Change Management Data Collection Tool: Findings and Lessons Learned

Mrs. Laura Lucas, PCE/A
Air Force Cost Analysis Agency
1865 4th St. Building 14, Room 120
Wright-Patterson AFB, OH

ABSTRACT

This paper relates the benefits and pitfalls of the online survey that the author designed and implemented. Using example questions and responses from the actual data collection tool, the author relates findings and lessons learned. Presentation topics will include: how the data collection tool strengthens future cost estimates, where the data fail to inform estimate inputs, and why the author recommends certain design choices.

In the military acquisitions world, an Enterprise Resource Planning (ERP) system is an information technology transformation, which applies an off-the-shelf, standardized suite of industry business rules from a commercial vendor. Defense department data on the associated change management cost – that is, the cost of all activities needed to enhance and facilitate Government employees' awareness and adoption of a major change – are scarce. Through experimentation with data collection tools and Communities of Practice, survey data can bridge the knowledge gap.

In the research project preceding this presentation, the researcher hypothesized that defense agencies would be hampered during ERP implementation by their bulk and many thousands of laws and regulations, despite strong leadership. After implementing the change management data collection tool, the author normalized 100 anonymous responses from various programs prior to performing statistical analysis. Surprisingly, a chi square test for goodness-of-fit between two samples showed no significant difference in the prevalence of resistance to change between Industry and Government during ERP transformation. The author described some obstacles and challenges to ERP implementation, which may distinguish Government from Industry in terms of their prevalence. Finally, the author extended findings into recommendations for cost analysts.

INTRODUCTION

The Change Management Data Collection Tool refers to a research project in which we conceptualized a data collection process for improving our understanding of change management requirements. Some of the terms and definitions from that research effort are listed below.

Change Management:

Process undertaken to lead people toward major change in an organization, with the goal to successfully implement a new process or product while minimizing negative outcomes; This includes all activities or programs needed to enhance and facilitate employee awareness and adoption of the change

Employee Resistance:

Sometimes informally called "human inertia," it is that human defense mechanism found in individuals, and especially in groups, during times of change; Resistance occurs when employees do not readily adopt the new process or system into their familiar, day-to-day business processes. By contrast, if employees actively support the change and willingly assume their new roles within the enterprise by the scheduled transition date, then the employees exhibit non-resistance.

Enterprise Resource Planning (ERP) System:

Type of information technology application, which uses an off-the-shelf, standardized software suite from a commercial vendor (e.g. SAP, Oracle, or BAAN International) to integrate multiple business areas in an organization

The study of human factors relating to change management is a large and active field. Methods, however, for preparing a reasonable change management budget or for calculating the potential return-on-investment thereof, are seldom addressed in the literature. When we began researching the topic, it was for a cost estimate on the ECSS program. We did not even know how we in the Air Force compare with Industry when it comes to employee resistance. Are we so hampered by our bulk and many thousands of laws and regulations, that our costs must significantly outweigh those of a typical company?

Right away, we found that human resources organizations such as the Society for Human Resource Management (SHRM) have an interest in change management and are valuable sources of information about Industry practices. In the 2007 Change Management Survey Report, SHRM found that resistance to change increases with the size of the change being implemented. In light of current programs such as Enterprise Resource Planning (ERP) systems, which rely on transformational change in order to succeed, we wanted to know what the Air Force is investing in change management and whether this amount is sufficient to meet our tendency as human beings to resist change.

This presented a research challenge: not only did we not know the typical size of a change management staff in an Air Force program, we did not want to draw inappropriate comparisons between Industry and Air Force requirements, as organization size could be a confounding variable. Further, we did not want to contribute cynicism with respect to any ERP acquisitions. Therefore, the collective knowledge of many experienced Air Force managers was needed to improve our understanding of the problem.

PROBLEM STATEMENT

The Null Hypothesis was that the data would not show a statistically significant difference between the resistance to change reported by Air Force survey respondents and the responses reported by SHRM for non-Government categories. Alternately, we hypothesized that Air Force survey respondents would report significantly more resistance to change as compared to the non-Government respondents to SHRM's 2007 Change Management Survey. Data mining was not available; we would use an original questionnaire as the data collection instrument. We would compare the collected data to 'sanitized' data, as published in the SHRM report. Our complete data collection instrument would consist of an email, an online electronic survey, and a spreadsheet.

BACKGROUND

Change management theory and ERP are two broad concepts, which often intersect in the literature examined. For more on ERP, Hill (2007) provides a detailed status of all the ERP acquisitions in the DOD up to the time his study was published. Here we focus on the background of change management theory in the context of ERP applications.[1] One study elegantly defines change management as "embracing the paradox between economic value and organizational capability" (Society for Human Resource Management [SHRM], 2007, p. 2). In that same study, 11% of professionals surveyed had been responsible for calculating a post-implementation Return on Investment (ROI) for a major organizational change.

In the aviation and aerospace industry, big names including the Boeing Company, Lockheed Martin Corporation, and Northrop Grumman Corporation endorse quantitative analysis in management for the critical role the half-art, half-science plays in enterprise decision-making. When it comes to change management cost estimating, the science is lacking. Economic benefits marketed well obviously increase the chance of a successful change, to highlight the importance of a scientific approach.

