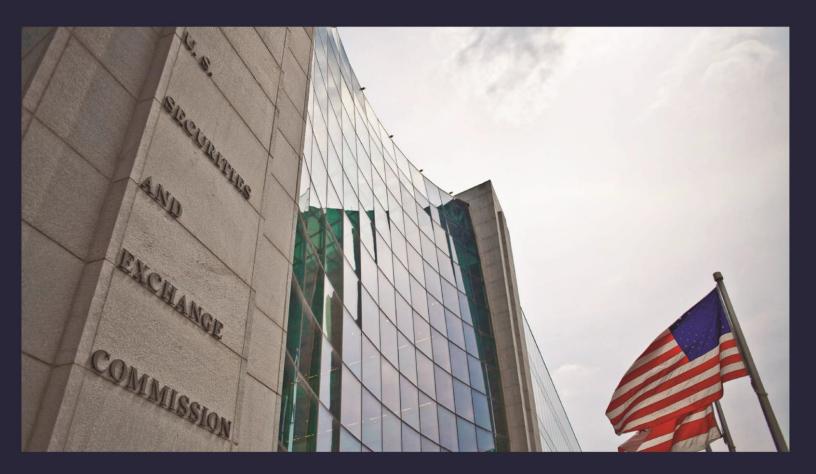U.S. Securities and Exchange Commission

Office of Inspector General

Office of Audits

Although Highly Valued by End Users, DERA Could Improve Its Analytics Support by Formally Measuring Impact, Where Possible

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

M E M O R A N D U M

April 29, 2019

TO: S.P. Kothari, Director and Chief Economist, Division of Economic and Risk Analysis

FROM: Carl W. Hoecker, Inspector General

SUBJECT: *Although Highly Valued by End Users, DERA Could Improve Its Analytics Support by Formally Measuring Impact, Where Possible*, Report No. 553

Attached is the Office of Inspector General (OIG) final report detailing the results of our evaluation of the Division of Economic and Risk Analysis' (DERA) data analytics initiatives. The report contains three recommendations that should help improve DERA's ability to assess its organizational performance, increase awareness of its analytics capabilities (including through outreach efforts), and fully integrate analytics into the work of the U.S. Securities and Exchange Commission in accordance with the agency's strategic goals and objectives.

On April 16, 2019, we provided management with a draft of our report for review and comment. In its April 25, 2019 response, management concurred with our recommendations. We have included management's response as Appendix II in the final report.

Within the next 45 days, please provide the OIG with a written corrective action plan that addresses the recommendations. The corrective action plan should include information such as the responsible official/point of contact, timeframe for completing required actions, and milestones identifying how DERA will address the recommendations.

We appreciate the courtesies and cooperation extended to us during the evaluation. If you have questions, please contact me or Rebecca L. Sharek, Deputy Inspector General for Audits, Evaluations, and Special Projects.

Attachment

cc: Jay Clayton, Chairman
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Sean Memon, Deputy Chief of Staff, Office of Chairman Clayton
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Executive Summary

Although Highly Valued by End Users, DERA Could Improve Its Analytics Support by Formally Measuring Impact, Where Possible
Report No. 553
April 29, 2019

Why We Did This Evaluation

The U.S. Securities and Exchange Commission (SEC or agency) increasingly relies on data and analytics to guide its strategic and operational activities and to make more informed, effective decisions. Based on fiscal year (FY) 2017 budget information, the SEC spends about $120 million annually on data management and about $20 million annually on analytics. Furthermore, the SEC's Strategic Plan for FY 2018 through FY 2022 and FY 2020 Annual Performance Plan emphasize the agency's goal of enhancing and expanding its use of analytics.

The SEC's Division of Economic and Risk Analysis (DERA) assists the agency in executing its mission by integrating sophisticated, data-driven analytics and economic analysis into the work of the SEC. Analytics provided by DERA's Office of Risk Assessment (ORA) and Office of Research and Data Services (ORDS) support exam planning and other agency oversight programs related to issuers, broker-dealers, investment advisers, exchanges, and other trading platforms.

