FOLLOW-UP REPORT

Technology Services

Citywide Information Technology Purchases Follow-Up

DECEMBER 2024

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DENVER AUDITOR

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City and County of Denver

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AUDITOR'S LETTER

December 5, 2024

In keeping with generally accepted government auditing standards and Auditor's Office policy, as authorized by city ordinance, we have a responsibility to monitor and follow up on audit recommendations to ensure city agencies address audit findings through appropriate corrective action and to aid us in planning future audits.

In May 2023, we audited Citywide Information Technology Purchases and found risks involving employees' use of purchase cards and expense reimbursements for unauthorized technology purchases. Technology Services agreed to implement all six recommendations.

We recently followed up and found the Technology Services agency fully implemented two recommendations, partially implemented three, and did not implement one recommendation.

Although the Technology Services agency has made some progress, it did not fully address all the risks associated with our original findings. Specifically, the agency did not enhance data entry workflows to increase the efficiency of technology purchases monitoring paid with a purchase card or expense reimbursement. We also found Technology Services and Controller's Office policies and procedures for technology purchases have conflicting guidance on how to buy technology. Lastly, Technology Services did develop training and a plan to educate city employees about approved methods to purchase technology, but requirements are not formally documented in a policy. Technology Services provided training and will monitor purchases but will not place any measures in place to prevent purchases other than policy directives. Consequently, we may revisit these risk areas in future audits to ensure the city takes appropriate corrective action.

We appreciate the leaders and team members at Technology Services who shared their time and knowledge with us throughout the audit and the follow-up process. Please contact me at 720-913-5000 with any questions.

Denver Auditor's Office

Timothy M. O'Brien, CPA
Auditor

ORIGINAL REPORT HIGHLIGHTS

Citywide Information Technology Purchases

Original Report Issued:
MAY 2023

Follow-up Report Issued:
DECEMBER 2024

Objective

To assess how well the city's Technology Services agency enforces Executive Order No. 18 by administering, implementing, and communicating requirements to city leaders and employees — particularly those who buy technology services and equipment on behalf of the city.

Background

Technology Services was established by Executive Order No. 18. The agency is responsible for reviewing and approving all technology purchases to ensure the continued operations and security of the city.

City agencies bypassed necessary approval for information technology purchases when they used purchase cards and expense reimbursements

Agencies did not follow the requirements in Executive Order No. 18. Specifically:

- Technology Services' policies and procedures for hardware and software did not address technology purchases or any exceptions for making a technology purchase.
- The city's system of record did not prevent city employees from buying technology with a purchase card.

Technology Services did not develop sufficient citywide guidance for technology purchases

Technology Services did not document and communicate requirements to city agencies related to technology purchases. Specifically, it did not:

- Define what constitutes a technology purchase.
- Define what Technology Services considers "on the network."
- Develop standard steps for approving technology purchases.

Additionally, Technology Services and the Department of General Services did not discuss and document the information that needs to be communicated to city agencies as it relates to technology purchases.

WHY THIS MATTERS

City agencies that bypass Technology Services' approval when purchasing technology are violating Executive Order No. 18. This noncompliance not only puts the security of the city's data at risk, but it also wastes taxpayer dollars through missed opportunities for bulk discounts.

2	3	1
FULLY IMPLEMENTED	PARTIALLY IMPLEMENTED	NOT IMPLEMENTED

Dec. 19, 2024

Action Since Audit Report

Citywide Information Technology Purchases

6 recommendations proposed in May 2023

The Technology Services agency fully implemented two recommendations made in the original audit report. Technology Services partially implemented three others but did not implement one recommendation.

