Why are Department of Transportation (DOT) ERP Implementations So Complex?

A Meta Whitepaper

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Background

There are a lot of government entities in our country. The US Census Bureau reported that in 2012 there were 12,880 Independent school districts, 38,910 general purpose local governments and a whopping 51, 146 special purpose governments. But only 50 states with the District of Columbia being a unique entity. US affiliated entities such as the Commonwealth of Puerto Rico also have similar departments. But states are complex organizations. Even the smallest states operate dozens of different types of "businesses". From law enforcement to social services to parks and regulatory functions, all states have a level of complexity not usually found in other types of government entities.

Clearly one of the most complex state agencies are Departments of Transportation (DOT). It can be said that they are also not just in one but multiple businesses. State DOT's address everything from highway construction and safety to public transportation to aviation and dam safety. Even with a robust ERP financial application, multiple specialized systems and business requirements need to be accommodated. This may best be done by integrating an existing system. Or a State may decide to change business processes and incorporate existing functionality into the statewide ERP system.

The rest of this document discusses options for state DOT's meeting their complex processing requirements and the challenges they face.

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All In, Independent or Partially In

Throughout my 40+ year career working for or with government organizations, I have seen multiple "deployment" options to meet the complex processing requirements for DOT's. First it is important to note that all DOT's will require multiple purpose-built software applications. For example, many state DOT's use pavement management or project management software from specialized vendors. Our purpose here is to examine how Enterprise Resource Management (ERP) applications meet the financial recording, billing, reporting and other functions for a DOT. This includes some elements of Human Capital Management (HCM) applications for purposes such as labor costing. ERP is an all-encompassing acronym and denotes the financial, human resource, budgeting, and planning applications.

I would classify DOT ERP deployment options using three models, All in, Partially in or Independent. All are viable depending on any state's unique requirements. Each has advantages and disadvantages.

- **All In** – In this model, the DOT uses the functions in the states ERP/HCM application for many purposes such as establishing projects and contracts and recording and classifying project transactions at the lowest level. These transactions are recorded, split according to funding source such as FHWA/State share/Other and flow throw the contract, billing, accounts receivable, accounts payable, labor costing, FHWA billing, recording, and reporting processes. In some cases, they may also use other ERP modules such as work orders, project planning and grant management. Many states such as New York, Connecticut, Minnesota, and Wisconsin use this model.
- **Independent** – In this model, the DOT manages their own ERP application and interfaces with the states core financial system. In some cases, the DOT uses a homegrown or legacy system. Although most are moving to implement Commercial Off the Shelf (COTS) applications. Some states like Texas and Rhode Island use the same vendors applications but run it separately from the statewide instance. Others like Wyoming use a COTS application but from a separate vendor than the Statewide application.
- **Partially In** – The third option varies widely in its use but has one thing in common. The DOT uses the statewide ERP system for some functions but mostly interfaces transactions from their own applications. For example, they use the state's General Ledger, Procurement and Accounts Payable applications. But the core project/transaction/billing functions are done in the DOT specific system.

Elements of Complexity

The premise of this paper is that state DOT's have unique and complex requirements that must be addressed. This is true if the system is independent or included as part of the statewide ERP. Each present their own challenges.

Process complexity – Meeting the needs of the department, state, federal and other stakeholders is a complex and highly integrated process. A typical process involves thousands of transactions with multiple data elements and multiple ERP and other applications. A typical business process includes:

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Applications	Purpose
Accounts Payable/Procurement/ Time and Labor/Payroll	All interfacing systems must contain all required data elements. This forms the basis for recording, classifying, billing, and reporting on project and non-project activity. Applications listed at left are core sources of these transactions
Budget Control and Contracts	Budget control must be maintained at the project, FHWA – Federal agreements and departmental/state levels. This is a complex process and can be done simultaneously at multiple levels.
Project Costing	Project Costing is the core repository of all transaction information related to DOT activity. It will receive transaction information from ERP and other sources.
Fund Allocation and Distribution	DOTs must allocate and distribute project cost transactions among multiple funding sources. For example, a single project can be funded by FHWA, State and other sources such as a local contribution. This process can be manual, partially manual, or automated based on funding patterns established in contract agreements.
Contract and Billing	Projects have multiple cost accumulation and billing "rules" required by funding agencies such as FHWA, FTA, FRA and FAA or the state. They include allowable costs, billing rules and indirect cost allocations.
Accounts Receivable	Once billed, project costs must be monitored and collected. This process controls billed vs collected and recognized as well as cash forecasting.
General Ledger	All states maintain a central ledger for control, classification, and reporting purposes. All DOT transactions, normally at a summary level must be posted to the State GL
Data Warehouse	Many DOT's feed transaction information to a data warehouse for analysis and reporting purposes.
Statewide System	DOTs are required to interface with multiple state systems beyond the GL.
Related DOT and State Systems	The ERP/HCM applications are not the only ones used by the DOT. For example, maintenance management and work order information must be captured so project cost information can be accurately applied. This also includes tracking of assets purchased with federal dollars.

