CONNECT ND

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State of North Dakota

The Value of ConnectND

Return on Investment and Benefits Analysis Update

DRAFT

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1. Executive Summary

Between November 2002 and January 2003, the State of North Dakota and the North Dakota Higher Education system conducted a detailed analysis of the estimated costs and benefits of the ConnectND project. That analysis gathered information and developed 10-year projections on total implementation and operating costs for the project. Information was also collected on the costs to operate existing systems (legacy systems) and that too was projected out 10 years. The project team interviewed members of the ConnectND team, departmental and higher education staff to determine the types of benefits that were expected from the project and how those benefits would return value to the state and the higher education system. At the conclusion of that analysis, a report was published titled "The Value of ConnectND. A key element of that report was a Return on Investment or ROI.

The 2003 ROI report and this updated version support the original reasons that the State of North Dakota chose to fund and implement ConnectND. The ConnectND Project Charter, which has guided the team's work, more clearly defined those objectives by identifying several project objectives that are intended to assure the state that the goals are reached. We considered these goals and objectives in developing the measurement recommendations included in this report. The Project Charter objectives include:

1. Developing self-service applications
2. Taking advantage of system integration
3. Utilize best business practices
4. Minimize customizations to the application
5. Interface to legacy systems that are not being replaced
6. Preparation of the State's Comprehensive Annual Financial Report (CAFR)
7. Standardize data classification throughout the state
8. Provide a statewide procurement system
9. Provide a statewide human resource system
10. To remain competitive as an organization and attract students.
11. Eliminate the risk of legacy system failure.

Beginning in November 2003, the State and Higher Education conducted a follow-up review of the earlier report with three primary objectives in mind. First, the team wanted to update any cost information for either the legacy systems or ConnectND based upon changes that have occurred on the project over the past year. Second, the team wanted to re-evaluate the expected benefits described in last years report to see if there were any changes in how staff felt about those benefits a year later. Finally, the team wanted to identify various ways that the State and Higher Education could measure the benefits over the life of the project. This report contains the updated information in a format that supplements the January 2003 report.

In order to compile this information, the team conducted an extensive number of individual and small group interviews of staff from the State and Higher Education and students and faculty from the pilot school campuses in Mayville and Valley City. Using the information collected in during the interviews, a series of seven (7) focus groups were held in Bismarck, Valley City and Mayville, to validate conclusions and findings.

Summary of Findings

Considering all updated costs of ConnectND, cost reallocations due to replacement of existing legacy systems as well as the updated direct project benefits the state of North Dakota will realize an overall return on the investment in ConnectND of 14.28% and a project payback of 7 years. However, it is highly likely that the useful life of this system will exceed the ten (10) year period used in this analysis, possibly to as many as 25 or even 30 years. Every year that the system delivers value to the state beyond the 10 years used in this analysis multiplies the ROI significantly. The detailed ROI calculation is detailed in Section 5.

In addition to this overall return, the state will potentially avoid between $58 and $64 million of costs for software replacement and/or upgrades that have been deferred by state agencies and higher education in anticipation of the new functionality from ConnectND. These deferred requests generally involve systems where the technology has long since exceeded its useful life, resulting in progressively higher maintenance costs, serious concerns about system reliability and high costs to add new functionality that meets changing internal and external requirements. The technology used for many existing systems including the Higher Education Computer Network Administrative Information Systems (HECN-AIS) and the state accounting system (SAMIS) is over 25 years old. Deferred development details are included a table in Section 2.

Continuation of the ConnectND project is critical for several important reasons:

- Capitalize on the money already invested in the ConnectND effort.
- Bring all State Government agencies and Higher Education institutions together under one unified financial, human resource and student administration system.
- Permit system expansion to cover K-12 schools and cities and counties as required.
- Automate the human resource functions for all agencies and institutions.
- Automate the procurement function through the Internet for staff and suppliers.
- Replace obsolete technology that is increasingly expensive to maintain and growing more unreliable.
- Provide a foundation for accelerating progress in economic development, customer service and organizational efficiency.
- To help the state respond to changing federal mandates needed to sustain student financial aid funding.
- Provide better information for management decision-making.
- Better serve students through more effective and efficient on-line services.

Summary of Direct and Indirect Benefits of ConnectND to the State

The state of North Dakota and its constituents will realize a number of direct and indirect benefits from the ConnectND project. Direct benefits are those benefits where a value of the benefit can be calculated based upon some basic assumptions on how the benefit will affect constituents and state staff. The values to the state of indirect benefits are more difficult to calculate with a reasonable level of certainty.

Of all the direct and indirect benefits listed in this analysis, the most important benefit to the state will be its ability to offer substantially improved customer service to constituents of both General Government agencies and Higher Education institutions. These improvements will be the direct result of implementing a state-of-the-art integrated software system that supports the general accounting, human resource, purchasing, payroll and student administration. In addition, ConnectND will play a major role in helping the state realize the strategic goals and strategies set out for the General State Government, Higher Education and in the Statewide Information Technology Strategic Plan 2002 and other strategic planning documents.

The following table summarizes the projected direct benefits of the ConnectND project. The direct benefits listed here are fully described in Section 4 of this report, along with descriptions of projected indirect benefits.

Direct Benefit Description	10 Year Benefit Value
Reduce or Eliminate "Shadow Systems"	$7,686,946
Statewide Integration on Common System	$2,955,651
Establish a Self-Service Environment for Vendors	$3,018,466
Establish a Self-Service Environment for Employees	$5,343,784
Improved Self-Service Environment for Students & Faculty	$19,325,375
Integrated Workflow, Industry Best Practices and Reduced Dependence on Paper	$46,282,375
Platform for Re-engineering Business Practices and Continued Process Improvement	$23,408,048
Cross Trained Workforce	$3,500,000
Total 10 Year Direct Benefits	$111,520,646

In addition to these direct benefits, there are two constituent groups that will realize significant benefits from the ConnectND project. They are the state's vendors and the students in Higher Education. We did not use these benefit numbers in the ROI calculation, but because they are impressive, we have included them in this report. The following table summarizes the return to these groups.

Benefit Group	10 Year Benefit Value
Vendors	$3,671,385
Students	$87,333,372
Total 10 Year Benefit	**$91,004,756**

Key Changes in this Update

There are a number of changes in the ROI between the 2003 and 2004 versions. For obvious reasons, we will not attempt to list every single change, but we will list the major changes to assist the reader in understanding how we got from where the ROI analysis was in 2003 and where things stand in the 2004 update.

General Changes

- The 2003 version included annual values for most costs. We improved consistency of the analysis by using 10-year totals for the values in 2004.
- A 2% per year increase in costs (including salaries) has been applied consistently throughout the 2004 update. In 2003, some costs projections included annual increases and others did not. Where the state provided numbers that showed annual increases above 2%, those values were used.
- In 2003, one annual salary value was used for employees in both state agencies and higher education. In 2004, different values were used based upon new information provided.
- An ROI calculation using Net Present Value (NPV) has been added.
- Graphs have been added to show the cumulative impact of cost and benefit to the state.

Legacy System Cost Changes (Section 2)

- Costs for normal hardware upgrades have been added for higher education. The state data center includes these costs in their rates, so no additions were needed in that area.
- Deferred development estimates were updated based upon revised estimates.

ConnectND Cost Estimates (Section 3)

- The project cost estimate has been updated to reflect actual expenses for the past year.
- The cost to implement the states payroll business process (no delay) has been added.
- Costs for staff additions in the State Information Technology Department and in the Information Technology organization in Higher Education have been added.

Direct Benefits (Section 4)

- In 2003, benefit values were calculated and projected on a "straight-line" basis. Experience has shown that this is not an accurate way to depict the value of those benefits. In the 2004 update, each direct benefit has been analyzed and project on a year-by-year basis. This allows the value of the benefit to vary over time.

- Benefits have been clearly split between the state and higher education.
- Updated assumptions (like demographics) have been used based upon new information available.
- Assumptions were also updated based upon actual experience in both the pilot state agencies and the campuses at Mayville and Valley City.

Conclusion

Based upon the updated analysis outlined in the balance of this report, the ConnectND project with an implementation cost of $39,687,342 will generate a payback or positive return on investment to the state in 7 years. Not only will the project generate a wide range of direct and indirect benefits conservatively estimated at $91,464,261 (NPV) over ten (10) years, but it will enable the state to tackle the future with a highly integrated, shared statewide information system that supports the needs and goals of the legislature, governor, the State Board of Higher Education and North Dakota's citizens and businesses.

2. Updated Legacy Systems Financial Analysis

The legacy system financial analysis outlined in the next major section of this report summarizes operational and maintenance costs for the legacy systems being fully or partially replaced by components of the ConnectND system. These system costs are also aggregated by business function.

System category	Financial Analysis Period 2005-07	2007-09	2009-11	2011-13	2013-15	10-Year Total
State government Acctg	$ 914,400	$ 932,688	$ 951,342	$ 970,369	$ 989,776	$ 4,758,574
State government Procurement	$ 28,800	$ 29,376	$ 29,964	$ 30,563	$ 31,174	$ 149,876
State government Payroll	$ 298,000	$ 303,960	$ 310,039	$ 316,240	$ 322,565	$ 1,550,804
HECN AIS - Acctg, Payroll, SS	$ 7,271,848	$ 7,417,285	$ 7,565,631	$ 7,716,943	$ 7,871,282	$ 37,842,989
Data Center Hardware Upgrades	$ 750,000	$ -	$ 750,000	$ -	$ 750,000	$ 2,250,000
Dept. Acctg and Proc.	$ 484,322	$ 494,008	$ 503,889	$ 513,966	$ 524,246	$ 2,520,431
Dept. Human Resources	$ 36,566	$ 37,297	$ 38,043	$ 38,804	$ 39,580	$ 190,291
Totals	$ 9,783,936	$ 9,214,615	$ 10,148,907	$ 9,586,885	$ 10,528,623	$ 49,262,966

Deferred legacy system development is a key component of the legacy system costs over the 10-year evaluation period. Both North Dakota General Government and the University System have stopped maintenance and improvement to a number of legacy systems in the anticipation that the ConnectND project would replace these applications. Costs have been included in the table that reflects either legacy system improvement, or replacement. The state and higher education believe that were it not for ConnectND, funding for all these projects would be requested during the next few years.