FULLY IMPLEMENTED 2	PARTIALLY IMPLEMENTED 3	NOT IMPLEMENTED 1

REMAINING RISKS

The recommendations Technology Services did not fully implement present several lingering risks. Among them:

- Technology Services and the Controller's Office did not change workflows to improve data quality, which would allow for efficient technology purchase monitoring when a purchase card or expense reimbursement is used. Instead, Technology Services is using data directly from the purchasing card provider for its technology purchases monitoring processes. By not improving workflows, Technology Services risks poor internal data quality, which may limit its ability to identify employees who use purchase cards to buy unauthorized technology.
- Technology Services did not update its policies and procedures to define "technology purchase" and "on the network." Without a clear definition of a "technology purchase," employees may unwittingly violate Technology Services' requirements. In addition, lack of a clear definition of "on the network" may result in an independent agency incorrectly concluding technology purchasing requirements do not apply to it.
- Technology Services did not address technology purchase expense reimbursements. Without updated and defined policies and procedures, employees may use expense reimbursements incorrectly, which could result in technology purchases that conflict with Executive Order No. 18 guidance.
- The Controller's Office purchase card guidelines allows technology purchases, which conflicts with Executive Order No. 18 and Technology Services policies on approved methods of buying technology. Due to the conflict between internal policies and Executive Order No. 18, an employee could purchase technology and violate Executive Order No. 18 guidance.
- Although Technology Services did develop and provide training to educate city employees about approved methods to purchase technology, it has not documented the training requirement in policy or established a method to monitor the training completion rate and content understanding. Without an educated workforce, employees could purchase technology using a purchasing card, which is not allowed under Executive Order No. 18.

FINDING 1 | City agencies bypass necessary approval for information technology purchases when they use purchase cards and expense reimbursements

RECOMMENDATION	IMPLEMENTATION STATUS
1.1 Determine when purchase cards can be used	FULLY IMPLEMENTED
1.2 Develop workflows for technology purchases	PARTIALLY IMPLEMENTED

Recommendation 1.1

DETERMINE WHEN PURCHASE CARDS CAN BE USED – The city's Technology Services agency should revise policy and procedure to reflect when a purchase card can be used to make technology purchases.

FULLY IMPLEMENTED

Agency's original target date for completion: Dec. 31, 2023

SUMMARY OF AGENCY ACTION

Technology Services updated its policies and procedures to reinforce the rule that employees cannot use purchase cards to buy technology. We verified this by comparing its updated 2023 and 2024 policies with the 2022 policies we reviewed during the original audit. Technology Services changed the policies statements below:

- In November 2023, Technology Services changed the "Hardware Asset Management Policy" to include:
  - City employees cannot purchase technology outside the approved procurement processes and using purchase cards is specifically banned for buying hardware.
  - Technology Services should be able to provide support for purchased hardware. If Technology Services cannot support the hardware, then it will offer alternative hardware options to the requesting agency before purchase approval.
  - City employees who seek new and existing hardware contracts and maintenance agreements must work with Technology Services to complete a vendor risk assessment before purchase.
- In February 2024, Technology Services changed the "Software Asset Management Policy" to include:

- Roles and responsibilities for the Technology Architecture Review Board for reviewing technology purchases.
- The Technology Architecture Review Board must consider the potential software and hardware solutions security risks to gain an understanding of the data stored, as well as business capabilities.
- Technology Services delegated responsibility for preventing technology purchases using a purchase card to General Services.
- Technology Services prohibits software installation until it is approved and licensed.

In January 2024, Technology Services worked with the city's Workday Learning team to communicate the policy changes to employees. City employees were required to review and acknowledge the "Hardware Asset Management Policy" in the Workday application.

Based on our review, we found 74.93% of employees acknowledged the policy, 12,499 out of 16,680 employees. Technology Services has not sent this same process of acknowledgment for the "Software Asset Management Policy." However, in March 2024, Technology Services used the Denver Employee Bulletin to communicate to employees that they are not allowed to use a purchase card for technology purchases.

Based on the policies changes and communication of the changes, we consider this recommendation fully implemented.

Recommendation 1.2

DEVELOP WORKFLOWS FOR TECHNOLOGY PURCHASES – The city's Technology Services agency should work with the Controller's Office to determine requirements for monitoring and ensuring preapproval of technology purchases. Options include:

- Developing a catalog of preapproved technology purchase types in ServiceNow that connects with Workday's workflows.
- Standardizing memo line entries with codes to better flag technology purchases or create flags based on keywords in Workday.
- Adding spending categories that trigger Technology Services reviews of purchase card reconciliations and expense reimbursement requests in Workday.
- Creating a required checkbox for purchase card reconciliations or employee reimbursement requests that requires city employees to attest that no technology was purchased.

