1-2009

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Abstract:

The case takes place in the Information Technology Office (ITO) of the Colorado Department of Transportation (CDOT) from 2001 to the present. Driven by the wishes of CDOT's executive director, and in a response to aging information systems, CDOT decided to install an Enterprise Resource Planning System (ERP). The case focuses on Bill Cron, an employee in the CDOT ITO, who was very concerned about not only the need for an expensive ERP, but also about the way the project was being executed. He voiced his concerns using as many channels as he could identify, but they seemed to fall on deaf ears. The decision focus of the case concerns which of three options Bill should pursue: being quiet and falling in line as directed, continuing to voice his concerns internally (internal whistle blowing), or going public and divulging his concerns in the local press (external whistle blowing).

Keywords: enterprise-wide systems, individual behaviors, organizational behaviors, psychological theory, teaching case, interviews, secondary source, education, policies, codes of conduct

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I. INTRODUCTION

Bill Cron was at his wit's end. He looked up at the huge banner hung in the hallway, and shook his head. The banner proclaimed, "CDOT Loves Change." "If only," Bill thought to himself. Over the years, he had seen management make questionable decisions, but this current situation really took the cake. A systems analyst with nearly 30 years of experience in both the private and public sectors, he'd spent the last three years working at CDOT, the Colorado Department of Transportation, in its Information Technology Office (ITO). CDOT management, driven by the wishes of Tom Norton, CDOT's executive director, had decided that their information systems were badly out of date and beyond repair. In late 2001, CDOT brought in CIBER, an international Consulting Firm based in Colorado (http://ciber.com) which concluded that CDOT's existing systems needed to be replaced with an Enterprise Resource Planning System (ERP). Total cost: Around $50 million.

While Bill agreed there were some shortcomings with the existing systems, he was certain they could be corrected with an alternative solution with a corresponding savings of time, money, and disruption to the organization. He voiced his concerns to IT management, CDOT senior management, and to the Colorado Board of Transportation Commissioners, but they fell on deaf ears, and CDOT moved ahead with the project. Throughout the process, Bill voiced his concerns not only about the project itself, but also about the way it was being executed. Again, his concerns fell on deaf ears. One member of the CDOT Commission, sympathetic to Bill's perspective, finally took him aside and said "Look, Bill. I agree with you, but they won't listen to me either. So if they insist on driving this truck off a cliff, there's nothing we can do but get out of the way."

Still, he was really uncomfortable about the situation. He felt he was being treated as a child, not as an adult, professional person. He was told to fall in line, or there would be consequences for not being a "team player." It was really scary for him, because it was almost like brainwashing. Bill saw three options: He could be quiet and fall in line as directed, he could continue to voice his concerns as he was currently doing, or he could go public and divulge his concerns in the local press. He decided to go home and talk things over with his wife. If he was going to put his career in jeopardy, he needed her support.

II. THE COLORADO DEPARTMENT OF TRANSPORTATION—BACKGROUND

Quoting from CDOT's Web site:

> The Colorado Department of Transportation is responsible for a 9,161 mile highway system, including 3,775 bridges. Each year, this system handles over 28.6 billion vehicle miles of travel. Although the interstate system accounts for only about 10 percent (915 miles) of the total mileage on the state system, 40 percent of all travel takes place on our Interstate highways. CDOT's highway construction program attracts private contractors and the low bidder is awarded the project and in turn is responsible for construction of that project. This partnership between government (CDOT) and business works well as we improve and expand our transportation system.

> CDOT maintenance forces take care of the highway system, plowing snow and repairing pavement. Last winter, these men and women plowed 7.1 million miles of highway. They also repaired road damage and potholes, using more than 270,947 tons of asphalt and 196,646 gallons of liquid asphalt in preservation activities. But CDOT is more than roads and bridges. The Division of Aeronautics supports aviation interests statewide, including grants to help improve local airports. CDOT's Transit Unit provides assistance to numerous transit systems in the state. And the Office of Transportation Safety helps local law enforcement agencies with special funds to apprehend drunk drivers and increase use of safety belts. [CDOT 2008]