Deferred Development	Minimum $s	Maximum $s
Statewide Payroll Replacement and new HRMS	$7,000,000	$9,000,000
Statewide Financials Replacement	$6,000,000	$8,000,000
Statewide Procurement	$750,000	$1,500,000
Departmental Accounting	$6,000,000	$6,000,000
Higher Education Student Admin Replacement	$15,000,000	$15,000,000
Higher Education Finance Replacement	$12,000,000	$12,000,000
Higher Education Payroll Replacement	$12,000,000	$12,000,000
Total	$58,750,000	$63,500,000

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3. Updated Financial Analysis for the ConnectND Project

The updated costs included in the ConnectND project shown in the following table are from the 2005-2007 biennium through the 2013-2015 biennium. This ten-year period begins after the 2004 implementation of Connect ND in statewide General Government agencies and the eleven campuses of Higher Education. It also corresponds with the anticipated repayment schedule for the bond issued to finance the balance of the project. The information in this table reflects cost data updates received from the project team in February 2004. This cost data does not include costs for replacing several additional systems in Higher Education (Housing, Parking, Facilities and Scheduling). Until those systems are replaced, the HECN mainframe cannot be removed and the savings associated with that elimination of a major hardware system will not accrue to the state.

	State & Higher Education Implementation and Ongoing Costs					
Description	2005-2007	2007-2009	2009-2011	2011-2013	2013-2015	10-Year Total
Staff	$6,163,140	$6,469,177	$6,792,477	$7,134,135	$7,495,234	$34,054,162
Hardware Replacement	$1,499,667	$2,171,535	$2,328,687	$1,997,556	$2,691,712	$10,689,157
Data Center Staffs	$2,195,894	$2,239,812	$2,284,608	$2,330,300	$2,376,906	$11,427,521
Software Maintenance (PS)	$1,787,682	$1,967,331	$2,324,779	$2,808,747	$3,393,926	$12,282,465
Software Maintenance (Other)	$330,798	$348,345	$367,532	$388,522	$411,494	$1,846,691
Training	$0	$0	$0	$0	$0	$0
Application Technical Support	$1,360,959	$1,501,609	$1,671,795	$1,877,721	$2,126,890	$8,538,974
Totals	**$13,338,140**	**$14,697,809**	**$15,769,878**	**$16,536,981**	**$18,496,162**	**$78,838,970**
Amortized Implementation Cost	$3,937,468	$3,937,468	$3,937,468	$3,937,468	$3,937,468	$19,687,342
Debt Service	$5,392,163	$5,397,075	$5,395,938	$5,396,666	$2,683,644	$24,265,486
BienniumTotal Cost	$22,667,771	$24,032,353	$25,103,284	$25,871,116	$25,117,274	$122,791,798

The ongoing operating costs shown above are in addition to the system implementation costs. System implementation has occurred over a two-year period (2003-2004). The following table summarizes the total estimated ConnectND costs for the project.

Project Implementation Costs	
Cost Category	2 Year Total
North Dakota Staff	$ 8,684,197
Software	$ 6,605,921
Other Software	$ 328,270
Data Center	$ 2,733,940
Training/Travel	$ 1,291,137
Professional Services	$ 17,169,814
Other Funded Costs	$ 2,424,063
Upgrades	$ -
Payroll Change	$ 450,000
Totals	**$ 39,687,342**

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4. Updated Direct and Indirect Benefits of ConnectND

The previous ROI report identified a number of direct and indirect benefits that ConnectND will generate for the state of North Dakota. In this section of the report we have listed those benefits and updated them with new information derived from the additional interviews and focus groups. Each of the anticipated benefits includes a description of the benefit, the expected payback for that benefit and recommendations on how the state and higher education can track and measure that benefit in the future.

In contrast to last year's report where we used 10-year straight-line averages for the benefits, this year we have included a more detailed annual assessment of the benefit value. The tables showing annual benefits represent a more accurate picture of how value will flow over time and allow the analysis to reflect annual changes in costs (employee salaries) and system usage patterns. This more detailed analysis better reflects the experiences of other government implementers of large ERP systems.

There are two major differences to note in this new analysis. First, many of the benefits may actually show a negative return for a short period after implementation. Second, the benefits value tends to grow larger over time. Both of these factors can be attributed to the extensive learning curve for staff as a result of the immense changes that are occurring in the organization, changes in costs and changes in utilization.

There are many variables that will affect the state's ability to fully realize these benefits. When appropriate, the Critical Success Factors (CSF) that will impact each benefit are linked to the benefit. The major CSF's are listed below. (See section 6 for a complete description of each CSF).

- Effective Project Governance
- Change Management Strategy
- Post Implementation Support Plan
- Maintenance Upgrade Plan
- Staff Training Strategy and Plan
- Commitment to dismantle "Shadow Systems"
- Law Changes
- IT Infrastructure and System Reliability
- Early Identification of Agency System Interfaces

Developing the projected savings and/or benefits in each of the areas listed, requires us to use common baseline demographics for the state of North Dakota. The demographics developed and used in the calculations are:

State Population	*640,000*	
Citizens with Internet Connectivity:	*448,000*	(70%)
Number of FTE State Employees (excluding NDUS)	*8,430*	(03-05 Exec Bud)
Number of NDUS Full-time Faculty & Employees	*5,983*	(NDUS)
Number of NDUS Part-time Employees	*538*	
Average annual cost of a State Employee	*$54,734*	(per OMB)
Average annual cost of a Higher Ed Employee	*$49,200*	
Number of annual work hours for an FTE employee	1,920	
Number of State Agencies/Branches	*58*	(03-05 Exec Bud)
Number of Higher Ed Campuses	*11*	
ConnectND State Gov Employee Users	*2,500*	(Financials)
ConnectND State Gov Employee Purchasing Users	*5,000*	
Number of Active Vendors doing business w/state	*7,500*	
Number of Students (Higher Education)	*52,480*	(NDUS)
ConnectND Higher Ed Employee Users	*1,000*	(Financials)
ConnectND Higher Ed Employee Purchasing Users	*3,000*	

In the following section of this report, we are going to discuss each of the direct benefits associated with the ConnectND project. At the end of each benefit discussion, we will identify the various ways for the state to measure how well the benefit is being delivered. As we developed the list of measurement ideas, it became clear that there were a number of baseline measurements that the state should be tracking that can be used in various ways and

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combinations to assess value delivered in each of the benefit areas. These baseline measurements include the following:

1) Number of employee hits on the ConnectND portal
2) Percentage of the employee population using the ConnectND portal
3) Number of vendor hits on the ConnectND portal
4) Percentage of the vendor population using the ConnectND portal
5) Number of vendors registered with the state
6) Help Desk general statistics over time
    a. Number of calls for assistance
    b. Number of lost calls
    c. Call hold times
    d. Help Desk technician performance tracking
    e. Caller's department/campus
    f. Caller's location
    g. Module or area where help is needed
    h. Time to complete resolution
    i. Description of the resolution
7) Number of on-line payments received from students and other constituents
8) On the student, employee and vendor portals, we recommend that the state set up a short satisfaction survey that users can click on and answer general satisfaction questions plus provide some general demographic information. Response statistics should be tracked in each of the survey areas.
9) General utilization statistics over time by location and department/institution
    a. Number of paychecks processed
    b. Number of vendor payments issues
    c. Number of bids received
    d. Number of Contracts
    e. Number or Purchase orders processed
    f. Number of class registrations
    g. Number of students registered
    h. Number of financial aid transactions
    i. Number of prospective students looking up information
    j. Prospective student capture rate

We recommend that the state establish a common point for collecting and recording these statistics and that there be a set of analytic tools, such as those provided in PeopleSoft EPM to facilitate management reporting and analysis.

In order to supplement the value of the baseline statistics listed above, we recommend that the state and higher education identify a common set of sample business procedures for performance sampling. This sample of common business procedures might include the following:

State Agencies Sample Business Procedures	Higher Education Sample Business Procedures
Create a Purchase Order	Create a Purchase Order
Set-up New Employee for Payroll	Set-up New Employee for Payroll
Receive goods and request payment	Receive goods and request payment
Add a Vendor to the Vendor file	Add a Vendor to the Vendor file
Make a progress payment on a Project	Make a progress payment on a Project
Set-up a contract	Faculty enter grades for a student
Update employee's voluntary deductions	Student register for classes
Pay an employee's expense report	Process a Student financial aid payment
Add a new insurance carrier	Set up a new grant
Issue a replacement W-2	Add a prospective student for recruitment

Once the list of sample business procedures is agreed to, the state and Higher Education should document the steps in the ConnectND procedure and measure the time necessary to complete the procedure at a representative agency. It is our understanding that the creation of two positions (state & Higher Education) called ConnectND Program Managers is being considered. These positions should be responsible for collecting, updating and maintaining this performance information. During the course of measuring each procedure, the Program Managers should also note significant changes between the ConnectND procedure and the procedure in the Legacy environment. They should also be looking for other related savings such as elimination of manual paper flow, reduction in filing requirements, changes in employee duties, etc. This measurement should be repeated every two years at the same agency as the original measurement. In the follow-up measurement process, the Program Managers should also be looking for changes in the procedure from survey to survey that would indicate a re-engineering of the workflow.