As managers, we know that all types of organizational change will cause disruption. Goal-driven, or transformational, change occurs at the behest of leaders internal to the organization (Low, 2007). An ERP transformation will undoubtedly cause disruption and requires special management attention. In anticipation, competing organizations have set up central offices to manage goals wherever possible. These entities, such as the military's Logistics Transformation Offices (LTO) or the DOD's Business Transformation Agency (BTA) can employ as many as 300 individuals (Carr, 2008). All share a common theory that human factors like trust, communicativeness, leadership skills, and Human Resources (HR) practices are important elements in change management.

The single most influential human factor bearing on the success or failure of the transformation is individual resistance to change. In turn, perhaps the most sensitive contributor to individual resistance to change is the need to rewrite or reduce position descriptions. Will the labor force currently working to

---

[1] This paper discusses the organization and people-oriented strategies used in most change management activities; there is also another category of change management strategies for ERP systems. This is the technical category, and it includes aspects of ERP installation, ERP complexity, adequacy of in-house technical expertise, and time and budget for implementation (Aladwani, 2001). While these are factors that can influence the economic outcome of a change management initiative, technical details are often guarded as need-to-know information and are outside the scope of the survey instrument for this research effort.

maintain and input data into the legacy systems support the transformation to ERP? The answer depends on the 'I's: incentives given, intervention into conflicts, indoctrination efforts, and user involvement in meaningful decisions (Hammer, 1995).

There are some formal processes in place for doing those things – we call it managing change. A change management plan details how changes are identified, managed, implemented, and measured (Defense Travel Management Office [DTMO], 2006). This important publication is often the first guide personnel will receive at the beginning of a transformation initiative. Resistance to ERP transitions is similar to resistance to other types of change. A successful change management team in this environment will first identify influential users and groups and then set up strategies to convince as many units as possible to adopt the ERP, including influential groups who will need to have a positive adoption attitude, and they will finally use a performance system to evaluate change management strategies during ERP implementation (Aladwani, 2001).

The DOD manages vast amounts of budget dollars, employees, and inventory items, as stated in the BTA's *Facts and Figures* (n.d.). However, its enormous size guarantees the DOD neither authorship nor ownership of any new systems or processes it purchases. According to Dunn (2006), DOD IT systems transformation calls for robust partnering with industry, and not for organic development. Since ERP systems are generally Commercial Off-the-Shelf (COTS) acquisitions, DOD involvement in the construction of these systems is low. When it comes to systems, the opposite of resistance to change is having authorship and ownership of the new system and its associated processes. Therefore, the potential for resistance to change is great, making change management a pillar of ERP initiatives.

METHOD

The study was a comparative model, between two independent samples of data. Both databases originally came from survey instruments; chronologically, the SHRM collected the first set, and we collected the second set. We designed an original survey, using SHRM's 2007 Change Management Survey as a guide. Only a small subset of the questions from the previous survey instrument was adapted to focus on the area of employee resistance. The brief, 2-page survey was administered in February, 2009. Initially, though the survey instrument was based on a validated, existing survey, we also conducted a pretest to ensure confidence in the abbreviated question set and in our unique design choices. In the end, we were able to use the respondents' data to perform a quantitative comparison on the dependent variable, which was how frequently they reported employee resistance.

We selected a manageable number of DOD employees, about 300 individuals, to invite to the survey web site. We electronically mailed an introductory letter with the link to "a brief change management survey." The sample size was limited to the first 100 individuals who responded to the voluntary online survey, due to constrained time and resources. The population of interest was the subset of DOD civilian and military employees involved in ERP implementation programs in the last 24 months, and any civilian and military employees who were affected by the changes. Thus, the population was very large. The sample consisted mainly of financial management, logistics, program management, contracting, and human resources professionals.

Therefore, two data samples made it clear and simple to measure the independent variable, which was DOD or non-DoD affiliation. We used computer software to perform a chi square test on the proportions of affirmative and negative responses to the dependent variable, which was the participant's opinion of whether employee resistance was present. The chi square test with the survey data was a good

match, because it allowed for testing *quantitatively* the significance behind the proportions of a response that interested us in two groups of *qualitative* data.

SURVEY INSTRUMENT

The survey instrument we designed and used for the study consisted of an opening paragraph in a bland-colored text box, a couple of helpful definitions for the minimal amount of technical terminology we had to use, followed by nine questions on two pages. The question types were a combination of multiple choice, multi-part guess, and short response. Most of the questions were multi-part guess questions. The key question asked participants to select a strong yes/no, a weak yes/no, or not sure response to employee resistance in their organization. Their responses to the key question provided metrics for quantitative analysis. Any questions requesting demographic information were on a separate page.

Advantages:

One advantage to the survey design was the high response rate, which increased noticeably with the implementation of an online survey as compared to the archaic method of having participants return the survey as an email attachment. We collected a complete sample of size n=100 within two days. A second advantage was the use of yes or no questions, because dichotomous data simplifies the conditions on the analyst for using a chi square test for goodness-of-fit. As an aside, the length of the survey received no comments, positive or negative.