CDOT's budget for the fiscal year 2007 was approximately $1.5 billion. Of this amount, about 34.5 percent was provided by the U.S. federal government, 27.7 percent came from the Highway Users Trust Fund (HUTF), 30.3 percent was allocated by the State of Colorado Legislature, and 7.5 percent came from miscellaneous sources [CDOT 2007; 2008]. Its 3,300 employees are managed by an executive director who reports to an 11-member transportation commission. The executive director and the transportation commissioners are appointed by the governor and confirmed by the Colorado State Senate. See Figure 1 for a complete organizational chart.
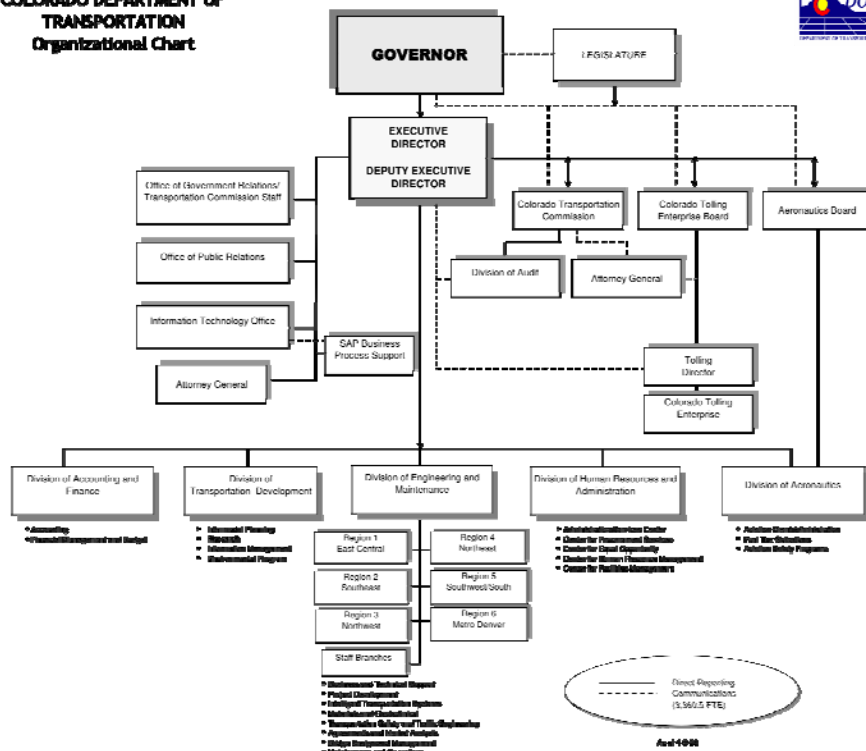
Figure 1. CDOT Organizational Chart as of April 9, 2008

III. ANTECEDENTS OF THE ERP PROJECT

Like many governmental agencies, CDOT had employed computer information systems to assist with record-keeping and supplying management information on its diverse operations for well over 20 years. And, like many governmental agencies of CDOT's size and scope, the information systems had been designed and installed over the years using several different hardware and software approaches. As a result, CDOT's management, and particularly Tom Norton, was frustrated when there were inconsistencies in the information provided by the various departmental systems. Tom Norton, an engineer by training, was not known for his patience.

In 2001, CIBER consultants were called in by Norton to develop an "Information Technology Strategic Plan for CDOT." Don Kirkpatrick was CDOT's CIO at the time and had only minimal contact with the outside consultants. Don reported to Peggy Catlin, the deputy director of CDOT who, in turn, reported to Tom Norton.

CIBER's report, delivered on December 27, 2001, called for a number of changes in the way CDOT managed its IT function. The recommendation with the potentially highest impact, however, was that CDOT replace its set of aging legacy systems with a commercial off the shelf (COTS) ERP system. This was the recommendation that resonated with Tom and Peggy. They were convinced that installing an ERP system would result in a clean sweep of CDOT's information systems and provide a common operating platform to carry CDOT into the future with a flexible, consistent, and reliable information systems architecture.

There was just one hitch, however. Some of the IT professionals, Don Kirkpatrick and Bill Cron among them, realized that it was important to reengineer CDOT's business processes so that the functional requirements of a candidate ERP package could be properly evaluated, and so that any latent inefficiencies would be eliminated prior to its installation. Since ample evidence was provided that a reengineering effort should come first [see, e.g. Hammer 1990], and since ERP projects had a mixed reputation [New York Times 1998] at best, CDOT management agreed to undertake a Business Process Reengineering (BPR) project as a first step.

IV. SELECTION OF ERP SOFTWARE AND SYSTEMS INTEGRATOR

Near the end of 2003, CDOT management believed that the BPR project was far enough along that a request for proposal (RFP) could be created to obtain bids for ERP software. A detailed RFP was published and four bids were received. One bidder, Siemens, was disqualified and PeopleSoft withdrew after they were purchased by Oracle. A selection committee of about a dozen CDOT employees went through a rigorous selection process. The two

remaining vendors, Oracle and SAP, were carefully scored on predetermined selection criteria such as price, corporate fit, and ability to meet CDOT's functional requirements. SAP was selected.

