

**Performance Audit 18-02:
Software Purchases**

September 2018

City Auditor

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OFFICE OF INTERNAL AUDIT

Stan Sewell, City Auditor

September 26, 2018

To: Mayor Andy Berke
City Council Members

Subject: Software Purchases, Audit 18-02

Dear Mayor Berke and City Council Members:

The attached report contains the results of our audit of software purchases. Our audit found that City planning regarding software purchases needs improvement. In order to address the noted areas for improvement, we recommended actions to revise the City's procurement manual to ensure comprehensive planning takes place prior to purchase and there is assignment of accountability on implementation.

We thank the management and staff of the Information Technology, Public Works, Fleet, Youth and Family Development and Chattanooga Police departments, as well as the City Court Clerk for their cooperation and assistance during this audit.

Sincerely,

Stan Sewell, CPA, CGFM, CFE
City Auditor

Attachment

cc: Audit Committee Members
Stacy Richardson, Chief of Staff
Maura Sullivan, Chief Operating Officer
Daisy Madison, Chief Financial Officer
Brent Messer, Chief Information Officer
Bonnie Woodward, Purchasing Director
Jim Arnette, Tennessee Local Government Audit

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AUDIT PURPOSE

This audit was conducted in accordance with the Office of Internal Audit's 2018 Audit Agenda. The objective of this audit was to determine if:

- The procurement process is sufficient to ensure the City purchases software that can, and will, be utilized to the City's benefit.

BACKGROUND

Information technology (IT) project management is the process of planning, organizing and delineating the City's specific IT goals and implementing defined solutions to them. Projects are chosen using goals and priorities of City management. The Department of Information Technology (DIT) works with all City departments and agencies to provide IT project management and other essential functions including: strategic software solutions, business analysis and planning, security, and support.

While DIT is primarily responsible for developing the technical framework for the City's IT projects (including software acquisition, implementation, and maintenance), the departments maintain responsibility for the facility modifications, changes to business processes, and operational personnel needed to achieve project goals. Therefore, it is important for both DIT and its partner departments to have sufficient funding and resources to complete projects on time and within budget. This requires significant advanced planning and budgeting by both DIT and departmental leadership.

The Project Management Office (PMO) is a subset of DIT. The PMO manages the City's IT project portfolio, provides general project management for the IT department, and technology-related business analysis for the departments. The PMO consists of five (5) employees who help the departments analyzing business needs and selecting suitable software. Being a relatively new organization (3 years), the PMO is continuing to refine and improve its operating procedures.

Purchases of IT software and equipment begin with the submission of a requisition in the purchasing system. Requisitions with commodity codes for computer-related purchases are forwarded to DIT for review and approval. Software purchases greater than \$25,000 must also be approved by the City Council. Approved software purchases are subsequently submitted for bid or Request for Proposal (RFP).

Financial Information

Identified Software Purchases Fiscal 2012-Fiscal 2017

Fiscal 2012	\$779,962
Fiscal 2013	1,708,211
Fiscal 2014	2,657,655
Fiscal 2015	2,508,518
Fiscal 2016	1,485,293
Fiscal 2017	4,106,668
Total	\$13,246,307

Source: Oracle Financial System

FINDINGS AND RECOMMENDATIONS

Project planning is insufficient

DIT does not have written P&P for project approval and completion.

IT Project Management policies and procedures do not effectively address requirements for obtaining software purchase authorizations and installing new software. Current PMO procedures generally follow the guidance of the Project Management Institute, but are not formalized.

Items to be considered for project approval/project charter include the following:

- Project scope and objectives are clearly stated;
- Project roles are clearly defined for all areas involved;
- Plan feasibility;
- Sufficient allocation of budget resources to complete project work; Five (5) year total cost of ownership – who will pay?
- Adoption of a standardized project plan with goals, milestones, and objectives clearly stated;
- Description of the results expected from the project;
- Operational requirements, *i.e.*, personnel capable of serving as a subject matter expert.
- Estimated length of the project and availability of sufficient resources for the duration of project;
- Identification of existing software that can be used for the same purpose; Positive return on investment;
- Sufficient iterations of planning in creating the project plan; and

- Oversight by the Project Review person/group over the approval process.

There is no overarching managing person/group that ensures all portions of a project are completed timely.

No individual or group has responsibility for ensuring DIT and the departments have the capacity, funding and available personnel to complete IT projects. Problems arise, for example, if software is purchased too early in the lifecycle of the project, as software may become outdated (or no longer meet functional requirements) by the time it is placed in use. Centralized IT governance and management accountability are fundamentally important to ensure the efficient use of PMO resources, and to avoid higher costs, duplication of efforts, and potential errors.

The “Gasboy” project (software cost \$278,874) is a good illustration of the need for centralized oversight. In that case, the software purchase was approved in 2015 and acquired in 2016. However, because facility construction and other required modifications were not completed on schedule, the software could only be used at one of three planned locations.