We initiated this evaluation to assess DERA's controls over integration of data analytics into the core mission of the SEC.

What We Recommended

To improve its ability to assess its organizational performance, increase awareness of its analytics capabilities, and fully integrate analytics into the work of the SEC in accordance with the agency's strategic goals and objectives, we recommend that DERA (1) work with end users of its analytics projects to develop metrics, where possible, for formally measuring analytics support impact; (2) modify existing internal tracking processes to include, where possible, analytics impact measurement; and (3) incorporate the results of analytics impact measurements in the Division's outreach efforts. Management concurred with the recommendations, which will be closed upon completion and verification of corrective action.

What We Found

We determined that, although end users highly valued DERA's analytics support and believed such analytics were indispensable for risk scoping, investor protection, detecting illegal conduct, allocating resources more efficiently, and helping the SEC achieve its mission, ORA and ORDS management generally did not formally measure the quantitative or qualitative impact of either office's analytics support. Management noted that it tracked end user requests for analytics support, considered repeat customers as evidence analytics are valued, and identified potential metrics for measuring impact (such as efficiency gains and end user satisfaction); however, management had not formalized such metrics.

DERA management and end users of DERA's analytics acknowledged that it might be difficult to devise meaningful impact measurement metrics for some analytics projects. For example, even though ORA analytics identified outliers that led to at least one Division of Enforcement investigation, not all analytics produce such directly measurable outcomes. Management was also apprehensive about burdening end users with requests for feedback regarding analytics' impact. However, by not measuring, where possible, the impact of ORA's and ORDS' analytics support, DERA risks limiting its ability to assess its organizational performance, increase awareness of its analytics capabilities (including through outreach efforts), and fully integrate analytics into the work of the SEC in accordance with the agency's strategic goals and objectives.

In addition, we reviewed available usage data for two analytics tools that incorporated ORA analytics and found that end users used and valued both tools. Although DERA did not regularly review the usage data for one tool and usage data for the other tool was incomplete, we determined that DERA's review of such data would not significantly help the Division meet agency goals and objectives.

We also assessed DERA's interactions with the SEC's other divisions and offices, including its coordination and outreach efforts, and determined that staff in other divisions and offices generally viewed interactions with DERA favorably; duplicative analytics work across the SEC was not apparent; and DERA proactively engaged in outreach. However, a majority of respondents to a question in a survey we administered (22 of 37, or almost 60 percent) expressed an interest in further DERA outreach. Respondents believed that promoting the nature and benefits (that is, impact) of DERA analytics and systems could be useful to the SEC's other divisions and offices.

Finally, we identified one other matter of interest related to data management. Although we did not assess the SEC's data management practices and are not making any recommendations regarding data management at this time, we noted that data management is the foundation of analytics. Therefore, it is important to verify completion of the SEC's plans to improve in this area. We will continue to monitor the agency's plans and progress related to data management.

For additional information, contact the Office of Inspector General at (202) 551-6061 or http://www.sec.gov/oig.

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ABBREVIATIONS

BD VADR	Broker Dealer Viewable Analytics Dashboard for Registrants
CF	Division of Corporation Finance
CIRA	Corporate Issuer Risk Assessment
DERA or Division	Division of Economic and Risk Analysis
Enforcement	Division of Enforcement
FY	fiscal year
GAO	U.S. Government Accountability Office
IM	Division of Investment Management
OCIE	Office of Compliance Inspections and Examinations
OCR	Office of Credit Ratings
OIG	Office of Inspector General
ORA	Office of Risk Assessment
ORDS	Office of Research and Data Services
SEC or agency	U.S. Securities and Exchange Commission
TM	Division of Trading and Markets