By this time, Don Kirkpatrick reported to the director of human resources whereas previously he reported to first, Tom Norton, and then to Peggy Catlin. Oddly enough, Don Kirkpatrick was not on the project's executive team, although as CIO it would have been normal that he be a member. Clearly, the internal IT organization was being pushed aside, perhaps because some members had not been overly supportive of the ERP decision in the first place.

Next, realizing that they would need some outside assistance from a consulting firm experienced in installing SAP, CDOT prepared another RFP. CIBER, Deloitte, and Rapidyne (Fujitsu) responded, and Deloitte was selected after a similarly rigorous review.

V. THE SAP INSTALLATION PROJECT BEGINS

The project kicked off in the summer of 2004. There was a mass meeting held at a local hotel. One department member recalls being told that if you saw or heard somebody who questioned why or how CDOT was installing SAP, you were to pressure that person to not question the project. They were just to have faith that it would work.

A steering committee was formed to run the project, led by Doug Lang, the new CIO. Doug was hired to replace Don Kirkpatrick, who retired. According to Bill Cron and other CDOT insiders, Doug Lang was an interesting choice for CIO, since he had no significant large systems background, and no college degree. Implementing an ERP requires an understanding of large-scale information systems and UNIX operating systems, neither of which Doug had gained by working on PCs with Microsoft software.

The steering committee consisted of four full-time dedicated procurement representatives, who served along with a number of other nondedicated members. The 60 nondedicated core members represented all major functions within CDOT: engineering, asset management, real estate, FICO, grants, budget, DDT planners, and billing. There were also two representatives from the software vendor, SAP, and anywhere from 10 to 40 representatives from Deloitte, the implementation consulting firm. There were two CDOT project managers, one internal and one who was hired specifically for this project on a contract basis, and there was also a Deloitte Project Manager (PM). The PMs met daily with Doug Lang, the CIO, and met weekly to update the project plan. Overall, the steering committee identified 4,400 functions (i.e., requirements) that the new system had to perform. As IT systems go, this is a rather large number of requirements.

Bill Cron was a member of the ITO and of the ERP Implementation team, but was not an early fan of the project. A tall man with nearly 30 years of IT experience, Bill was intimidating, physically and intellectually. A former seminary student, he was known as a quick judge of character with strong moral fiber. He was persistent, knowledgeable, kept current with developments in his field, and had few equals among his peers within the state's IT professional community. He wasn't a ringleader, but when he was asked, he would express his opinion. For example, Bill did not hesitate to point out at every opportunity that IT decisions were being made by CDOT managers unfamiliar with IT. In turn, these CDOT managers were being pushed by Deloitte. Internal IT experts, he felt, were being ignored. He went on to express his opinion that the cost and organizational disruption of an ERP project was unnecessary, and that the kinds of reports Tom Norton wanted could have been pulled together from a data warehouse which combined information from CDOT's stovepipe systems. Again, Bill could not get the attention of anyone in management who was in a position to address his concerns. As a matter of fact, managers were beginning to tune him out as an unnecessary distraction, even a nuisance.

VI. THE SAP INSTALLATION PROJECT CONTINUES

According to Bill:

> Deloitte took over CDOT like a swarm of locusts. They ran everything, even though they didn't seem to know the department's issues or requirements. They even managed HR issues in the department—any person who was seen as a roadblock was eliminated from the project. They configured the software, but there was little knowledge transfer. Employees were treated like puppy dogs—if you were a good puppy, you got a biscuit. But if you asked questions, you were treated poorly and labeled as a tough cookie.

Solbourne, a systems integration firm located in Boulder, Colorado, that provides enterprise services based on Oracle Fusion Middleware technology and Oracle's E-Business Suite, was hired to do the Independent Verification and Validation (IV&V) work for the project. According to Genco, a firm that specializes in IV&V assignments, IV&V's purpose is "to analyze a development contractor's processes and products to ensure adherence to contract

requirements and sound engineering practices to meet the customer's objectives, specifically to produce a product on schedule and at budget."

