

Budget Template for Estimating System Development Costs
By
Bob Davis

Introduction

Intuitively the use of data standards to develop new or enhanced data systems should provide: 1) a cost effective roadmap to implementation, 2) simplify the development process, and 3) strengthen the relationships between data suppliers and data users. This template is designed to provide a common tool to evaluate the development costs of a system design.

Factors Contributing to Information Technology Project Failures

Data standards prevent information technology project failures. Using the search criteria "information technology project failures" on an Internet search results in many hits. One article cited the top 10 reasons for information technology project failures:ⁱ

1. Lack of user input
2. Incomplete requirements and specifications
3. Changing requirements and specifications
4. Lack of executive support
5. Technology incompetence
6. Lack of resources
7. Unrealistic expectations
8. Unclear objectives
9. Unrealistic time frames
10. New technology.

Another article emphasized how common project failures are. For example, "The average project was 189% over budget and 222% behind schedule and contained only 61% of the originally specified features."ⁱⁱ

The exhibit below provides a matrix of the above mentioned reasons for information technology project failures reasons. In a recently implemented of an emergency department data collection system in New York State 6 of the 10 reasons cited for information technology failure were addressed by having a definitive set of standards and operating within the boundaries of those standards. Any requests for data elements not supported by the standards were postponed to later phases of implementation, after the initial system was operational with the existing data standards. System developers will find it useful to find their own strategies to address each of these reasons for system failures.

Exhibit 1: Reasons for Information Technology Failures Matrix

Reason for Failure	Mitigation Plan
1. Lack of user input	
2. Incomplete requirements and specifications	
3. Changing requirements and specifications	
4. Lack of executive support	
5. Technology incompetence	
6. Lack of resources	
7. Unrealistic expectations	
8. Unclear objectives	
9. Unrealistic time frames	
10. New technology	

Categorizing System Implementation Costs

System Design Costs

The system design phase should include an educational component for potential data suppliers, i.e., the hospitals, and data users. For the most part, the relationship between the users and suppliers of the data was based more on impressions than actual experiences and interactions. Timely and successful completion of the project with the collection of high quality, useful data depended on developing a foundation of trust and mutual understanding between data users and data suppliers. The principal design challenge involves limiting the scope of the system design to match budgetary constraints. It is important to factor the cost of an educational effort that would foster mutual understanding amongst various stakeholders, system caretakers, data users, and data suppliers. Specifically, the users of the data need to be educated about the limits of the data system as constrained by the allocated budget. The suppliers of the data needed to be educated about the reasonability of the data users' needs. During this consensus building process, all stakeholders need to agree on the scope of the system design.

At this point each system caretaking organization will need to decide if it will be outsourcing the system design and/or system development activities or if it will be using internal resources to do the design and development work.

Below in Exhibits 2 and 3 are templates for estimating system design costs. It should be noted that the preliminary design outreach activities for the recently developed Emergency Department Data Collection System in New York State were done in cooperation with the 2 hospital associations in New York State. It was important that any system design have a broad base of support.

Exhibit 2 includes the cost estimates for the system design phase assuming system caretaking resources are used for system design activities.

- Staff time to develop the preliminary and final system design specifications.
- Staff time and travel expenses to conduct necessary training user and supplier training to get "buy in" for the system design.

Exhibit 2: Estimated System Design Costs Using In-House Caretaking Resources

Note: For the sake of comparison users of this template should use the same hourly rate of \$50 per hour for development staff time.

Preliminary system design outreach costs	
x meetings lasting y hours each with z attendees	?? hours
Average hourly rate	\$50
<i>Total estimated salary to develop a preliminary system design</i>	???
Specification development cost	
x months y FTE (z hours per week)	?? hours
Average hourly rate	\$50
<i>Total estimated salary to develop preliminary system specifications</i>	???
Outreach educational costs for potential data users and suppliers	
x meetings with y staff conducting outreach meetings	?? hours
Average hourly rate	\$50
<i>Total estimated salary for outreach educational sessions</i>	???
Estimated travel expenses for each out of town outreach meetings	???
<i>Estimated out-of-town travel expenses for x meetings</i>	???
Final Specification development cost	
x months y FTE (z hours per week)	?? hours
Average hourly rate	\$50
<i>Total estimated salary to develop final system specifications</i>	???
Total Estimated Development Costs	???

Exhibit 3: Estimated System Design Costs Outsourcing System Design Activities

Note: For the sake of comparison users of this template should use the same hourly rate of \$50 per hour for internal development staff time.

Preliminary system design outreach costs	
x meetings lasting y hours each with z attendees – for internal staff deployed	?? hours
Average hourly rate	\$50
Consultant / Vendor charges	??
<i>Total estimated salary to develop a preliminary system design</i>	??
Specification development cost	
x months y FTE (z hours per week) – for internal staff deployed	?? hours
Average hourly rate	\$50
Consultant / Vendor charges	??
<i>Total estimated salary to develop preliminary system specifications</i>	??
Outreach educational costs for potential data users and suppliers	
x meetings with y staff conducting outreach meetings – for internal staff deployed	?? hours
Average hourly rate	\$50
Consultant / Vendor charges	??
<i>Total estimated costs for outreach educational sessions</i>	??
Estimated travel expenses for each out of town outreach meetings	??
Consultant / Vendor charges	??
<i>Estimated out-of-town outreach expenses for x meetings</i>	??
Final Specification development cost	
x months y FTE (z hours per week)	?? hours
Average hourly rate	\$50
Consultant / Vendor charges	??
<i>Total estimated costs to develop final system specifications</i>	??
Total Estimated Development Costs	??