Background and Objectives

Background

The U.S. Securities and Exchange Commission (SEC or agency) increasingly relies on data and analytics to guide its strategic and operational activities and to make more informed and effective decisions. According to an internal assessment based on fiscal year (FY) 2017 budget information, the SEC spends about $120 million annually on data management and about $20 million annually on analytics. In addition, the SEC's Strategic Plan for FY 2018 through FY 2022 and the SEC's FY 2020 Annual Performance Plan emphasize the agency's goal of continuing to enhance its analytical capabilities (Strategic Goal 3).[1] One initiative to reach that goal notes the agency's commitment to expand the use of analytics to help set regulatory priorities and focus staff resources, including developing a data management program that treats data as an SEC-wide resource, thereby enabling rigorous analysis at reduced cost (Strategic Initiative 3.2). Another initiative emphasizes enhancing analytics of market and industry data to prevent, detect, and prosecute improper behavior (Strategic Initiative 3.3).[2]

According to the National Institute of Standards and Technology, "analytics" refers to the discovery of meaningful patterns in data, and is one of the steps in the data life cycle—that is, the set of processes in an application that transforms raw data into actionable knowledge.[3] Put more simply, "[t]he analytics process is the synthesis of knowledge from information."[4]

"Data management" refers to capabilities that provide necessary support functions, such as operations management, workflow integration, security, governance, and support for processing models. Data management consists of technologies and processes that deliver accurate and reliable data to support a range of functions (including strategic decisions and day-to-day operations) and promotes integrity, completeness, and accuracy throughout the data life cycle, including acquisition, storage, maintenance, access, use, and disposal.

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[1] U.S. Securities and Exchange Commission, *Strategic Plan Fiscal Years 2018 – 2022*, October 11, 2018; U.S. Securities and Exchange Commission, *Fiscal Year 2020 Congressional Budget Justification and Annual Performance Plan; Fiscal Year 2018 Annual Performance Report*; March 18, 2019. The SEC's Strategic Goal 3 is to "Elevate the SEC's performance by enhancing our analytical capabilities and human capital development."

[2] The SEC's FY 2020 Annual Performance Plan did not establish performance goals or indicators related to Strategic Initiatives 3.2 and 3.3.

[3] National Institute of Standards and Technology Special Publication 1500-1, *NIST Big Data Interoperability Framework: Volume 1, Definitions*; September 2015.

[4] *Id*.

In September 2009, the SEC created the Division of Economic and Risk Analysis (DERA or Division)[5] to integrate financial economics and rigorous data analytics into the core mission of the SEC.[6] DERA interacts with all other SEC divisions and several offices by providing economic analyses, data, and insights from research to support the agency's policymaking, rulemaking, enforcement activities, and examinations. Among other things, DERA develops customized analytics tools and analyses to proactively detect market risks that could indicate possible violations of Federal securities laws. Moreover, the analytics provided by DERA's Office of Risk Assessment (ORA) and Office of Research and Data Services (ORDS) support exam planning and other agency oversight programs related to issuers, broker-dealers, investment advisers, exchanges, and other trading platforms.

DERA management, staff, or other SEC stakeholders initiate projects that can result in ORA and ORDS analytics support. The projects can vary significantly in duration and complexity. For example, on an ad hoc basis, DERA or other SEC staff can initiate projects informally that will require few staff hours or resources. In comparison, complex or resource-intensive projects may require more staff time and often undergo formal approval, tracking, and closeout processes.

Objectives

Our objective was to assess DERA's controls over integration of data analytics into the core mission of the SEC. We focused on ORA's use of data analytics in support of agency enforcement and risk assessment activities, as well as the data analytics support offered by ORDS. Specifically, we assessed:

- impact and usage of these analytics with respect to the Division of Enforcement (Enforcement) and the Office of Compliance Inspections and Examinations (OCIE); and

- interactions between DERA and the SEC's other divisions and offices.

To address our objective, among other things, we (1) interviewed DERA management, agency end users of DERA analytics, and management from other SEC analytics groups; (2) reviewed ORA and ORDS analytics project documentation; (3) surveyed SEC personnel who have used or have a reasonable expectation to use DERA's analytics tools or support; (4) sent a questionnaire to Enforcement and OCIE staff who requested and received DERA's analytics support; and (5) reviewed usage data for two tools that incorporate ORA analytics. Appendix I includes additional information about our objective, scope, and methodology.