> Independent Verification and Validation is not merely quality assurance; IV&V performs in-depth technical analyses of the products and the processes of system development. IV&V advises the customers when signs of problems begin to emerge so that the customer can make plans to deal with the situations. More importantly, IV&V acts as an independent unit without any bias, which adds objectivity to their analyses. [Genco 2008]

Normally, Solbourne would report to the State's Office of Information Technology, an independent entity. But quality standards were breached, because Solbourne instead reported to Doug Lang, CDOT's own CIO. "This was like having a fox in the hen house," Bill commented. (Solbourne was acquired by Deloitte on July 17, 2008) [Deloitte 2008].

By December, 2004, Bill was losing patience. He was in the midst of doing data conversion activities and had a growing awareness that what was being coded and developed did not reflect the current business practices. This was especially true for the payroll and timesheet portions of the system. The more Bill brought up testing and QA issues, the more resistance he faced. He decided to make his concerns known publicly at an ERP status meeting held on December 6. He began his comments by declaring that his primary concern rested solely with the interests of the people of the State of Colorado, and that his loyalties remained foremost with his colleagues at CDOT and the ITO. Next, he presented five major concerns with the ERP conversion:

1. Defective Requirements

    Bill was concerned about the 4,400 requirements put forward by the steering committee. One source of concern was that the requirements were not based on a previously validated business process reengineering effort. Another source of concern was that Bill wrote, audited, or revised approximately 1,000 of the requirements, over half of which he found to be invalid. Many of the business requirements were merely copied from other documents, for example, from previous projects undertaken in California and North Carolina. Yet, there was no proof that those processes reflected CDOT's business practices.

2. Defective Business Process Reengineering

    At some point, the BPR effort was left in the dust, was truncated, and was largely ignored after the ERP project got underway. A BPR effort for an organization of CDOT's size could take at least two or more years. It should not be done in conjunction with a software acquisition. More so, to be effective, a BPR effort needed to be completed **before** an ERP was implemented.

3. Current Software not Upgraded

    Many of CDOT's current applications ran on Sybase software. However, once the decision was made to implement the ERP, production support for Sybase was stopped, putting CDOT several versions behind in Sybase and applications software.

4. Maturity of the ITO

    Bill was also concerned about the lack of experience with projects of this magnitude in the ITO. There were no uniform policies in place concerning testing or quality assurance. There was no consistent functional design methodology and no consistent system design standards. There were no consistent system documentation standards, no data dictionaries, detailing data relationships, or business rules for data fields in various tables where data is stored. This would be especially critical when it would come to data conversions to a new system. There was no consistent source management tool, from which program source code could be checked in and out, and made secure, which would assure that the actual code and functions could be readily modified. Finally, there was a lack of documentation for extremely critical systems that needed to be mapped out. In short, Bill felt that the fundamental "blocking and tackling" of doing IT had been neglected by the steering committee, and that they had largely gotten by with the "seat of their pants," especially in the applications area.

5. Mixed Results of New Technology Initiatives in Colorado and Resulting Bad Publicity

Bill was familiar with the literature that concluded that IT projects of this magnitude often fail. For example, the Gartner Group estimates that more than 72 percent of large IT projects fail within the reasonable confines of fulfilled operational expectations and budgetary constraints. Beyond this, there was a history of failed system initiatives in the state of Colorado (see Figure 2). Missing from Figure 2 is the Colorado Benefits Management system (CBMS), which converted in September 2004 and as of early 2009 is still not meeting the performance standards set for it (McCubbrey and Fukami 2005; Fukami and McCubbrey 2006). These failures have not gone unnoticed by the press, and bad publicity, as well as at least one lawsuit (regarding the CBMS fiasco), has occurred as a result. Governing Magazine gave Colorado a "C+" in their annual Management Report Card, and a "C" for Information Management [Governing 2008].

Problem Systems

Department of Transportation: Sixty percent of DOT staff said they want their year-old, $38 million computer system fixed or scrapped.

Vocational Rehabilitation: Colorado halted development of this $4.5 million computer system from HCL last year and has not decided whether to repair or drop it.

Vehicle Registration: Colorado pulled the plug on the $10 million CSTARS system for vehicle registration last year. The Department of Revenue is revamping what it wants the computer system to do.

Unemployment Insurance: Colorado lost $27 million on this system, which former Gov. Bill Owens shut down because it had a 20-percent error rate. The Department of Labor is trying to simplify its workflow before trying again.

New Systems

Taxation: (State CIO Michael) Locatis gives the Owens administration an A+ on its last-minute contract to buy an off-the-shelf tax system to replace a jury-rigged mess with parts that date to the 1960s. Fast Enterprises of Greenwood Village has installed its program in numerous other jurisdictions, and will adjust it to fit Colorado's tax laws. The $56 million project is the first installation to be supervised by Locatis' team and "the one we're most proud of."