Using these measurements and the baseline statistics, the state and Higher Education will be able to estimate progress in realizing each of the direct benefits listed in this section.

1. Reduce or Eliminate "Shadow Systems"

Departments and agencies create "shadow systems" for any number of reasons. The most common reasons are a lack of flexibility in the legacy system, difficulty in getting information for agency specific reports and lack of trust in the legacy system. The internal integration, flexibility and ease of use of PeopleSoft will give the state an excellent platform for significant reductions in this wasteful practice.

In North Dakota state General Government and Higher Education, shadow systems exist on a number of levels. The most common example is where departments are using internal accounting systems that duplicate many of the functions of SAMIS (the statewide accounting system) because SAMIS does not offer the functionality these agencies need. Other agencies are supporting a wide range of smaller spreadsheets and databases that replicate functions like leave accounting, SAMIS reporting, purchase order tracking, project management, etc. In Higher Education, many institutions use shadow systems to the HECN-AIS to track financial, personnel, and/or student information at a finer level of detail, at different points in time, or to accumulate costs in groupings that suit their needs.

> ***Payback – Comparable research by both Meta Group and Gartner[1] shows that each shadow system can increases overall operating costs by up to 20%. Increased operating costs include higher training costs, duplicate hardware and software costs, duplicate data entry functions, and employee time spent reconciling discrepancies between the primary and shadow systems.***
>
> ***In discussing this issue with staff members, most acknowledged that the effort to maintain the state's numerous shadow systems takes considerable staff time; however the information maintained in these systems is critical to agency management. They also acknowledge that the staff time used to maintain these shadow systems could be put to better use directly serving constituent needs if ConnectND can fill identified gaps in information and reporting from SAMIS, HECN-AIS and other statewide systems.***

[1] Meta Group and Gartner are nationally recognized independent research organizations that regularly review and survey developments in the Information Technology sector and report the results of their research.

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The amount of time spent on this activity will vary widely between small and large agencies or campuses. If on average, each agency or campus could reallocate 60 FTE staff days per year or about 5 FTE staff days per month from this redundant activity, then the 58 state agencies and 11 NDSU campuses would derive the following benefit:

Reduce or Eliminate Shadow Systems - State & Higher Education Benefit											
Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
# of State Departments	58	58	58	58	58	58	58	58	58	58	
Emp Days Benefit/Year	10	20	30	40	50	60	60	60	60	60	
Total Days Benefit/Year	580	1,160	1,740	2,320	2,900	3,480	3,480	3,480	3,480	3,480	
State Employee Benefit	$132,274	$269,839	$412,853	$561,480	$715,887	$876,246	$893,771	$911,646	$929,879	$948,477	$6,652,352
# of Campuses	11	11	11	11	11	11	11	11	11	11	
Emp Days Benefit/Year	10	20	30	40	50	60	60	60	60	60	
Total Days Benefit/Year	110	220	330	440	550	660	660	660	660	660	
Higher Ed Employee Benefit	$22,550	$46,002	$69,003	$92,004	$115,005	$138,006	$138,006	$138,006	$138,006	$138,006	$1,034,594
Total Value of Time	$ 154,824	$ 315,841	$ 481,856	$ 653,484	$ 830,892	$ 1,014,252	$ 1,031,777	$ 1,049,652	$ 1,067,885	$ 1,086,483	$ 7,686,946

Critical Success Factors: Effective Project Governance
Change Management Strategy
Commitment to dismantle "Shadow Systems"
IT Infrastructure and System Reliability

Measuring this Benefit:

Of all the tangible benefits this is easy to understand how savings would be generated, but is the most difficult area to identify a simple and easy way to measure accomplishments. Early in the ConnectND project, the state compiled a list of systems in use in the various agencies and higher education. That list also identified those systems that were candidates for elimination as "shadow systems". We recommend that the Information Technology Department (ITD) resurvey the agencies and institutions every two years. The questions could be formatted in a simple and quick to use survey that could be conducted over the state's Intranet. The survey should ask several important questions.

1) Which of the systems on the list has your agency eliminated as a result of ConnectND?
2) Has your agency developed or implemented any new systems as a result of ConnectND?

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3) If so, what systems have you implemented and what does the system do?
4) What did the system cost you to implement, and how much does it cost to maintain?
5) What functionality is lacking in ConnectND that caused you to decide to implement this system?
6) If ConnectND could be upgraded or modified to meet your functional requirements, would you be able to eliminate this new system?

2. Statewide Integration on Common System

A single system configured to meet the business needs of both general government and higher education in the state of North Dakota will facilitate the sharing of information and make work flow across agency lines effectively on a "real-time" basis without the delays and limitations previously experienced with "stove-pipe" legacy systems. This will also help the state leverage resources by sharing training costs, gaining economies of scale on hardware and software expenses, sharing and integrating common business practices (such as purchasing), and establishing the capacity for comprehensive financial reporting.

Payback: Today, the state of North Dakota operates a large collection of automated systems that support various ongoing business functions like General Ledger, Purchasing, Payroll, Fixed Asset Tracking, Student Administration, etc. A major payback in this area will be the opportunity to eliminate most, if not all, redundant systems and have a single shared data repository.

Having data and business processes spread out in this many locations results in staff members doing multiple data entry and increases the risk of introducing errors in the data that require reconciliation between sources. With the data in a single common system, users will have direct access to real-time operational data limited by security controls. Based upon feedback from multiple agencies during the analysis phase of this project, it is reasonable to expect that staff actively using the system will increase their productivity once the system learning curve has been overcome. The value of both the initial reduction in employee effectiveness and the improved efficiency over time is shown in the following table:

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Statewide Integration on a Common System - State & Higher Education Benefit											
Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
# State System Users	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	
% Productivity Improvement	-0.05%	-0.10%	0.0%	0.05%	0.05%	0.05%	0.1%	0.1%	0.1%	0.1%	
State Employee Benefit	($205,253)	($418,715)	$0	$217,816	$222,172	$226,615	$462,295	$471,541	$480,972	$490,591	$1,948,035
# Higher Ed Sys Users	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	
% Productivity Improvement	-0.1%	-0.1%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	
Higher Ed Employee Benefit	($198,800)	($200,736)	$0	$200,736	$200,736	$200,736	$200,736	$200,736	$200,736	$200,736	$1,007,616
Total Value of Time	$ (402,053)	$ (619,451)	$ -	$ 418,552	$ 422,908	$ 427,351	$ 663,031	$ 672,277	$ 681,708	$ 691,327	$ 2,955,651

Critical Success Factors:

Effective Project Governance
Change Management Strategy
Maintenance Upgrade Plan
Commitment to dismantle "Shadow Systems"
IT Infrastructure and System Reliability

Measuring this Benefit:

The value derived from this benefit can be tracked by evaluating the baseline metrics listed at the beginning of this section such as number of employee hits, percentage of employees using the portal, student hits, percentage of students using the portal, help desk statistics and the satisfaction survey. Tracking these data points over time will provide picture of how the system is being used, where faculty/employees are having problems, are problems increasing or decreasing, and other valuable evaluative information.

3. Establish a Self-Service Environment for Vendors

The PeopleSoft ERP system provides an integrated tool set that will allow the state to set up self-service portals for use by vendors selling goods and services to the state. These portals will allow the vendors to conduct business with the state in a secure and reliable fashion 24 hours/day, 7 days/week. The state conducts business with over 7,500 vendors per year and issues over 385,000 payments for goods and services through the current SAMIS system.

The state is offering some of these services successfully via Internet based web sites today. The advantages of offering these expanded services to the vendor community as part of the ConnectND project are numerous. Among the major benefits are:

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built-in integration with the accounting functions, state-of-the-art security to assure the integrity of vendor requests, common web-based interface that reduces time to learn how the system works, and technical integration that leverages staff training and skills for the development of new service offerings.

Payback: About 70% of North Dakota's businesses stated that they had a high interest in conducting business with the state on-line via the Internet[2]. Each time the vendor uses the Internet to conduct basic purchasing transactions, like registering a business or submitting a bid, a state employee does not need to be available to handle this transaction. We have estimated that 10 minutes of staff time would be saved for each of these transactions that the vendors conduct via the Internet. The following table shows the progression of the savings in this area assuming reasonable increases in vendor utilization of the interface and a growing number of transactions as the years go by.

Establish a Self-Service Environment for Vendors - Employee Time Benefit											
Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
# of Vendors	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	
% Vendors w/Internet	50%	55%	60%	65%	70%	75%	80%	85%	90%	90%	
# of Transactions/Year	1	1	2	2	3	3	4	4	4	4	
Total Transactions	3,750	4,125	9,000	9,750	15,750	16,875	24,000	25,500	27,000	27,000	
Empl Hours Benefit	625	688	3,000	3,250	7,875	8,438	16,000	17,000	18,000	18,000	
Total State Benefit	$17,817	$19,991	$88,977	$98,320	$243,001	$265,565	$513,661	$556,681	$601,215	$613,239	$3,018,466

Although we did not use the following information in the ROI calculation, it is important to recognize that there is also a significant savings potential for the vendors that use the on-line interface. Vendors would save travel expenses, employee costs and other expenses, which would be a direct benefit to the businesses' profitability. For the purposes of this example, a vendor savings of $20/transaction was assumed. The vendors also save time and effort with the new system because the state has converted to a single vendor file shared by all state agencies and higher education. The vendors all go to one place to register with the state, where before they had to go to each agency and each campus to be included in the procurement process. The following table illustrates these savings using the same number of transactions and usage assumptions used in calculating the State's savings shown above.