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[5] In June 2013, the SEC changed the name of its Division of Risk, Strategy, and Financial Innovation to the Division of Economic and Risk Analysis to better align with the Division's core responsibilities and focus.

[6] The SEC's mission is to protect investors; maintain fair, orderly, and efficient markets; and facilitate capital formation.

Results

Finding 1. Analytics Tools We Reviewed Were Used and Valued, and DERA's Interactions with Others Were Generally Positive

Although DERA did not regularly review usage data for one tool that incorporated ORA analytics and usage data for another tool was incomplete, we reviewed available usage data and found that end users used and valued both tools. Additionally, DERA's review of such data would not significantly help the Division meet agency goals and objectives. We also determined that the SEC's other divisions and offices, including five with their own analytics staff who interacted with DERA, generally viewed such interactions favorably; duplicative analytics work across the SEC was not apparent; and DERA proactively engages in outreach. However, a majority of respondents to a question in a survey we administered (22 of 37, or almost 60 percent) expressed an interest in further DERA outreach. Respondents believed that promoting the nature and benefits (that is, impact) of DERA analytics and systems could be useful to the SEC's other divisions and offices.

DERA Did Not Regularly Review or Have Complete Usage Data, Yet Tools Were Used and Valued. We sought to assess usage data for two analytics tools that incorporate ORA analytics: (1) the Corporate Issuer Risk Assessment Tool (CIRA), and (2) the Broker Dealer Viewable Analytics Dashboard for Registrants (BD VADR). As discussed further below, we concluded that, although DERA did not regularly review usage data for CIRA and available usage data for BD VADR was incomplete, both tools were used and valued. Furthermore, DERA's review of such data would not significantly help the Division meet agency goals and objectives regarding organizational performance, awareness of DERA's capabilities, or integration of analytics into the SEC's work.

CIRA. In FY 2015, DERA started CIRA as a project for Enforcement's Fraud Group and subsequently expanded CIRA for use by Division of Corporation Finance (CF) staff. CIRA expands on an "accounting quality model" that was developed to detect anomalous patterns in financial reporting and helps identify situations or activities at corporate filers that may warrant further inquiry. Between FY 2016 and FY 2018, the SEC incurred development and maintenance costs of about $2 million for CIRA. We requested, received, and analyzed usage data for CIRA. This data included information on user groups, individual users within each group, and the number of company searches performed by each user during a 16-month period. ORA management stated that usage of CIRA during this 16-month period was consistent with expectations; however, we found that DERA did not regularly review such data. Although DERA did not regularly review usage data, we noted that Enforcement's Fraud Group was satisfied with CIRA. Further, we found that ORA has a close working relationship with the Fraud Group, seeks feedback from them on the usefulness of the tool, and would likely be aware of the Group's level of satisfaction with the tool.

BD VADR. OCIE developed BD VADR, and ORA provides analytics support for the tool. OCIE examination program staff use BD VADR to help identify certain categories of potential risks at broker-dealers. Between FY 2015 and FY 2018, the SEC incurred about $400,000 in development and maintenance costs for BD VADR. We requested, received, and analyzed usage data for BD VADR. This data included all end users and the number of logins per end user for about a 1-year period. However, we determined that this data did not capture all usage of the underlying analytics. According to OCIE management, staff can access the underlying analytics either through BD VADR—this usage is captured—or by viewing reports generated from the tool—this usage is not captured. Because available usage data did not identify actual total usage, it was of limited value. However, based on an analysis performed by OCIE, we determined that BD VADR has provided valuable input into OCIE's risk-based examination planning efforts.

Although DERA did not regularly review CIRA usage data and BD VADR usage data was incomplete, we determined that reviewing such data would not significantly improve DERA's ability to assess organizational performance, increase awareness of DERA analytics support, or fully integrate analytics into the work of the SEC. We are not making any recommendations related to usage data for these two tools at this time.