When a project is undertaken, adequate funding, facilities, and personnel should be available for all plan segments to be completed within the project timeframe.

Sufficient planning is needed prior to a project being undertaken.

A well-developed project plan should anticipate all foreseeable constraints imposed on the project. Project managers should develop an initial plan that focuses on one or two major constraints, then refine the plan iteratively as other potential barriers and constraints are identified. In other words, the final values of the planning variables are less important than understanding the relationships among the variables that develop during the project planning phase.¹

DIT should be involved at the earliest stages of a project, especially those requiring the acquisition of new software. However, DIT is frequently not consulted on proposed projects until the planning process is well underway. DIT indicated they have quarterly meetings with department personnel, but often departmental leaders don’t attend the meetings. As a result, DIT may have only a limited understanding of the specific departmental business needs and expectations.

¹ 2003 IBM White Paper “Project Planning Best Practices”

Ideally, when a project proposal is submitted to the PMO, additional information should be provided by the department listing all known contingencies and recommended solutions to potential issues.

We sampled eight projects with software costs greater than \$25,000 during our review. All projects in our sample, with one exception, had planning deficiencies at some level.

The Electronic Content Management (ECM) project (estimated non-salary costs \$1,100,000) is a good illustration of the need for collaborative planning and due diligence. The ECM was designed to convert paper files to electronic records. However, the project failed after encountering several problems that likely could have been avoided with proper planning, including: stakeholders were not invested in the project; the program was not open sourced (source code available to change) as projected; consultant billing rates were higher than expected; and DIT staff were not trained by the consultants for ongoing adjustments to the equipment/software.

Lack of subject matter expertise is another problem frequently faced by IT project managers. DIT indicated they do not have the staffing to provide expertise on all software used throughout the City. However, DIT should be familiar with the project (learn from the vendor) and be able to provide on-going support with available in-house resources or with the help of the vendor.

A detailed Project Charter needs to be implemented

In conjunction with the Mayor's office, a committee, including a member of DIT management, has created a pilot project charter, project plan, and project completion forms. The project charter specifies the objectives, contact, timeline, budget and risks for DIT. However, responsibilities and risks for the departments (budget, modification of facilities, changes to business processes, etc.) are not adequately addressed. Consequently, the project charter lacks a significant portion of defined accountabilities.

A standard project charter should be required for all software projects, with objectives and deliverables for all parties clearly identified. Responsibilities and timelines should be specified for all aspects of a project, delineating accountability for timely completion of project milestones for both DIT and partnering departments, with documented approval by all parties to signify agreement.

Projects are delayed due to lack of budget to complete them.

The lack of proper budget planning for a project can result in costly delays, sometimes causing equipment and software to be out-of-date when implemented. The examples below highlight the importance of budget planning:

Brazos (E-citation) (non-salary costs \$666,581)

This project mechanized traffic tickets and directly linked them to the court system. The e-citation machines purchased in September 2014 contained out-of-date software when procured and had to be upgraded to more current standards prior to use. The hand-held machines weren't used for two years due to lack of budget to complete the project. Disabled and obsolete machines were replaced with up-to-date machines with greater capabilities, but at a significant cost to the City.

Gasboy (Fleet fuel management) (non-salary cost \$278,874)

This project was intended to track fuel usage by employee/vehicle and show the amount of remaining fuel in the storage tanks. The software was purchased in December 2015 by the Fleet Division. The Fleet and Purchasing Divisions purchased this software by increasing a maintenance contract, bypassing standard purchasing procedures. The project required modification of facilities that were unbudgeted, and remain uncompleted. As a result, the software is only operational in one of three locations.

RecTrac (Recreation Center software) (non-salary costs \$238,741)

The City purchased Rectrac for \$109,814 in FY2013. Five years after procurement, the system remains non-operational in nine of seventeen recreation centers. The online scheduling functionality is not used at any facility. Many recreation centers do not have the necessary facilities or personnel to operate RecTrac (front desks, staffed front desks). The purpose of the project was to track users and demographics at recreation centers, process payments and provide citizens online ability to view and register for available classes and activities at YFD centers. Since initial procurement, another \$128,927 has been expended for webhosting and annual maintenance for the underutilized software.

DIT has begun working, in conjunction with the Capital Planning group, to develop a governance program to prioritize projects and ensure funding is available.

Projects fail after initial implementation due to lack of budget to sustain maintenance, upgrades and support.

Our review identified key opportunities for improvement in sustainability planning. We determined that some software failed to deliver optimal value due to lack of budget for ongoing maintenance and support. Funding must be available to provide ongoing support and maintenance if software is to have lasting value.

Lack of sustainability is often the root cause of failed IT projects. Significant resources can be wasted on IT initiatives that fail to deliver optimal value simply because no resource team is in place to ensure the success of the project after implementation, *e.g.*, maintenance, support, upgrades, etc.