Data Complexity – The state, DOT, FHWA and others demand specific data elements for control, funding, and reimbursement. FHWA in their FMIS application requires many specific elements. They include not only project and funding information but also other elements like geospatial information.

Upfront design attention must be paid to standardizing as much as possible while recognizing what is truly unique to a specific function. DOT and other agencies still need to perform agency specific functions within

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a common ERP system. One example is the chart of accounts and reporting. While some elements need to be common Statewide, others need to be unique to allow DOT and other agencies to accommodate unique data gathering, reporting and transaction needs. For example, Connecticut built a new page specific for unique DOT data elements used for tracking and reporting.

Great value can derive from a system that includes analytical capabilities as part of the initial implementation. For example, project dashboards that allow managers to track projects and react accordingly can greatly enhance the value of the new system. A data warehouse that combines multiple elements from different systems has proven to provide tremendous value.

> *"Changes or additions to functionality and processes must consider all departments, not just the DOT. Consensus must be reached with the system administrators and other affected departments before changes can be made."*
>
> -   SCOTT THORNTON, Wisconsin State DOT Controller

Organizational Complexity – States are complex entities and DOTs are one of the more complex agencies in state government. For DOTs with independent applications, organizational complexity can be reduced. But a truly integrated DOT/State ERP system poses organizational challenges.

One of the major areas involves change management and culture. On a conference call with state DOT PeopleSoft users, a caller asked what one customer's biggest frustration was. They said it was a culture change due to a truly integrated system. They could no longer make configuration changes in a vacuum but had to collaborate with a wider audience. That audience includes not only internal DOT staff but the rest of the stake holders using the ERP application.

Control can also be a difficult issue. Scott Thornton, Controller of the Wisconsin DOT noted this concern. Changes or additions to functionality and processes must consider all departments, not just the DOT. Consensus must be reached with the system administrators and other affected departments before changes can be made.

Another major area is ensuring conformance with Statewide needs while meeting the unique requirements for DOT. While modern ERP/HCM applications accommodate this, it must be intelligently structured at the beginning of the project, not later after design decisions have been made.

ERP Trends for Statewide systems?

Many states have or are in the process of migrating to a new Cloud based ERP/HCM. Recent states to make this move (or are in process) are North Carolina, Idaho, Missouri, Massachusetts, Rhode Island, Connecticut and more. Others like New York State who decided to stay on the current ERP system (PeopleSoft) have expanded the scope of coverage to include NY DOT and almost all other executive branch agencies.

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Implementing a new statewide ERP application is an excellent time to examine processes and scope. Many states already have included DOT into the project scope, and I expect more will do so as they plan new projects.

Some Guidance

Each DOT and state have unique challenges; degree of central authority, baggage from legacy systems and other technical and cultural issues that will impact how a modern ERP system is implemented.

There are several suggestions you should consider as you make your decisions:

- Modern systems are highly configurable. Dozens of DOT's successfully utilize the state ERP application for all of the key functions. Using the state ERP provides a host of benefits and lower cost of ownership. Integrations don't have to be developed and maintained. Central reporting and analysis are easier for both DOT and state staff. Some states like New York and Connecticut use a statewide support staff to service all agencies using the ERP application. This centralizes expertise in a core and very experienced team who can streamline adoption and change management. This also means that the team must remain versed in how each agency including DOT utilize the software, and how updates will affect the current business process, procedures and ultimately reporting. Software subscription/maintenance costs are also lower since DOT is not separate.
- Some states will find it more practical to stay on their own instance. This is especially true if the state is not undertaking a major ERP implementation project. Some legacy systems such as PeopleSoft have evolved of 30+ years to be highly functional. They also incorporate Cloud like

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features such as rapid quarterly updates. For those DOTs who chose to stay on the legacy system, they can still upgrade and improve processing. Especially if they take advantage of features they may not have used before. Either way it should be a business decision.

- Consider the value of a data warehouse. Today's applications for data warehousing and analytics help to easily combine data from multiple sources. They also provide tools to visualize and analyze data for end users and managers.
- Select consultants or system integration firms with DOT experience. As described in this document, DOT's are special and complex. You will save a lot of time, and perhaps money, in the long run.

I hope this document helps with the complex decisions public sector managers must deal with. If you have any questions, please contact me – Robert Sabo – robert.sabo@metaformers.com

About the Author

Bob Sabo has over 40 years of experience working for government and private sector companies providing technology services to the public sector. He is a member of the Executive team at Meta.

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