DERA's Interactions with Others Were Generally Positive. We also assessed DERA's interactions with the SEC's other divisions and offices, including its coordination and outreach efforts, and, as described below, determined that end users of DERA analytics generally viewed interactions with DERA staff favorably.

Coordination. DERA coordinates its analytics projects and initiatives with the SEC's other divisions and offices, including five other divisions and offices that have their own analytics staff (Enforcement, OCIE, the Division of Investment Management [IM], the Division of Trading and Markets [TM], and the Office of Credit Ratings [OCR]). We interviewed management from these non-DERA analytics groups and assessed questionnaire responses from SEC staff who had previously requested analytics support from DERA. Overall, we concluded that duplicative analytics work across the SEC was not apparent. As noted by a Senior Officer from a non-DERA analytics group, DERA's work complemented—not duplicated—his office's analytics work.

Outreach. DERA proactively engages in outreach. For example, the Division organizes an annual "Quant Congress" and invites staff from non-DERA analytics groups to attend and collaborate on analytics issues. Additionally, in 2016, DERA staff visited SEC regional offices to explain DERA's function and raise awareness of the services DERA can provide, such as analytics support through ORA and ORDS. DERA also conducts informal outreach, which can, according to DERA management, include ongoing conversations between ORA and ORDS staff with their counterparts in other SEC divisions and offices. However, we surveyed staff and management from Enforcement, OCIE, IM, OCR, and CF and found that respondents believed DERA could increase its outreach. Finding 2 further addresses this topic.

Finding 2. ORA and ORDS Management Generally Did Not Formally Measure the Impact of Either Office's Analytics Support
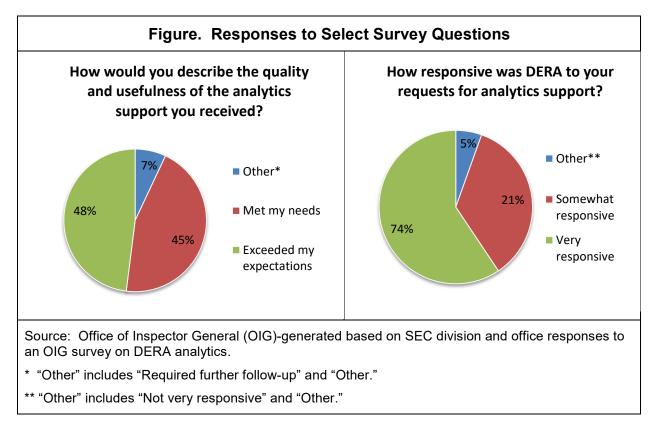
As previously stated, the SEC has established (1) a goal of enhancing its analytical capabilities, and (2) a corresponding strategic initiative to expand the use of analytics to help set regulatory priorities and focus staff resources. Such strategic goals and objectives are particularly relevant to DERA (including ORA and ORDS), given the Division's role in creating analytics that help deploy scarce resources targeting possible misconduct. Federal guidance, particularly the U.S. Government Accountability Office's (GAO's) *Standards for Internal Control in the Federal Government*, states that collecting performance measurements is important for assessing how, and to what extent, an entity is meeting its performance goals and objectives. We determined that, although end users highly valued DERA's analytics support and believed such analytics were indispensable for risk scoping, investor protection, detecting illegal conduct, allocating resources more efficiently, and helping the agency achieve its mission, ORA and ORDS management generally did not formally measure the impact of either office's analytics support. According to DERA management, measuring the impact of its analytics efforts is often difficult. In addition, management was reluctant to burden end users with requests for information that might be useful for measuring impact. However, by not formally measuring, where possible, the impact of ORA's and ORDS' analytics support, DERA risks limiting its ability to assess its organizational performance, increase awareness of its analytics capabilities (including through outreach efforts), and fully integrate analytics into the work of the SEC in accordance with the agency's strategic goals and objectives.

