced by the judicious review of the factors supporting the alternative selected and the process that confirmed all variables were considered in a rational and systematic manner.

**REFERENCES**

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