[2] North Dakota Business Use of Information Technology; Social Science Research Institute, UND June 27, 2002

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Establish a Self-Service Environment for Vendors - Vendor Time Savings											
Vendor Savings/Transaction	$ 20.00	$ 20.40	$ 20.81	$ 21.22	$ 21.65	$ 22.08	$ 22.52	$ 22.97	$ 23.43	$ 23.90	Total
Total Vendor Savings	$75,000	$84,150	$187,272	$206,936	$340,966	$372,627	$540,558	$585,830	$632,696	$645,350	$3,671,385

Critical Success Factors: Effective Project Governance
Change Management Strategy
Post Implementation Support Plan
Staff Training Strategy and Plan
IT Infrastructure and System Reliability

Measuring this Benefit:

Performance in this area can be readily tracked using a combination of the baseline measurements such as number of vendors registered, number of hits on the vendor portal, and vendor satisfaction with the process. As these numbers become available, the state can verify that the usage levels anticipated in the table above are actually being achieved. When there is a variance the state should analyze the cause and take corrective action. Even when no variance is seen, we recommend that the state conduct interviews of vendor usage and satisfaction using a random sample of vendors on a bi-annual basis.

In addition, we recommend tracking the number of qualified bids received on purchase requests and sampling a number of commonly purchased items and track prices over time.

4. Establish a Self-Service Environment for Employees

A major new component of the ConnectND ERP system is a statewide Human Resource (HR) System. The new HR system includes an Intranet portal that will allow employees to handle basic transactions and requests in a secure and reliable fashion 24 hours/day, 7 days/week. Depending upon how system security is set up, these self-service portals can be used to update personal information like an address, make changes to tax withholding data, request leave, report time and much more.

The advantages of offering these expanded services to the state's workforce as part of the ConnectND project are numerous. Among the major benefits are: saving employees time in completing routine changes, state-of-the-art security to assure the

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integrity of employee requests, a common web-based interface that reduces time to learn how the system works, and technical integration that leverages staff training and skills for the use of these new service offerings.

***Payback:** Most state employees have access to on-line services via the Internet either at their desks or through shared computers. Using the Internet to conduct basic HR transactions would save time in reduced travel, phone calls, and related follow-up. Based upon the average salary per state employee the table below shows the cumulative impact of this new service. In the table, we have assumed that employees would save one-half hour of time per transaction and that initial system usage would be limited. However, as employees learn its value and network connectivity becomes more and more available, the state will see considerable growth in the value of this service.*

Establish a Self-Service Environment for Employees - Time Benefit											
Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
# State Employees	8,430	8,430	8,430	8,430	8,430	8,430	8,430	8,430	8,430	8,430	
% Using Self-Service	40%	40%	45%	45%	50%	50%	55%	55%	60%	60%	
# of Transactions/Year	3	4	5	6	7	8	9	10	11	12	
Total State Benefit	$144,190	$198,098	$281,278	$344,285	$455,221	$530,658	$669,823	$759,132	$929,178	$1,033,922	$5,343,784

Critical Success Factors:

Effective Project Governance
Change Management Strategy
Post Implementation Support Plan
Staff Training Strategy and Plan
IT Infrastructure and System Reliability

Measuring this Benefit:

Performance in this area can be readily tracked using a combination of the baseline measurements such as number of hits on the employee portal, percentage of employees using the portal and employee satisfaction with the process. As these numbers become available, the state can verify that the usage levels anticipated in the table above are actually being achieved. When there is a variance the state should analyze the cause and take corrective action. Even when no variance is seen, we recommend that the state conduct field verification of employee usage and satisfaction using a random employee sample on a bi-annual basis.

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5. Improved Self-Service Environment for Students and Faculty

The existing student administration system in Higher Education allows students and faculty to register, complete a number of scheduling requests, check/pay tuition and fees, conduct student/faculty advising sessions, and check/report credits and grades using the Internet or by telephone. ConnectND is expected to also allow access to learning material and to improve the flow and functionality of existing student transactions and add new capabilities to the system. Some of the new functionality includes giving a student access to financial aid information, allowing students to update contact information such as their address, telephone number and e-mail address, and make payments using a credit card.

Having this type of on-line processing available through an Internet portal is absolutely critical if the state's higher education institutions are to remain competitive with higher education institutions in other states particularly when it comes to recruiting and retaining out-of-state, or out-of-country students. Prospective students and high school counselors have come to expect these types of on-line services from the institutions they work with as the norm. Not having an easy-to-use Internet based system comparable to what is available from other institutions hurts the State of North Dakota's recruiting efforts and may eventually result in a decline in enrollment.

Payback: Nearly 100% of the 52,480 ***students attending Higher Education institutions and the*** 5,983 ***faculty and staff members in North Dakota have Internet access for accessing ConnectND. NDUS staff estimates that the initial usage by students would start lower, but grow considerably over the ten years of this analysis. Each time a student uses this system to find information or process a transaction, the state will save approximately 3 minutes of employee or faculty time. Because the students can access the system 24 hours a day, 7 days a week from anywhere there is an Internet connection, the state can provide better service to the students at a lower cost. In the following table, the benefit of these timesavings to employees and faculty is projected.***

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Improved Self Service Environment for Student and Faculty - Time Benefit											
Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
# Higher Ed Employees	5,983	5,983	5,983	5,983	5,983	5,983	5,983	5,983	5,983	5,983	
% Using Self-Service	20%	30%	35%	40%	45%	50%	55%	60%	65%	70%	
# of Transactions/Yr	2	4	6	7	7	8	9	10	11	12	
Employee Benefit	$10,221	$34,794	$62,107	$84,466	$96,925	$125,541	$158,464	$195,919	$238,139	$285,368	$1,291,943
# of Students	52,480	52,480	52,480	52,480	52,480	52,480	52,480	52,480	52,480	52,480	
% Using Self-Service	80%	80%	80%	85%	85%	85%	90%	90%	95%	95%	
# of Transactions/Year	20	20	25	25	30	30	35	35	40	40	
Employee Benefit	$1,075,840	$1,097,357	$1,371,696	$1,457,427	$1,748,912	$1,748,912	$2,160,421	$2,160,421	$2,606,222	$2,606,222	$18,033,432
Value of Time Benefit	$ 1,086,061	$ 1,132,151	$ 1,433,803	$ 1,541,893	$ 1,845,837	$ 1,874,453	$ 2,318,885	$ 2,356,340	$ 2,844,362	$ 2,891,590	$ 19,325,375

Although we did not use the following information in the ROI calculation, it is important to recognize that there is significant savings potential for the students that use the ConnectND. Students, especially those located in remote areas or commuting from out-of-state/country would save considerable travel expenses, telephone costs and other expenses, which would lower the overall costs of their education. The students also save time and effort with the new system because the state has converted to a consolidated system shared by all higher education institutions. Now, students all go to one place to register, check grades, etc. where before they had to go to each university and to get the information they need. For this calculation, it was assumed that students would save an average of ½ hour each time they used the portal, and that the value of that time was $10/hr. The following table illustrates these savings to students using the same transaction volume assumptions that we used in calculating higher education employee and faculty savings shown above.

Establish a Self-Service Environment for Students - Student Time Benefit											
Student Benefit/Trans	$ 5.00	$ 5.10	$ 5.20	$ 5.31	$ 5.41	$ 5.52	$ 5.63	$ 5.74	$ 5.86	$ 5.98	Total
Total State Benefit	$5,248,000	$5,352,960	$5,825,024	$5,961,524	$5,520,906	$5,691,324	$10,342,676	$10,549,529	$12,297,737	$12,543,692	$87,333,372

Critical Success Factors:
Effective Project Governance
Change Management Strategy
Post Implementation Support Plan
Staff Training Strategy and Plan
IT Infrastructure and System Reliability

NDI 006888

Measuring this Benefit:

The employee/faculty benefit from student and faculty self service can also be tracked using a combination of the baseline measurements. As utilization figures become available, the state can verify that the levels anticipated in the table above are actually being achieved. When there is a variance the state should analyze the cause and take corrective action. Even when no variance is seen, we recommend that the state conduct field verification of student and faculty usage and satisfaction using a random sample on a bi-annual basis. An indication of key areas for field verification could come from either the usage variance or the portal survey statistics.

In addition, we recommend that staffing information and student contact statistics be gathered on a random basis of selected student services counters and phone centers such as Financial Aid, Registration, etc. These statistics should be monitored to verify that staffing levels are stable and phone/walk-up contacts from students are decreasing over time. If these contacts are not decreasing the state should analyze the cause and take corrective action.

6. Integrated Workflow, Industry Best Practices and Reduced Dependence on Paper

A major feature of the PeopleSoft ERP system is integrated workflow. Integrated workflow will allow the state to define an infinite number of business processes (hiring an employee, registering a student, issuing a bid, setting up a project, etc.) and build the rules for those processes into the system. The system will then enforce the rules and facilitate the transaction through the workflow process resulting in improved organizational efficiency and accuracy that will have a direct positive impact on constituent service.

The built in workflow features combined with extensive internal integration will also allow the state to significantly reduce its dependence on paper documents in all business areas that are used to process these transactions. Reduced paperwork will increase internal efficiency, eliminate "lost" transactions, improve information retrieval capability, enhance accountability and reduce the need for expanded paper filing systems and the space they occupy.