PARTIALLY IMPLEMENTED

Agency's original target date for completion: Dec. 31, 2023

SUMMARY OF AGENCY ACTION

Technology Services' leaders discussed monitoring and preapproval requirements with the Controller's Office, but the agencies determined there was no feasible solution to proactively prevent unapproved technology purchases for purchase cards and expense reimbursements.

For example, when the Controller's Office and General Services implemented checkboxes, like the one we recommended, users may decide to click the checkbox without following instructions to finish the reconciliation, which is not effective. In addition, flagging using checkboxes in Workday does not prevent an employee from using either a purchase card or the expense reimbursement process because it is after the expense occurred.

Technology Services and the Controller's Office can block transactions using merchant category codes, but the agencies demonstrated there would be a significant number of manual exceptions to process to not disrupt services.

Citi Bank defines merchant category codes as "to identify the type of business in which a merchant is engaged. Payment brands use merchant category codes (MCCs) to classify merchants and businesses by the type of goods or services provided. Payment brands, issuers and acquirers can use MCCs to categorize, track and restrict transactions."

While Technology Services did not develop an automated workflow to prevent technology purchases using a purchase card or expense reimbursement, it is being notified by the Controller's Office of technology purchases that use certain accounting codes. While this information does not prevent the purchase of technology, it may allow Technology Services to potentially identify the employee who violated the policy. However, this communication is informal and not documented in a policy or procedure to help ensure the process is performed consistently.

In addition to being notified, Technology Services changed the workflow in Workday for technology purchases that do not use a purchase card or expense reimbursement. The new workflow now requires its chief data officer to approve the purchase after a vendor risk assessment has been successfully completed. This ensures new software or hardware vendors have gone through a vendor risk assessment and Technology Services is able to support the purchase.

As a result, we consider this recommendation partially implemented. Without improved workflows to detect unauthorized purchases or the use of merchant category code restrictions, employees may purchase technology which is not allowed under Executive Order No. 18.

FINDING 2 | Technology Services lacks detailed citywide guidance for technology purchases

RECOMMENDATION		IMPLEMENTATION STATUS
2.1	Clarify policies and procedures for technology purchases	PARTIALLY IMPLEMENTED
2.2	Update documentation for technology purchases	PARTIALLY IMPLEMENTED
2.3	Update guidance for when purchase cards can be used for technology purchases	NOT IMPLEMENTED
2.4	Develop and conduct training on technology purchases	FULLY IMPLEMENTED

Recommendation 2.1

CLARIFY POLICIES AND PROCEDURES FOR TECHNOLOGY PURCHASES – Once workflows are determined, as outlined in Recommendation 1.2, the city's Technology Services agency should:

- Refine its relevant policies and procedures.
- Develop supplemental procedures to address city employees' roles and responsibilities for technology purchases — both for agencies on the network and Technology Services personnel.
- Finalize and approve these policies and procedures.

PARTIALLY IMPLEMENTED

Agency's original target date for completion: Dec. 31, 2023

SUMMARY OF AGENCY ACTION

Our follow-up found Technology Services did not document existing workflows or the roles and responsibilities for managing the workflows as outlined in Recommendation 1.2.

Instead, Technology Services created an interactive technology purchase card dashboard to identify potential policy violations. The dashboard visualizes technology purchases made with purchase cards with data taken directly from the purchase card provider. The asset management team uses the dashboard to keep Technology Service's leaders informed about purchase card technology purchases. In addition, the dashboard can be used to identify employees who may require training and coaching on technology purchase requirements.

However, Technology Services did not document the processes, roles, and responsibilities for managing the dashboard. While the dashboard does not replace a preventive control, like merchant category code restrictions, it can detect when employees use purchase cards to buy technology, and educate those employees identified on the appropriate policy.