Women, Infants and Children Program: New software is being created for this nutrition program for Colorado, Utah and Wyoming jointly. The federal government is funding the $11 million project.

Telephones: New $13 million contract will consolidate 20 phone systems near the Capitol into one by 2010. So far, two offices are switching.

Source: "State Data Systems Get Some Glue," by Ann Imse, *Rocky Mountain News*, May 21, 2008.

Figure 2. Key Colorado State Computer Projects

Based on these concerns, Bill concluded his remarks by suggesting that the ERP implementation be put on hold until these issues could be resolved. Bill used the analogy of building a house to illustrate his point. You could have a bunch of pre-cut lumber, nails, pipes, and fittings dropped on your property, and you are told to build the house. The problem is that you do not have the blueprints, or worse, the wrong blueprints, so you do not have the ability to know what pieces to fit and how to construct the house. In Bill's opinion, this is what CDOT was trying to do with its ERP implementation.

At this point, Bill's role in the project was to oversee around 40 or so legacy systems until the November, 2006 cutover. He was solely responsible to assure the systems still ran the business. In April, 2006, Bill was removed from the implementation team. He was simply raising too many questions.

VII. THE PROJECT APPROACHES LAUNCH DATE

Despite Bill's protestations, CDOT continued to stay the course with its ERP implementation efforts. The PMs continued to meet regularly to update the project plan. Solbourne, the IV&V firm, regularly reviewed the project's status, and issued yellow and red alerts where action needed to be taken. The team dealt with the issues as they were identified.

ERP software typically consists of several modules reflecting different functional applications of the organization, and this was the case at CDOT. The PMs decided to launch the HR module first, on April 1, 2006, excluding payroll. The launch went well. The remaining modules, including payroll, were scheduled to launch on November 1, 2006.

In addition to the normal software testing, user acceptance tests were conducted prior to November 1. Training sessions were also conducted for field personnel who would be responsible for entering data into the new system. For example, one highway road crewmember reported receiving four hours of training in the new system. The old system was manual, paper-based, and took this crewmember 10 minutes per day to record his entries, with codes that he had easily memorized. The new system, however, required much more. He would need to enter data on eight different screens to reflect the activities performed, supplies and equipment used, and time spent by individual employees. All of these entries required a specific code in order for the ERP system to accept them. The four hours of training, led by a supervisor who had received one day of training, was conducted without screen shots, which would normally be used to help field personnel understand the new system.

In addition, it was disclosed that there would not be extensive testing of the new system. Thorough testing is essential to determine if a new system will function correctly. Bill became very concerned that CDOT was in for a massive failure. Furthermore, there was no recovery plan in case of catastrophic failure. In switching over to the ERP, CDOT was walking the tightrope without a net.

As before, Bill continued to speak out. As the November 1, 2006, date for the system to "go live" approached, he urged the project managers to spend more time on testing and on training line employees in how to use the new system. His main motivation was a concern that employees and taxpayers would be put in grave danger by the ERP implementation. The employees who were the hardest working and the most vulnerable, the plow drivers and maintenance folks, would be hurt the most by a direct impact on their pay, if the system did not correctly process timesheets. Consequently, public safety would also be negatively impacted. The processes to procure the proper equipment and materials for road clearing and plowing could not be ordered in a timely fashion putting both employees and the taxpaying public at risk. Unlike the private sector, citizens cannot choose whether to buy CDOT's products and services. Bill felt a particular moral responsibility to ensure the employees and the public were not put at risk, because CDOT is a public sector organization.

By this time, no one wanted to hear what Bill had to say. "Be a team player," he was told over and over again. Still, he did not want to see the "truck go off the cliff." Isn't that what a "team player" would do — speak out about his concerns, to try and prevent his department from making a critical, and expensive, mistake? Public funds were not being used wisely. He went through all of his available internal channels, including his direct supervisor, but was being tuned out. Bill felt certain that, if he could be heard, he had at least a fighting chance to save CDOT both money and time. He wondered if there was anyone he could talk to that would listen to him, if there was anything else he could do to get management's attention. He knew he was right! Bill pulled his car out of the CDOT parking lot and started to make the drive home. He hoped talking with his wife would help him sort out his options.

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EDITOR'S NOTE: The following reference list contains the address of World Wide Web pages. Readers, who have the ability to access the Web directly from their computer or are reading the paper on the Web, can gain direct access to these references. Readers are warned, however, that
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