The PeopleSoft ERP system is installed in thousands of commercial and government agencies worldwide. PeopleSoft and their certified integrators like MAXIMUS have an ongoing commitment to identifying the best business practices of clients using the system and building those practices into the ERP system. The state of North Dakota can easily take advantage of these features and experience without having to reinvent the wheel.

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Payback: ***The state of North Dakota is heavily reliant on manual business processes that are supported by core business systems in General Government and Higher Education that are 25+ years old. Because of the technical limitations of the state's outdated technology, little has been done to automate major portions of the workflow and eliminate the flow of paper throughout the organization.***

As a result, the state of North Dakota will see significant productivity improvements from the ConnectND project. Other states like Iowa, supported by independent research from Gartner and META Group, experienced modest productivity gains of 1% per employee using all the features of the system, when manual and other paper based processes are replaced with fully automated electronic transactions and integrated workflow. In addition, productivity gains of 0.25% are possible for staff members using the integrated electronic purchasing features. In all cases, these savings do not develop until the system has been installed and operational for several years. In fact, most organizations see a decline in effectiveness in the early years as the employees learn the new system, learn the new processes and gain an understanding of how to best use the system. Based upon the number of ConnectND users in North Dakota, the state could see the following changes in employee performance and effectiveness during the ten years of this analysis:

Integrated Workflow, Industry Best Practices and Reduced Dependence on Paper - Benefit											
Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
# State System Users	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	
% Productivity Improvements	-0.5%	-0.750%	-0.5%	0.0%	0.5%	1.0%	1.5%	2.0%	2.0%	2.0%	
Annual Employee Cost	54,734	55,829	56,945	58,084	59,246	60,431	61,639	62,872	64,130	65,412	
Employee Benefit	($2,052,525)	($3,140,363)	($2,135,447)	$0	$2,221,719	$4,532,307	$6,934,430	$9,430,824	$9,619,441	$9,811,829	$35,222,215
# Higher Ed System Users	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	
% Productivity Improvement	-0.50%	-1.00%	-0.5%	0.0%	0.5%	1.0%	1.0%	1.5%	1.5%	2.0%	
Annual Employee Cost	49,200	50,184	50,184	50,184	50,184	50,184	50,184	50,184	50,184	50,184	
Higher Ed Employee Benefit	($984,000)	($2,007,360)	($1,003,680)	$0	$1,003,680	$2,007,360	$2,007,360	$3,011,040	$3,011,040	$4,014,720	$11,060,160
Total Value of Time	$ (3,036,525)	$ (5,147,723)	$ (3,139,127)	$ -	$ 3,225,399	$ 6,539,667	$ 8,941,790	$ 12,441,864	$ 12,630,481	$ 13,826,549	$ 46,282,375

Critical Success Factors:

Effective Project Governance
Change Management Strategy
Post Implementation Support Plan
Staff Training Strategy and Plan
Law Changes

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Measuring this Benefit:

Improvements in productivity will occur as the state takes advantage of the features of ConnectND. How effective the state will be in achieving these benefits will largely be a factor of how the state develops and deploys workflow. We recommend that the state track the number of workflow related changes that are developed in ConnectND. Periodically, the state should select various workflow processes and analyze their effectiveness. This assessment should include talking to the affected employees and getting their impressions of how the workflow and/or the change in business practice has impacted their work. The state should also monitor the number of customizations and/or modifications developed and applied after go-live. Increases in this number are an indication that the state is not taking advantage of delivered system functionality.

In addition, the baseline measurements when tracked over time will help provide a picture of how well the state is doing in this area. As in the other benefit areas, when variances in utilization are seen, the state needs to analyze the cause and take corrective action. In some cases, analyzing the problem will require field assessments, employee surveys and/or other tools to determine the cause.

7. Platform for Re-engineering Business Practices and Continued Process Improvements

The overall effort to implement the PeopleSoft ERP system that employs industry best business practices, gives the state of North Dakota an outstanding opportunity to thoroughly evaluate current business practices and make changes where appropriate. Re-engineering business practices in line with the flexible functionality available in the PeopleSoft ERP system, improves application maintainability when making future system upgrades.

In addition to the re-engineering of current business practices accomplished during initial implementation, the PeopleSoft ERP project will position the state of North Dakota to take advantage of future enhancements in the product. The PeopleSoft ERP system is constantly being updated and major new releases are available about every 18 months. These updates and new releases allow PeopleSoft to introduce new functionality and technology on a regular basis. Addition of new functionality into the product base is generally the result of experiences at other public and private organizations. This assures the state of North Dakota that the major investment being made in this system will not become functionally or technically obsolete any time

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In the future and that the state can continually improve business process by incorporating the lessons learned by other organizations.

Payback: ***The major payback for ERP implementation projects can occur with initial implementation if the organization seriously considers their business processes and re-engineers them to take advantage of existing system functionality. As this functionality is enhanced, greater and greater savings will result over time. However, once implemented, organizations continue to see paybacks in three important areas.***

The first area is reduced development and maintenance costs normally necessary when external factors affect business processes. A good example are the changes in federal loan programs for students that the NDUS estimates will require $1,000,000 in software maintenance costs to implement. An organization the size of North Dakota would normally expect at least one change of this magnitude per year.

The second area is the opportunity to re-engineer business processes on a go-forward basis after initial implementation. As organizations gain experience with these highly integrated systems additional re-engineering opportunities become more apparent. It is reasonable to expect that the state of North Dakota could increase performance improvements from those identified in the preceding benefit.

The final area that will produce payback to the state is the delivery of completely new functionality from the software vendor. This new functionality normally arises from a specific need or best business practice found at another user of the system. Most recently, PeopleSoft has introduced major new functionality in the areas of customer relationship management, employee self-service, government and student administration Internet web portals, and enterprise performance management.

There does also exist functionality in the PeopleSoft system that will allow the state to automate processes that are currently manual. Two specific areas where automation of manual process are currently planned for implementation are human resources and electronic procurement (e-Procurement). Any one of these efforts to implement new or existing could easily result in multiple two-year development projects in the $1,000,000 range each for a large organization engaged in internal development. The following table projects possible cost savings in these areas for the next ten years.

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Platform for Re-engineering Business Practices and Continued Process Improvements											
Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Legacy System Upgrades	218,936	223,315	227,781	232,337	236,983	241,723	246,557	251,489	256,518	261,649	2,397,288
# State System Users	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	
Re-engineer % Increase	0.000%	0.000%	0.050%	0.050%	0.100%	0.100%	0.100%	0.150%	0.200%	0.300%	
Re-engineer Benefit	$ -	$ -	$ 213,545	$ 217,816	$ 444,344	$ 453,231	$ 462,295	$ 707,312	$ 961,944	$ 1,471,774	$ 4,932,260
# State System Users	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	
New Functionality % Inc	0.000%	0.000%	0.050%	0.050%	0.100%	0.100%	0.100%	0.150%	0.200%	0.300%	
New Functionality Benefit	$ -	$ -	$ 213,545	$ 217,816	$ 444,344	$ 453,231	$ 462,295	$ 707,312	$ 961,944	$ 1,471,774	4,932,260
Total State Benefit	218,936	223,315	654,870	667,968	1,125,671	1,148,184	1,171,148	1,666,112	2,180,407	3,205,198	$12,261,809
Legacy Sys Upgrades	218,936	223,315	227,781	232,337	236,983	241,723	246,557	251,489	256,518	261,649	2,397,288
# Higher Ed Users	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	
Re-engineer % Increase	0.000%	0.000%	0.150%	0.150%	0.200%	0.200%	0.250%	0.300%	0.300%	0.400%	
Re-engineer Benefit	$ -	$ -	$ 341,672	$ 348,505	$ 473,987	$ 483,446	$ 616,394	$ 754,466	$ 769,555	$ 1,046,595	$ 4,834,599
# Higher Ed Users	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	
New Functionality % Inc	0.000%	0.000%	0.150%	0.150%	0.200%	0.200%	0.250%	0.300%	0.300%	0.400%	
New Functionality Benefit	$0	$0	$301,104	$301,104	$401,472	$401,472	$501,840	$602,208	$602,208	$802,944	3,914,352
Total Higher Ed Benefit	218,936	223,315	570,557	581,948	1,112,422	1,126,641	1,364,791	1,608,163	1,628,282	2,111,188	$3,914,352
Total Benefit	$ 437,872	$ 446,629	$ 1,525,427	$ 1,549,913	$ 2,238,093	$ 2,274,826	$ 2,535,939	$ 3,274,275	$ 3,808,688	$ 5,316,386	$ 23,408,048

Legacy Sys Upgrade assumes 1 per year and staffing of 4 FTE's in both State and Higher Ed

Critical Success Factors: Effective Project Governance
Change Management Strategy
Post Implementation Support Plan
Staff Training Strategy and Plan

Measuring this Benefit:

Improvements in productivity and re-engineering business processes will become an on-going effort as the state takes greater and greater advantage of the features of ConnectND. How effective the state will be in achieving these benefits will be a factor of how well the state manages change. We recommend that the state track the number of re-engineering related changes are developed in ConnectND. In order to make re-engineering a priority, the state should consider developing a program to review re-engineering efforts and reward the teams involved. This would require the

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state to review re-engineering efforts and analyze their effectiveness. This assessment should include talking to the affected employees and getting their impressions of how the changes in business practices have positively or negatively impacted their work.

In addition, the baseline measurements when tracked over time will help provide a picture of how well the state is doing in this area. When variances in system utilization patterns by students, vendors and employees are seen, the state needs to analyze the cause and take corrective action. In some cases, analyzing the problem will require field assessments, employee surveys and/or other tools to determine the cause.