The dashboard is managed and updated by one employee in the asset management team. This is intended to ensure the dashboard is updated the same way each time. But while having one employee manage the dashboard decreases the risk of inconsistent performance, there is a risk that when the staff member leaves city employment, that knowledge could be lost.

Additionally, this recommendation addressed the need to educate all purchase card users on new processes. However, because Technology Services chose a different way to mitigate the risk of poor data quality, not all items required in the recommendation were required to be implemented by Technology Services.

Even though Technology Services has not identified any additional Workday workflows, the agency has been integrated into the workflow through specific spending categories flagged by the city, and by city staff who identify technology purchases through their approval reviews. When Controller's Office staff review Workday purchases, they flag technology purchases when possible and include Technology Services staff in the workflow to see whether a vendor risk assessment has been performed for the purchase.

While Technology Services has made progress with updating policies and procedures, it has not documented the dashboard processes it uses to identify employees using a purchase card to purchase technology. Therefore, because the risk has been only partially reduced, we consider this recommendation partially implemented.

Recommendation 2.2

UPDATE DOCUMENTATION FOR TECHNOLOGY PURCHASES – The city's Technology Services agency should change its policies and procedures to define "technology purchases" and "on the network" to ensure compliance with Executive Order No. 18. This change should include guidance on when purchase cards and expense reimbursements can to be used for technology purchases and it should better define what technology purchases require preapproval from Technology Services.

PARTIALLY IMPLEMENTED

Agency's original target date for completion: Dec. 31, 2023

SUMMARY OF AGENCY ACTION

We found Technology Services' updated policies and procedures do not specifically define “technology purchases” or “on the network.” Executive Order No. 18 says Technology Services has authority over technology that operates “on the network.” Some agencies do not believe they operate on the city’s network, which impacts how Technology Services manages technology citywide. Defining these terms provides Technology Services with clear responsibility for its role in securing and maintaining the city’s technology operations.

Technology Services officials did update their policies and procedures to include guidance that restricts city agencies from buying technology with a purchase card, but the policies and procedures do not include any specific guidance on expense reimbursements. The policy simply says that technology purchases much be preapproved.

In the policy update, Technology Services takes responsibility for reviewing requests made by city personnel for new hardware and software, through the city’s technology in-take process. City employees must make all requests for software and hardware using the city’s internal ticketing software, SupportNow.

Technology Services also takes responsibility for communicating its policies and requirements through a training and communications plan. The communications plan aims to educate through awareness and by targeting specific employees for each training.

While Technology Services did take meaningful steps to update its policies and to create mechanisms to communicate those policies to the target audience to reduce the risk of an employee purchasing unapproved technology, it did not address all risks our recommendation sought mitigate. As a result, we consider this recommendation partially implemented.

Recommendation 2.3

UPDATE GUIDANCE FOR WHEN PURCHASE CARDS CAN BE USED FOR TECHNOLOGY PURCHASES – Following Recommendation 1.1, the city’s Technology Services agency should work with the Controller’s Office to update credit card usage policies and procedures to reflect when purchase cards can be used for technology purchases.

NOT IMPLEMENTED

Agency’s original target date for completion: Dec. 31, 2023

SUMMARY OF AGENCY ACTION

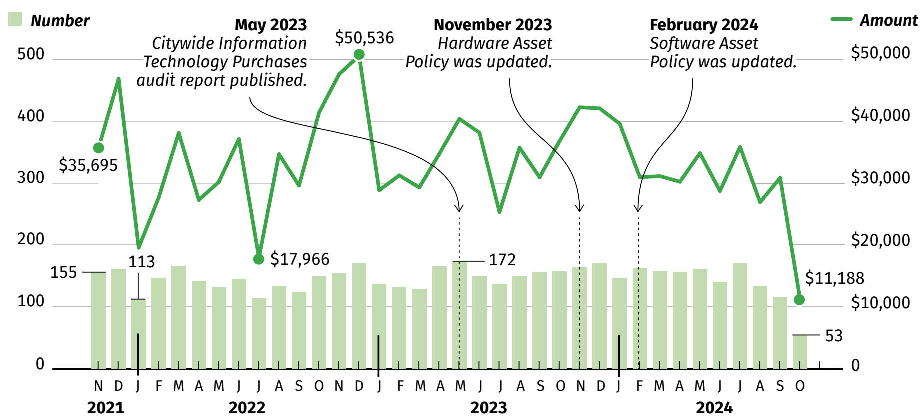
Technology Services worked with the Controller’s Office to update the “Purchasing Card Guidelines,” but the Controller’s Office chose not to update its guidelines.