Exhibit 4 is a step in the system implementation process done in New York State to validate with data users and data suppliers the final system design. An additional set of outreach meetings across the state were scheduled in cooperation with the New York Health Information Management Association to publicize the final decisions made in the system design. This was done before any of the computer programming began.

Below in Exhibit 4 are the estimated cost figures for NYS DOH staff to conduct training for the Emergency Department Data Collection System.

Exhibit 4: System Training - Estimated Costs

Note: For the sake of comparison users of this template should use the same hourly rate of \$50 per hour for internal development staff time.

Out-of-town training	
x out-of-town meetings conduct by y system caretaking staff	?? hours
Average hourly rate	\$50
<i>Total estimated salary to conduct final outreach meetings</i>	<i>\$??</i>
Travel expenses for each meeting	???
<i>Estimated out-of-town travel expenses for x meetings</i>	<i>\$??</i>
In-town training	
x in-town meetings conducted by y system caretaking staff	?? hours
Average hourly rate	\$50
<i>Total estimated salary to conduct final outreach meetings</i>	<i>\$??</i>
Total Estimated Final Outreach Costs	\$??

Benefit from Approach to System Design

Developing consensus around the system design is an important step that should be factored into the system design budget. System design documentation developed in an environment that balanced the needs and capabilities of both users and suppliers is less subject to change once the development work begins.

A secondary benefit from the consensus approach being recommended is the improved relationship between the data suppliers and data users with the system caretakers.

System Development Costs

For the purpose of this template we are defining the following terms:

Phase One Programming	Work done to develop computer software and perform comprehensive in house testing of an "alpha" system.
Beta Testing	Outreach to selected data suppliers to test the completed "alpha" system.
Phase Two Programming	Work done to modify the "alpha" system based on the "beta" testing results.
Phase Three Programming	Work done to migrate legacy system files (if necessary) to the new system and to develop production procedures for implementation of the new system.

Below in Exhibit 5 and 6 are the estimated cost figures for development of a new data system. Exhibit 5 is assuming that all the computer development activities are done with in-house computer resources. The assumption with Exhibit 5 is that sufficient technical resources exist within an organization to perform the necessary programming tasks.

Exhibit 6 assumes that the computer development activities are outsourced to a software vendor.

Exhibit 5: Estimated Costs for In-House System Development

Note: For the sake of comparison users of this template should use the same hourly rate of \$50 per hour for internal development staff time.

Phase One Programming	
x months y FTE (z hours per week)	?? hours
Average hourly rate	\$50
<i>Total estimated salary complete phase one</i>	<i>\$??</i>
Hardware & Network Ware Purchase Cost	
<i>Total estimated cost to purchase necessary hardware for system and network</i>	<i>\$??</i>
Phase Two Programming	
x months y FTE (z hours per week)	?? hours
Average hourly rate	\$50
<i>Total estimated salary complete phase two</i>	<i>\$??</i>
Phase Three Programming	
x months y FTE (z hours per week)	?? hours
Average hourly rate	\$50
<i>Total estimated salary complete phase three</i>	<i>\$??</i>
Total Estimated System Development Costs	\$??

Exhibit 6: Estimated Costs for Outsourced System Development

Note: For the sake of comparison users of this template should use the same hourly rate of \$50 per hour for internal development staff time.

Phase One Programming	
Vendor Costs	\$??
x months y in-house FTE (z hours per week) to support vendor development	?? hours
Average hourly rate	\$50
<i>Total estimated costs to complete phase one</i>	\$??
Hardware & Network Ware Purchase Cost	
<i>Total estimated cost to purchase necessary hardware for system and network</i>	\$??
Phase Two Programming	
Vendor Costs	\$??
x months y in-house FTE (z hours per week) to support vendor development	?? hours
Average hourly rate	\$50
<i>Total estimated salary complete phase two</i>	\$??
Phase Three Programming	
Vendor Costs	\$??
x months y in-house FTE (z hours per week) to support vendor development	?? hours
Average hourly rate	\$50
<i>Total estimated salary complete phase three</i>	\$??
Total Estimated System Development Costs	\$??

Exhibit 7: Total Project Cost Estimates

Total Estimated Costs from Exhibit 2 or 3	\$??
Total Estimated Costs from Exhibit 4 (if done)	\$??
Total Estimated Costs form Exhibit 5 or 6	\$??
Total Estimated Project Costs	\$??

Summary

It is hoped that this template will provide structure to compare costs of a variety of system development activities in a simple straight forward approach. The hypothesis to be tested by collecting estimated system design costs for as many projects as possible would be that systems using data standards are implemented at a lower cost with higher success rates. A secondary hypothesis would be that both in-house and outsourced systems would receive the same benefits from designing and implementing standards-based systems.

Comment [JP1]: Bob – Please insert language.

ⁱ Jim Johnson, "Chaos the Dollar Drain of Information Technology Project Failures",
www.standishgroup.com/chaos.html

ⁱⁱ www.stsc.hill.af.mill/crosstalk/1998/07/causes.asp