8. Cross Trained Workforce

A common statewide PeopleSoft ERP system will give the state the added flexibility of being able to cross train the workforce. Accounts payable or Human Resource personnel in one institution or agency will be using nearly identical if not identical transaction workflow to process their work. This increases staffing flexibility, minimizes training program development costs and improves the efficiency of the state's PeopleSoft training program.

Payback: Employee training is a major investment that must occur as part of any large systems integration effort like ConnectND. Training employees is critical to the success of this project. Typical training investments per employee are in the range and continue as an expense as new employees join the workforce and existing employees are reassigned, promoted or relocated. As a result of the implementation of a common user interface in the integrated system and the elimination of numerous "shadow systems", the state of North Dakota will avoid a significant amount of re-training costs as employees already familiar with the ConnectND system move from one agency to another. Based upon an estimated movement of existing employees between agencies, the savings in retraining costs to the state would be:

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Cross Trained Workforce - Benefit											
Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
# State System Users	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	
State Training Costs/Emp	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	
State Turnover Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	
Total State Benefit	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	$2,500,000
# Higher Ed System Users	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	
Higher Ed Training Cost/Emp	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	
Higher Ed Turnover Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	
Total Higher Ed Benefit	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	1,000,000
Total Benefit	$ 350,000	$ 350,000	$ 350,000	$ 350,000	$ 350,000	$ 350,000	$ 350,000	$ 350,000	$ 350,000	$ 350,000	$ 3,500,000

Critical Success Factors: Change Management Strategy
Post Implementation Support Plan
Staff Training Strategy and Plan

Measuring this Benefit:

Using some of the tools in the HRMS component of ConnectND, the state should monitor employee turnover and reassignments in key positions that work directly with the system. Comparing actual to projected turnover rates will be a good indication of the state's ability to realize this benefit. The state should also be able to use the HRMS component to track employee training costs and analyze trends in this area.

Along with these specific metrics, the state should also use the baseline measurements to monitor trends in system utilization.

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4.5. Other Indirect Benefits

There are several indirect benefits that have intrinsic value to the state of North Dakota, but lend themselves less to qualifying a specific payback.

Migration to "Thin Client" Architecture

The PeopleSoft ERP system planned for implementation in the state of North Dakota uses the latest "thin client" or Internet browser based technology. The industry shift to "thin client" has eliminated many of the problems inherent with "client server" systems such as software application distribution and support, desktop computer reliability, core system maintainability and performance. The "thin client" architecture employed by the PeopleSoft ERP system results in a system that is highly reliable, easier to manage and maintain, flexible, and easier to use since most staff members are familiar with the Internet browser type of interface.

Critical Success Factors:
- Post Implementation Support Plan
- Maintenance Upgrade Plan
- Staff Training Strategy and Plan
- IT Infrastructure and System Reliability

Common Coding Structures

The Higher Education Institutions' and General Government agencies' legacy systems have, for the most part been developed in isolation. This results in differences in account structures, data names and data relationships. Because of these inherent differences, it is difficult to share or exchange information and get a complete statewide picture of financial status. A good example would be to look at how many different places and formats information about students and employees are stored in state databases. Storing the information in this distributed fashion also increases the likelihood that there will be discrepancies in the data. The PeopleSoft ERP implementation process now underway at the state will result in definition of common coding structures, shared data repositories and better overall data integration.

Critical Success Factors:
- Effective Project Governance
- Change Management Strategy
- Commitment to dismantle "Shadow Systems"
- Early Identification of Agency System Interfaces

Enhanced Internal and External Security

Internal and external security is a major focus in the PeopleSoft ERP solution. The sophisticated security methodology employed by PeopleSoft has the flexibility and reliability to support a multi-agency, multi-institutional implementation with the highest standards for data security and reliability that far exceeds the capabilities of most legacy systems.

Critical Success Factors: Post Implementation Support Plan
Maintenance Upgrade Plan
Staff Training Strategy and Plan

Meet Government Reporting Requirements

Government reporting requirements are constantly changing. A recent example is the rollout of GASB 34. Since the PeopleSoft system is used in hundreds of government agencies across the country, meeting and exceeding these ever changing reporting requirements is a high priority. As a result, the state of North Dakota will receive timely updates to the system that meet changing requirements as part of the normal application maintenance and upgrade process.

Critical Success Factors: Change Management Strategy
Post Implementation Support Plan
Maintenance Upgrade Plan
Staff Training Strategy and Plan
Commitment to dismantle "Shadow Systems"
Law Changes
IT Infrastructure and System Reliability
Early Identification of Agency System Interfaces

Software Available to Local Government and K-12

The contract signed by the state of North Dakota with PeopleSoft says that any government agency or political subdivision of the state (including local school districts) are entitled to use the PeopleSoft system without additional license fees. Depending upon the size of the local government entity, this would result in significant savings to the taxpayers of North Dakota. Local agencies would be able to implement the system and capitalize on the experiences of ConnectND, leverage training resources and minimize hardware expenses throughout the state.

Flexibility to Meet a Wide Range of Business Process Requirements

PeopleSoft recognized long ago that maintainability and upgradeability of the system was a major issue for them and a major concern for their customer base. As a result, they have designed the system with the tools and features that allow it to be adapted to the diverse needs of their client base. The flexibility delivered in the system also allows the system to support a wide range of organizational structures, organizational interrelationships and reporting requirements. This ever-improving flexibility minimizes the need for extensive application customizations improving the maintainability of the application.

Critical Success Factors: Effective Project Governance
Change Management Strategy
Post Implementation Support Plan

NDI 006897

Maintenance Upgrade Plan
Staff Training Strategy and Plan
IT Infrastructure and System Reliability
Early Identification of Agency System Interfaces

Extensive Support for Integration to Complementary Software

As an industry leader in ERP systems, PeopleSoft is on the radar of all the leading vendors of complementary desktop software products like e-mail, spreadsheets, word processing, document management (imaging) and Geographic Information Systems (GIS). Therefore, it is easy to extract or access data in the PeopleSoft system for seamless use at the desktop. PeopleSoft also supports all major desktop formats for ease of storing this supporting information in the system.

Critical Success Factors: Staff Training Strategy and Plan
Commitment to dismantle "Shadow Systems"
IT Infrastructure and System Reliability

NDI 006898

5. Return on Investment Analysis of ConnectND

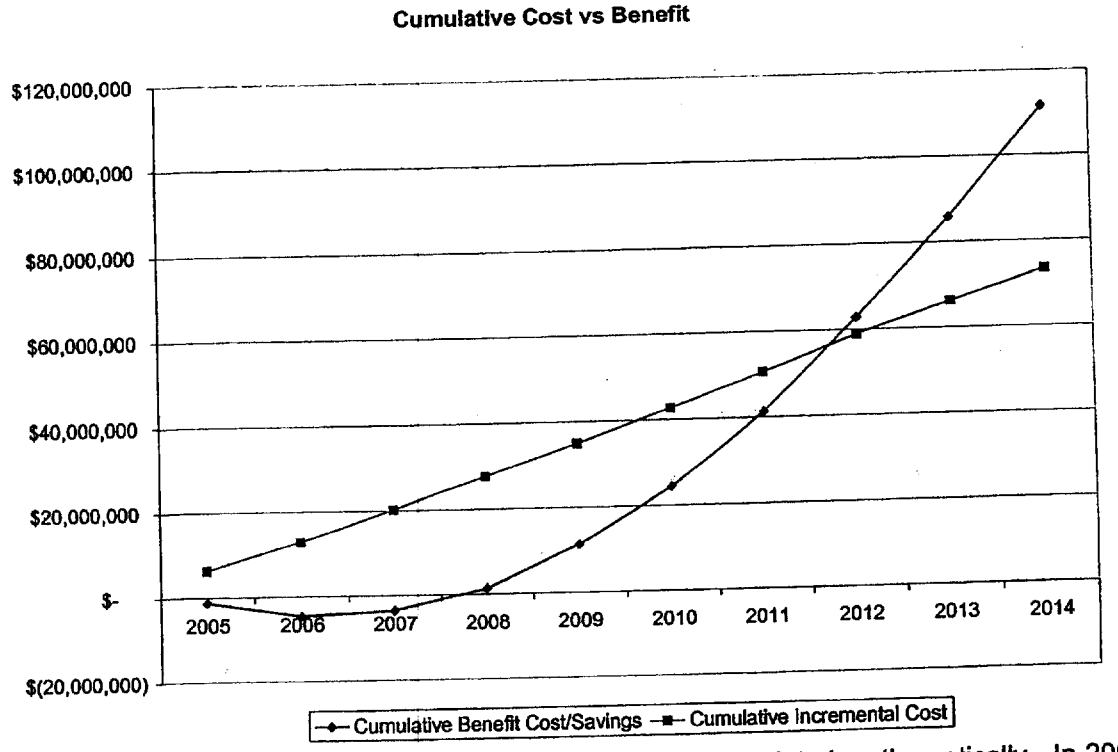
The data presented in the previous sections is used in this financial analysis to quantify the value of the ConnectND project. This Return on Investment (ROI) model is a derivative of the formula used by the state of Iowa. Other methodologies used in the public sector were evaluated in the course of developing this document, and advantages of each have been incorporated into the North Dakota approach.

The analysis compares the costs of the ConnectND project to the costs of running the current legacy systems "as is". Deferred development cost to upgrade or replace the legacy systems on a piecemeal basis has not been included. It is likely that some or all of these deferred development projects would need to be funded in the future if the ConnectND project was not implemented.