An example of poor sustainability planning is the ECM project cited above. Per the PMO “The imaging proof of concept was great and it was deployed, but when it was finished, no one was there to maintain it, improve it and continue to roll it out”.

Communication for software projects needs improvement.

DIT approves all purchases of computer-related items, including software. Communication between DIT, PMO and departments is not always sufficient to produce a favorable result.

We found instances in our sample where the CIO approved large software purchases without the knowledge or input from the PMO and other DIT management until they were assigned to implement them. The PMO was not involved in researching, planning and input normally performed prior to software purchases. Examples are Gasboy, RTA upgrade (Fleet software) and E-citation.

Recommendation 1:

We recommend the Project Management Office develop and implement written procedures (and the project charter be modified) for projects in excess of \$25,000 to address the following items:

- DIT personnel be involved in software purchases from the beginning of the planning process;
- Policies be enacted that gives the PMO authority to determine a current software in house be used if it can perform the needed tasks.
- Project Charter clearly defines responsibilities of DIT and stakeholder departments and are assigned to specific individual positions, and agreement documented by signature, prior to the software purchase; Project planning be strengthened and steps

included in the project charter to indicate required planning steps have been completed;

- Project Charter shows sufficient budget availability to implement the project;
- Project Charter shows the estimated costs of sustainability for five years and the planned funding;
- Project Charter indicates physical changes are completed by stakeholder departments prior to the software purchase being completed;
- Project Charter indicates personnel changes are completed, or a plan created to accomplish them, prior to the software purchase being completed;
- Business process changes are designed and ready to be put in place when the project concludes;
- Significant due diligence steps be created to perform prior to contracting with consulting firms;
- A process be put in place to prevent DIT management approval of software purchases without PMO input and knowledge.

***Auditee Response:** We concur with the audit finding and recommendation.*

Recommendation 2:

We recommend the written procedures and mandatory project charter for projects in excess of \$25,000 be included in the next revision of the City's *Purchasing Manual*.

***Auditee Response:** We concur with the audit finding and recommendation.*

***Purchasing Response:** Reference will be made to the requirement (if applicable to the Purchase) for an Information Technology Project document, in the Specification supplementation section of the Manual. The transaction will be reviewed by Purchasing for the presence of the document.*

Recommendation 3:

We recommend DIT develop a dashboard showing open projects, budget status and timeline in relation to goals set at the beginning of the project.

***Auditee Response:** We concur with the audit finding and recommendation.*

Proposed software purchases should be compared to similar software in-use prior to purchase.

IT investments should be coordinated across the City to avoid software duplication. Using several software titles that perform similar functions in different departments is expensive, increasing costs of maintenance and upgrades. It also increases the complexity for the Help Desk to support them. For example, the City currently has several applications that perform asset management functions; Oracle, Cityworks, Landsweeper and WASP.

DIT has established the FY2019 budget for an inventory program to track owned software as well as its maintenance. There is currently no software inventory documenting the purpose/use of software. The PMO is in the process of developing a descriptive listing of software owned by the City.

Prior to purchasing software, the City should perform an analysis to determine if existing software can perform the necessary task or can be modified to do so. DIT personnel should discuss with departmental management existing products that could be used or modified to accommodate a specific business need.

The City should consider drafting vendor contracts to allow for scalability to expand functionality. DIT is currently working with the Purchasing Department to develop expandable blanket software contracts to include the ability to purchase additional modules and support. Our review found that most vendors are anxious to provide more functionality to their software.

Recommendation 4:

We recommend development of a software inventory and analysis to determine if currently-owned software is capable of performing the task prior to purchasing new software. Vendors of similar software should be consulted to determine if their software can perform the task with minor modifications. DIT personnel should examine the feasibility of using currently-owned software when it will perform the needed task.

Auditee Response: *We concur with the audit finding and recommendation.*

APPENDIX A: SCOPE, METHODOLOGY AND STANDARDS

Based on the work performed during the preliminary survey and the assessment of risk, the audit covers software purchases from July 1, 2013 to June 30, 2017. When appropriate, the scope was expanded to meet the audit objectives. Source documentation was obtained from DIT, stakeholder departments and City financial records. Original records, as well as copies, were used as evidence and verified through physical examination. Information was also obtained through interviews with DIT and stakeholder personnel.

To develop our recommendations, we reviewed industry best practice documents and conducted interviews with Department of Information Technology personnel, as well as with stakeholder personnel. We also inspected financial documents in the City's financial system and reviewed DIT documentation.

A sample of eight software projects were chosen judgmentally for sampling as a basis for findings of this audit.

To achieve the audit's objectives, reliance was placed on computer-processed data contained in the City financial system. The reliability of the data contained in this system has previously been deemed to be reliable.

We conducted this performance audit from April 2018 to August 24, 2018 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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