Executive Order No. 18 and Technology Services policies do not allow using purchase cards to buy technology, but the "Purchase Card Guidelines" allow a purchase card to be used to purchase technology with Technology Services' approval. Because both agencies report to the mayor, Executive Order No. 18 applies to both agencies. Therefore, the Controller's Office's "Purchase Card Guidelines" should align with Executive Order No. 18.

Because "technology purchases" has not been defined in the policy, and the various guidance does not agree, an employee could be unclear as to the allowability of technology purchases using either the purchase card or expense reimbursement processes.

As shown in Figure 1, we analyzed purchase card and expense reimbursement purchasing transaction data from May 2021 through October 2024 with critical actions dates to determine whether Technology Services' actions reduced spending with purchase cards. Our trend analysis shows the actions did decrease the dollar amount of noncompliant technology purchases. But the dollar amount now spent matches the dollar amount spent in 2021.

FIGURE 1. **Technology purchases in possible violation of Executive Order No. 18, by month**



Source: *Created by Auditor's Office staff.*

Based on the conflicting language across city executive orders, policies, and guidelines, and the Controller's Office refusal to update its guidelines or enforce Executive Order No. 18 using merchant category codes, we consider this recommendation not implemented.

Recommendation 2.4

DEVELOP AND CONDUCT TRAINING ON TECHNOLOGY PURCHASES – Once recommended process, policy, and procedural changes have been implemented as described in recommendations 1.2 and 2.2, the city's Technology Services agency should work with the Department of General Services to develop a required training and periodic refresher, specifically for those personnel responsible for technology purchases citywide. This should include:

- Definitions for technology categories, how to purchase technology on purchase cards, and what receipts are required for out-of-pocket reimbursements.

Once training has been developed, Technology Services should develop a communications plan to disseminate Executive Order No. 18 and Technology Services' policies and procedures for technology purchases annually to applicable staff who make citywide technology purchases. This training should also discuss security, data protection and privacy, and financial resources risks when agencies bypass Technology Services' preapproval of technology.

FULLY IMPLEMENTED

Agency's original target date for completion: Dec. 31, 2023

SUMMARY OF AGENCY ACTION

Technology Services developed a training video that describes city employees' responsibilities for purchasing technology. The training explains why purchase cards should not be used to make technology purchases and explains the security risks. It also says city agencies must get preapproval from Technology Services before moving forward with a technology purchase, which may include both hardware and software. In addition, city staff also cannot purchase software without Technology Services conducting a vendor risk assessment to ensure the software is safe to use.

The second part of the recommendation called for Technology Services to create a plan for communicating the training and to educate employees on technology purchase requirements. Technology Services created the communications plan and had a timeline for communications to occur. The communications plan details include:

- Methods to communicate the training video.
- Purchase card requirements.
- Target audience for each communication and training.
- Creating a webpage to educate employees about technology purchase requirements.

In addition, Technology Services did communicate the ban on using purchase cards via the Denver Employee Bulletin to help ensure all city employees received the information.

Finally, while we applaud Technology Services for delivering training to the purchase card employee group and communicating the purchase card prohibition to all city employees, Technology Services cannot know whether employees viewed the video or test them to verify they understood the information because the training is not required or tracked to completion. However, this potential issue was not identified in our original recommendation. We encourage Technology Services to require the training and create a process to ensure the training was viewed and understood by purchase card users.

Therefore, because Technology Services created the training video, developed a communications plan, and made the training video available to employees, we consider this recommendation fully implemented.

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