ROI Financial Analysis	Today's $'s	Net Present Value @ 2.5% Return
A. Total 10 Year Legacy System Costs System Costs from the 2004FY to 2013FY	$49,262,966	$27,134,659
B. Total 10 Year ERP Costs System Costs from the 2004FY to 2013FY	$122,791,798	$107,172,440
C. Incremental Government Investment: B - A	$73,528,833	$80,037,781
D. Direct Project Benefits/ 10 Year Totals		
1. Reduce or Eliminate "Shadow Systems"	$7,686,946	$6,533,460
2. Statewide Integration of Common System	$2,955,651	$2,335,112
3. Establish Self-Service Environment for Vendors	$3,018,466	$2,501,370
4. Establish Self-Service Environment for Employees	$5,343,784	$4,498,626
5. Improved Self-Service Environment for Students/Faculty	$19,325,375	$16,534,485
6. Integrated Workflow, Industry Best Practices and Reduced Dependence on Paper	$46,282,375	$36,361,682
7. Platform for Re-engineering Business Practices and Continued Process Improvement	$23,408,048	$19,636,303
8. Cross Trained Workforce	$3,500,000	$3,063,222
E. Total 10 Year Project Benefit: 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8	$111,520,646	$91,464,261
10 Year Return On Investment (ROI) = (E - C / C)	51.67%	14.28%
Project Payback (in years) = Intersection Point on the Graph	7	N/A
Procect Payback (in years) using 2003 formula		7.00

Another way to look at ROI is graphically. The following graph plots two ROI variables for the life of this analysis. The first line (pink line with squares) shows the cumulative incremental project cost. Cumulative incremental costs is the total cost of the project minus the projected cost to continue using the legacy systems added up for 10 years running. We use cumulative incremental costs here, because the direct benefits identified are the result of the State's

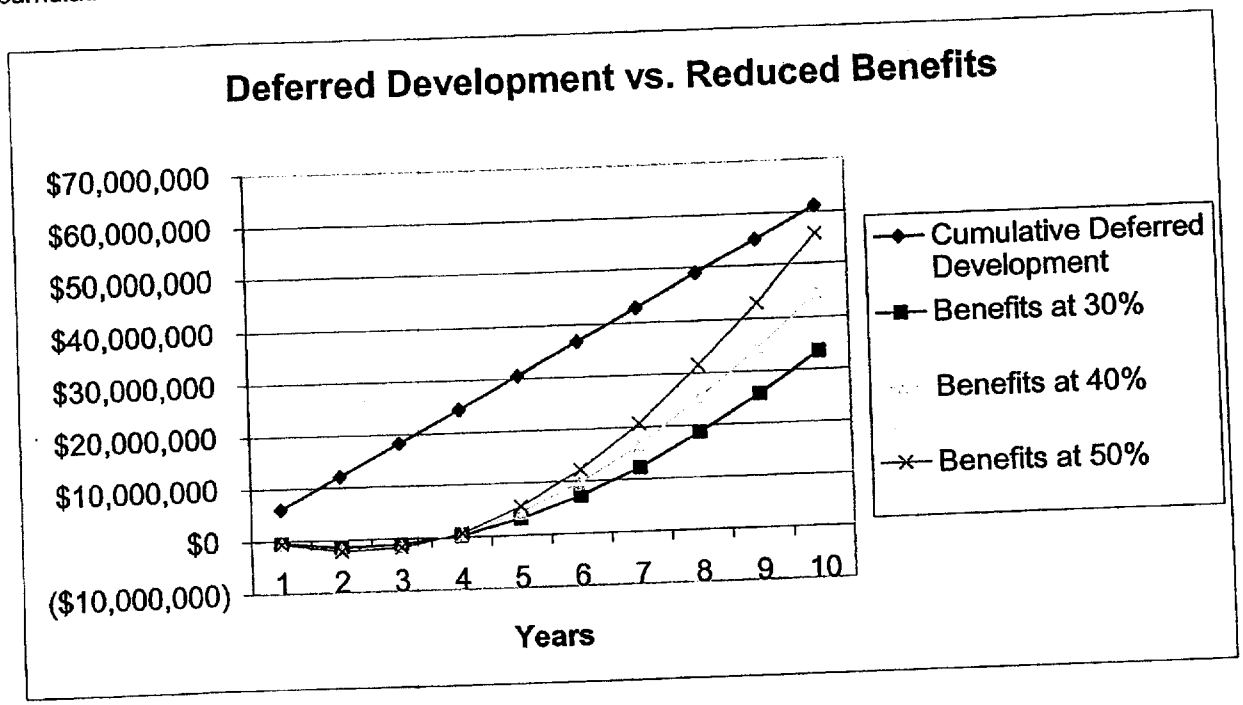
investment in ConnectND and generally would not be seen if the state continued to operate "status quo" with the legacy systems. The blue line with diamonds plots the cumulative value of the direct benefits. Because some of these benefits are projected as negative values in the initial years after implementation, this line dips below zero, and then takes a couple of years to recover. The point where the blue and pink lines cross is the point where the state begins to realize a positive return on the ConnectND investment. This is also shown in the table listed above as the "Project Payback (in years)".



In the 2003 ROI report, the Project Payback (in years) was calculated mathematically. In 2004 we calculated this value both mathematically (for consistency with 2003) and represented the payback graphically. Both approaches yield the same result.

We also would like to contrast the graph above with a graph showing where the state would be regarding costs and benefits had it chosen not to implement ConnectND. Here, the state would have continued to acquire and develop system on a case-by-case basis. To compile this graph, we used the annual costs of the systems projects identified in the Updated Legacy Systems Financial Analysis as Deferred Development. In other words the costs of the non-integrated systems projects that state agencies have not requested funding to buy or develop due to ConnectND. Under this alternative scenario, the state should expect to realize some benefit from these new systems, but not nearly as great a benefit as under the integrated approach

represented by ConnectND. Benefits would be reduced because of lack of integration, potential for diverse hardware and software, redundant data, redundant software, etc. The graph shows the cumulative direct benefits at 30-50% of the levels under ConnectND. As one can see, the cumulative benefits do not reach the level of cumulative costs in the 10-year analysis period.



6. Critical Success Factors for ConnectND

An analysis of Return on Investment (ROI) would be incomplete without a discussion of the many factors that past experience has taught us are critical to overall project success or the Critical Success Factors. The impact of not adequately understanding how each of these factors affects the effort ranges from reducing overall ROI by minimizing the return from the direct and indirect benefits to outright project failure and abandonment of the effort.

Effective Project Governance

A very important issue in helping organizations effectively deal with the Critical Success Factors described in this section of the analysis is to be sure that there is a well-defined and effective governance process in place during the entire system life cycle. In order to be effective, the governance process is frequently administered through a system steering committee. The steering committee operates under a charter that must address the following issues:

Membership – who, how they are selected, term of service.
Leadership – how leadership is selected and the responsibilities of leadership, such as setting the agenda and documenting decisions,
Decision Making Process – what is the process for effective decision-making, what factors cause an issue to be elevated to the group, what happens when the group cannot reach a decision?
Role of Sub-groups or Task Forces – what is the process, scope and roles of sub-groups or task forces in helping the steering committee perform their duties.
Performance Measurement – how will the steering committee assess overall performance of the system, user satisfaction, and costs/savings?

Project Governance Benefit *– The largest benefits from effective project governance are effective and efficient decision making and consistent statewide policy setting. Both these benefits will contribute to lowering overall project cost and improving acceptance of the system.*

Change Management Strategy

The processes that any large organization must go through to implement and integrate a major software system such as ConnectND impose immense challenges on everyone involved. In order to assure success, public officials, management and staff must understand that these challenges must be carefully addressed in all phases of the project. Managing these changes and the associated expectations for the effort through an effective and comprehensive Change Management Strategy is critical to success. The strategy must focus on the following key elements:

- **Unfreeze**

Here we recognize that it is human nature to resist change. Employees that resist change are said to be "frozen" in their current thinking. In order to effect change, the perceptions, attitudes and other mindsets must be unfrozen. Once unfrozen from past practices, the employees will be able to accept the change and implement it.

- **Communications**
  Everyone involved in the project must be in a constant communication mode. This means listening or reading as well as speaking or writing about the project, the project objectives, gaps, strengths, weaknesses and anything else that is valuable to the overall success of the project.
- **Involvement & Commitment**
  Large complex projects like ConnectND succeed when everyone from the top to the bottom stays involved and committed to the success of the effort.
- **Open to Options**
  Everyone involved in the project must remain committed to keeping an open mind and avoid the "we have always done it that way" trap. In doing so, adequate time must be allotted to conducting the analysis needed to understand how the changes proposed will affect employees' jobs.
- **Stay Focused on the Objective**
  Another danger in large projects is to get side tracked or diverted into less productive activities. These diversions become sinkholes for time and resources that make little contribution to the overall project. As a result, it becomes a collective responsibility of the project team members to stay focused on the objective and to help keep others focused as well.
- **Continuous Incremental Improvement**
  Sweeping positive change, while delivering outstanding results often is impossible to control and organizationally disruptive. As a result, when it comes to large complex projects, continuous incremental improvement is more reliable and sustainable. It is important for elected officials, managers and staff to realize that reaching all the goals expected of ConnectND will not occur overnight and the continuous improvement is a long term commitment.
- **Thorough Understanding of the Internal & External Environment**
  ERP systems are monuments to system integration. In order to be successful in affecting the positive changes possible with these projects, everyone on the team must have a thorough understanding of the impacts that each and every decision they make will have on the other parts of the system and on external systems as well.
- **Create an Atmosphere that is Tolerant of Setbacks & Failures**
  It is extremely important that elected officials, managers and staff all understand that setbacks and failures will occur during the course of the project. A realization that we learn from our mistakes helps create an atmosphere more tolerant of these problems and one that encourages team members to take more risks when searching for the best solutions.