Analytics Support Is Highly Valued, Yet Management Generally Did Not Formally Measure Analytics' Impact. In our survey, we asked end users of DERA analytics how, if at all, DERA analytics impacted their work. Responses were overwhelmingly positive. As shown in the figure below, about 93 percent of respondents to one survey question said the quality and usefulness of DERA's analytics met or exceeded respondents' expectations.[7] About 74 percent of respondents to another survey question said DERA was very responsive to requests for analytics.[8] Finally, almost half of all survey respondents noted that DERA's analytics enhanced respondents' ability to do their job. Respondents stated that DERA's analytics were indispensable for risk

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[7] Of the 66 total respondents to the survey, 44 answered a question about the quality and usefulness of the analytics DERA provides. Forty-one of the 44 respondents (or about 93 percent) indicated that the quality and usefulness of DERA's analytics either met or exceeded respondents' expectations.

[8] Of the 66 total respondents to the survey, 43 answered a question about how responsive DERA was to respondents' requests for analytics support. Thirty-two of the 43 respondents (or about 74 percent) indicated that DERA was responsive to requests.

scoping, were invaluable to investor protection, and helped the SEC detect illegal conduct and allocate resources more efficiently.

Figure. Responses to Select Survey Questions

How would you describe the quality and usefulness of the analytics support you received?

- Other* — 7%
- Met my needs — 45%
- Exceeded my expectations — 48%

How responsive was DERA to your requests for analytics support?

- Other** — 5%
- Somewhat responsive — 21%
- Very responsive — 74%

Source: Office of Inspector General (OIG)-generated based on SEC division and office responses to an OIG survey on DERA analytics.

* "Other" includes "Required further follow-up" and "Other."

** "Other" includes "Not very responsive" and "Other."

However, ORA and ORDS management generally did not formally measure the quantitative or qualitative impact of either office's analytics support. Management noted that it tracked end user requests for analytics support and considered repeat customers as evidence that ORA and ORDS projects are valued. In addition, management had identified potential metrics for measuring impact (such as efficiency gains and end user satisfaction), but acknowledged that it had not formalized such metrics.

GAO's *Standards for Internal Control in the Federal Government* states that management should define objectives in measurable terms (either quantitatively or qualitatively) so that performance toward achieving those objectives can be assessed.[9] In addition, management should determine whether performance measures are appropriate for evaluating the entity's performance in achieving objectives.[10]

We noted that DERA's existing project management processes provide options for assessing and recording impact measurement. Specifically, DERA management, assisted by the Division's Project Management Office, prioritizes proposed analytics

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[9] U.S. Government Accountability Office, *Standards for Internal Control in the Federal Government* (GAO-14-704G), Section 6.04; September 2014.

[10] GAO-14-704G, Section 6.07; September 2014.

projects based on cost, benefits, and resource availability. On a monthly basis, management formally reviews proposed and ongoing projects. These reviews, in part, facilitate management decisions to initiate, continue, or close projects. Management also reviews ongoing projects through quarterly meetings with staff where management monitors project scope and progress. In addition, staff completes closeout reports, which document project completion and capture lessons learned, project transition plans, and disposition of project deliverables. However, to date, DERA has not used these project management processes to formally measure the impact of analytics on end users, including how analytics assist the SEC in preventing, detecting, and prosecuting improper behavior; setting regulatory priorities; focusing staff resources; or meeting other strategic goals and objectives.

Challenges Exist in Measuring the Impact of Analytics. DERA management and end users of DERA's analytics acknowledged that it might be difficult to devise meaningful impact measurement metrics for some analytics projects. For example, some DERA analytics diminished the need for certain manual calculations, but management noted it would be hard to quantify this in terms of staff hours saved. In addition, even though ORA analytics identified outliers and led to at least one Enforcement investigation, not all analytics produce such directly measurable outcomes. Moreover, although SEC staff may use DERA analytics to inform their decisions, DERA management noted that analytics are rarely the sole input. Finally, DERA management was apprehensive about burdening end users with requests for feedback regarding analytics' impact.