Disadvantages:

The main disadvantage to the survey design was that, because of the yes or no questions, the survey instrument did not collect the right data for a correlation analysis. A descriptive analysis of completed ERP programs to describe the correlation between change management cost, training staff size, use of a dedicated web site, and number of employees would be a suggested area for further research. A limitation was that it took a significant time investment to contact potential survey participants on the Communities of Practice. There was a trade-space between collecting identifying information and the ability to assume the responses were honest and unbiased. Non-attribution and an informal feel were considered important to the survey design; that became a huge limiter when we could not identify specific programs.

EXAMPLE QUESTION AND RESPONSES

What obstacles or challenges has your organization faced in the last 24 months? (Choose one response per row.)	Definitely Yes	Yes	Not Sure	No	Definitely Not
Communication breakdown.	21.8% (19)	**35.6% (31)**	13.8% (12)	26.4% (23)	2.3% (2)
Costs exceeding budget.	6.9% (6)	21.8% (19)	24.1% (21)	**44.8% (39)**	2.3% (2)
Employee resistance.	14.9% (13)	23.0% (20)	25.3% (22)	**34.5% (30)**	2.3% (2)
Lack of participation in training.	6.9% (6)	25.3% (22)	26.4% (23)	**40.2% (35)**	1.1% (1)
Insufficient time devoted to training.	14.9% (13)	**41.4% (36)**	16.1% (14)	26.4% (23)	1.1% (1)
Software/hardware malfunctions.	14.9% (13)	29.9% (26)	20.7% (18)	**33.3% (29)**	1.1% (1)
Higher-than-expected staff turnover.	14.9% (13)	23.0% (20)	20.7% (18)	**37.9% (33)**	3.4% (3)
Infeasible schedule.	6.9% (6)	20.7% (18)	27.6% (24)	**43.7% (38)**	1.1% (1)
Training ineffective or of poor quality.	11.5% (10)	23.0% (20)	27.6% (24)	**36.8% (32)**	1.1% (1)

Figure 1. Key question and frequency of responses from DoD participants.

Figure 1 is an example of what we call a "multi-part guess" question. The values shown were the actual response frequencies, which were invisible to the participants who visited the survey web site. Since the previous study allowed responses of "not sure," we allowed the same response, for consistency. The data did not show a significant difference in employee resistance at the 95% confidence level, between the non-Government results and the responses shown above.

Table 1

Results of Chi Square Test – Employee Resistance

	Observed	Expected	Residual
Negative Responses	14	10.40	3.60
Positive Responses	26	29.60	-3.60
Total Responses (n)	40		
χ^2	1.684		

df	1
Probability Not Sig.	0.194

Note: Records were excluded if unsure or if responses to all 9 categories were negative.

RECOMMENDATIONS TO COST ANALYSTS

The data contradicted the research hypothesis. Quantitative analysis alone cannot determine why there may be less employee resistance than expected, although background research points out the strength of DOD when it comes to leadership skills. We recommend that cost analysts perform further data-gathering and analysis, especially once (if ever) jobs in DOD have been reduced due to ERP implementation. Until additional research further illuminates the results, we recommend that DOD component cost analysts use Industry standards, if available, in their change management estimates. There was no evidence that the cost should be more for DOD than for any business in a one-for-one comparison.

REFERENCES

Aladwani, A. M. (2001). Change management strategies for successful ERP implementation [Electronic version]. *Business Process Management Journal,* 266 – 275.

Benedict, A. (2007). *Change management survey report*. Alexandria, VA: Society for Human Resource Management.

Carr, C. (2008). How new systems implementations will affect financial management. *Armed Forces Comptroller, 53,* 8 – 11.

Defense Travel Management Office. (2006). *Change management plan* (Version 1.0) [Brochure].

Dunn, G. (2006, October 27). *Air Force logistics transformation: eLog21*. [Presentation].

Enterprise applications cost and satisfaction study: Oracle applications and SAP. (2003, January). Sterling, VA: Current Analysis, Inc.

Facts and figures. (n.d.). Retrieved June 6, 2008, from http://www.defenselink.mil/dbt/facts_figures.html

Hammer, M., & Stanton, S. A. (1995). *The reengineering revolution.* New York: HarperCollins.

Hartman, P. (2007). ECSS change management. *Air Force Journal of Logistics, 31,* 24 – 27.

Hill, C. W. (2007). *Transforming the force: A comparative analysis of the DoD's ERP systems.* Master's thesis, Naval Postgraduate School, Monterey, California.

Low, B. R. (2007). *Mapping change management: A co-citation analysis.* Master's thesis, Air Force Institute of Technology, Wright-Patterson Air Force Base, Ohio.

Palmer, B. (2004). Overcoming resistance to change. *Quality Progress*, 37, Retrieved March 26, 2008, from http://vnweb.hwwilsonweb.com.ezproxy.libproxy.db.erau.edu

Society for Human Resource Management. (2007, December). Change management: The HR strategic imperative as a business partner [Electronic version]. *HRMagazine, 52,* S1 – 10.