***The Change Management Benefit** - Every single effort to affect change results in changes in the overall business performance levels normally seen in the organization.*

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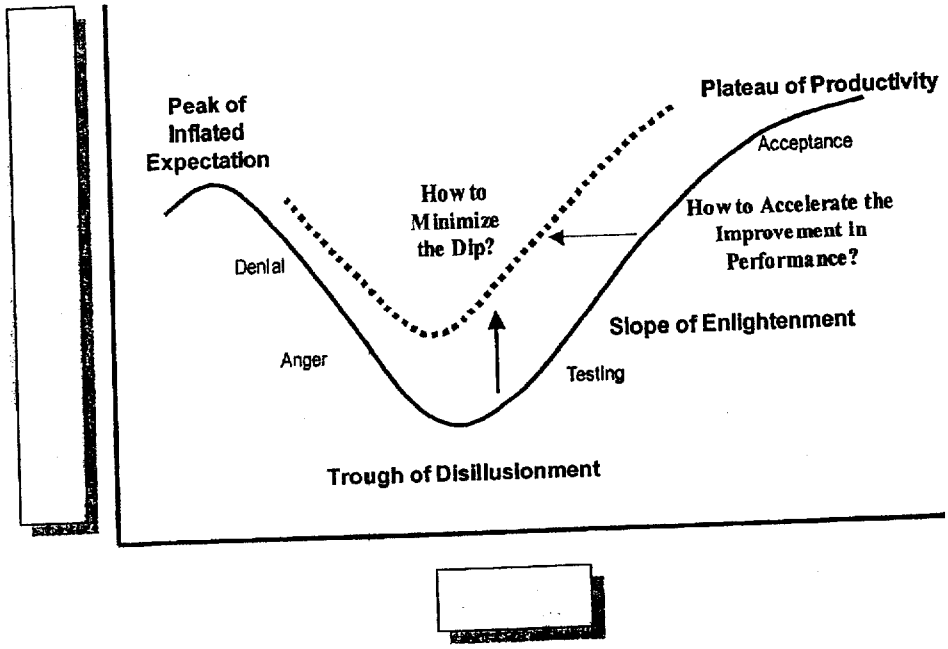
ERP projects are no exception. Typically, business performance through the change cycle deflects over time in response to the changes being imposed. That deflection is illustrated by the red curve on the following graph. The process begins with the "Peak of Inflated Expectation" progresses rather quickly to the "Trough of Disillusionment", up the "Slope of Enlightenment" and eventually to the "Plateau of Productivity". Along the way, many emotions are expressed from excitement and curiosity, to denial, apprehension and finally resolution and satisfaction.

The benefit that can be expected from understanding this change in performance cycle can be immense. While most experts agree that the cycle cannot be avoided, most agree that minimizing the depth of the Trough of Disillusionment and accelerating the organization up the Slope of Enlightenment has tremendous value to any organization.



Post Implementation Support Plan

A sizable number of ERP projects fail or languish in the "Trough of Disillusionment" much longer than necessary when they fail to consider the importance of a responsive and effective Post Implementation (PI) support infrastructure. The PI support infrastructure must be given the resources, staff and tools necessary to support problem resolution, track problem status and provide timely management reports.

The plan for PI support for the ConnectND implementation as large and complex as here in the state of North Dakota would include the resources of a "call center" or "help desk", a problem tracking tool such as PeopleSoft's CRM Help Desk, functional and technical back-up support to assist when the problems are too complex for the help desk, and field support staff that can troubleshoot problems on-site.

> ***Post Implementation Support Plan Benefit*** *– Without an effective plan for adequately supporting the system after implementation, staff and management will become quickly disillusioned with the system when their problems and questions go unresolved. Frustration will grow and blame will be focused on "the system". A significant benefit from a coordinated approach to support is having problem tracking data that can help managers understand where staff are having difficulty so that corrective action such as training can be focused where it will do the most good.*

Maintenance and Upgrade Plan

The PeopleSoft ERP system incorporates complex technology that is constantly undergoing updates and changes. The state of North Dakota must insure that adequate resources are available to support the maintenance and upgrade process. This includes adequate hardware and network capacity to support independent development, test and production systems, a comprehensive software change management policy to assure adequate testing of software modifications, ongoing commitment to staff training and updates prior to migration into production, and a governance or decision making structure that supports timely decision on application modifications and upgrade priorities.

> ***Maintenance and Upgrade Plan Benefit*** *– Understanding the system life cycle that includes frequent system updates (patches and fixes) plus periodic upgrades (approximately every 18-24 months) means that the state can plan for these events, schedule staffing and forecast budgets effectively.*

Staff Training Strategy and Plan

A statewide strategy and plan for staff training should be developed to address the intensive training requirements necessary in the time period before "go-live" and the training necessary in a post implementation environment. Continual employee turnover, technology upgrades and business process changes will drive the need for training on a go-forward basis. The state will

find that training needs are quite extensive immediately prior to each "go-live" event and moderate after that period. New system releases and major technological changes will generate additional training demands.

> ***Staff Training Strategy and Plan Benefit*** *– Without an adequate investment in staff training, employees will be ineffective in using the new system.*

Commitment to Dismantle "Shadow Systems"

Because the state's key business systems are considered hard to use and lack flexibility and "ad hoc" reporting capability, many state departments and institutions have addressed their needs for information by creating extensive "shadow systems". As ConnectND moves forward and these issues are addressed, management must constantly be on the lookout for the existence of both old and new shadow systems and actively discourage their continued use.

> ***Commitment to Dismantle "Shadow Systems" Benefit*** *– Organizations like the state of North Dakota spend considerable staff resources maintaining extensive amounts of data in shadow systems. If managers recognize this trend and actively seek to minimize it, then these staff resources can be used to support other more productive efforts. Without management commitment in this area, shadow systems tend to take on a life of their own.*

Law Changes

In some cases, the state may find that existing laws prohibit or restrict the state's ability to take full advantage of the functionality available in the ConnectND system. When necessary, the state should evaluate the impediments created by law and make changes where appropriate.

> ***Law Changes Benefit*** *– Quite often, the laws that govern state organizations were developed at a time when systems and Information Technology in general were far less sophisticated or even non-existent. Changing laws to facilitate the use of technology and modern systems can minimize system customizations and streamline workflow.*

IT Infrastructure and System Reliability

All components of the system must be scaled and maintained to assure reliable and effective performance. A system that fails frequently or is slow to respond will have a negative impact on employee effectiveness.

> ***IT Infrastructure and System Reliability Benefit*** *– System reliability is becoming more and more critical as a larger portion of employees and constituents activities include interacting with large integrated systems to complete tasks. If that environment is unreliable or unresponsive, making employees wait through long delays, then overall productivity suffers.*

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Early Identification of Departmental System Interfaces

Many departments operate systems that provide functionality outside that which will be provided by ConnectND. Often, these system need to send or receive information from ConnectND through system interfaces. In order to assure continued operation of these systems and appropriate accounting for detailed financial information, agencies will have to understand the changes they will be required to make to internal systems as soon as possible.

> ***Early Identification of Agency System Interfaces Benefit*** *- North Dakota state agencies operate a number of major systems that support internal business functions (like Child Support, fleet management, hunting license sales, data processing billing, etc.). Many of these systems supply summarized accounting information to state systems. If agencies are made aware of needs to modify these interfaces early, they can plan for the workload and keep operations in business. If agencies are informed late in the process, it may be necessary to hire outside resources to meet project schedules.*

7. Analysis Scope

There are two elements that defined the methodology used and the scope of this project. The first is the timeframe for the analysis. The state of North Dakota plans to capitalize its investment in the ERP system through a ten (10) year revenue bond financing. As long as PeopleSoft and the state continue a mutually beneficial relationship, this project will continue to provide value to the state of North Dakota far longer than the ten (10) years used in this analysis. A ten (10) year cost analysis was used beginning in the 2005-07 biennium through the 2013-15 biennium. In the public sector, it is common for an analysis of this type to cover projected costs and benefits over a period of five (5) to ten (10) years.

The second element was defined by the legacy systems being replaced as a result of the ERP project. In North Dakota, there are as many as 100 legacy systems used by General Government that are identified for full replacement, partial replacement or replacement with an interface to existing outside data. In the Higher Education environment there may be as many as 200 legacy systems and/or system components that could be replaced by ConnectND functionality. The legacy costs documented in this analysis cover the General Government and Higher Education systems proposed to be replaced.

The ERP software field is rapidly changing. PeopleSoft, as a major player in this market, has a recognized reputation as a leader in technological innovation. As a result, it is highly probable that future software releases from PeopleSoft will include added features and functionality expanding the scope of the product. PeopleSoft will provide these upgrades and added features to the state at no additional charge as part of the annual maintenance fees provided for in the contract. It is also highly probable that the state will find that additional legacy systems beyond the ones covered in this analysis can and will be replaced by PeopleSoft components in future releases.

Assumptions

There were several general assumptions that guided the ROI project team through this project. They included:

- The timeframe for this analysis is ten (10) years beginning with 2005-07 biennium.
- Inflation factor of 2% per year was applied to employee salary cost projections.
- Population and other demographic information used in this analysis are listed in the chapter titled "Direct and Indirect Benefits of ConnectND".