Lack of Impact Measurement, Where Possible, May Limit DERA's Ability To Meet Certain Agency Goals and Objectives. By not formally measuring, where possible, the impact of ORA's and ORDS' analytics support, DERA risks limiting its ability to assess its organizational performance, increase awareness of its analytics capabilities (including through outreach efforts), and fully integrate analytics into the work of the SEC in accordance with the agency's strategic goals and objectives. Responses to our survey, questionnaire, and interviews suggest that end users of DERA's analytics are able and willing to provide information so that Division management can measure the impact of their analytics and, as appropriate, the agency can prioritize its work and make decisions regarding resource allocation. For example, survey and questionnaire respondents from Enforcement noted that DERA's analytics contributed to decisions to abandon further inquiry or close investigations, which helped prioritize Enforcement's limited staff resources. Conversely, respondents also noted that DERA's analytics frequently showed indicia of wrongdoing, which may provide support for Enforcement action. Additionally, managers of non-DERA analytics groups we interviewed offered examples of how DERA support impacted their groups. Examples included DERA's efforts to build, deploy, and revise models and identify anomalies in disclosure documents that contain unstructured data. In addition, OCIE performs an annual "lookback analysis" to assess the effectiveness of BD VADR. According to the most recent analysis, BD VADR was effective in providing valuable input into OCIE's risk based examination planning efforts. At a minimum, if asked, end users could opine on whether DERA's analytics projects fulfilled their intended purpose, which may be useful

to DERA management and the Division's Project Management Office, as well as other agency managers, for decision-making, prioritization, and resource allocation purposes.

Finally, we determined that DERA proactively engaged in outreach. However, we surveyed staff and management from Enforcement, OCIE, IM, OCR, and CF and found that, when asked whether DERA's data analytics could be better integrated into the mission of the SEC, a majority of respondents to that question (22 of 37, or almost 60 percent) indicated a desire for additional outreach. For example, survey respondents noted that DERA could increase its outreach generally, either within the SEC or by becoming more involved in division- or office-specific work, such as investigations or examinations. Respondents also noted that promoting the nature and benefits (that is, impact) of DERA analytics and systems could be useful to the SEC's other divisions and offices.

Strengthened outreach efforts could develop a more informed and consistent knowledge base of the available analytics tools and processes across SEC divisions and offices. In fact, the SEC's Technology Strategic Plan lists analytics knowledge base development as a key required action for the SEC to achieve its strategic initiative of enabling advanced analytic insights. We noted that 67 percent of respondents to a question in our questionnaire (or 10 of 15) stated that they knew to submit a request to DERA for analytics support because of existing relationship(s) with DERA staff, indicating that DERA could improve its outreach efforts by integrating analytics impact measurement data into its existing outreach efforts. Additionally, DERA could use such information to inform how and to whom DERA communicates its capabilities. Communicating actual applications and outcomes of DERA's capabilities to a targeted audience could further the missions of individual divisions and offices and improve the integration of analytics into the core mission of the SEC.

To its credit, ORDS management is working to identify and document processes related to data support and data insight.[11] Management told us that, when identifying and documenting these processes, it will look for impact measurements.

Recommendations, Management's Response, and Evaluation of Management's Response

To improve its ability to assess its organizational performance, increase awareness of its analytics capabilities (including through outreach efforts), and fully integrate analytics into the work of the SEC in accordance with the agency's strategic goals and objectives, we recommend that the Division of Economic and Risk Analysis:

Recommendation 1: Work with end users of its analytics projects to develop metrics, where possible, for formally measuring analytics support impact.

> **Management's Response.** Management concurred with the recommendation. The Division of Economic and Risk Analysis will work with end users of its

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[11] Data support provides information about data, while data insight generates insight from data.

analytics projects to develop methods to formally measure the impact of analytics support, where possible. Management's complete response is reprinted in Appendix II.

OIG's Evaluation of Management's Response. Management's proposed actions are responsive; therefore, the recommendation is resolved and will be closed upon verification of the action taken.

Recommendation 2: Modify existing internal tracking processes to include, where possible, analytics impact measurement.

Management's Response. Management concurred with the recommendation. The Division of Economic and Risk Analysis will review its existing project management methodology for data analytics projects undertaken by the Office of Risk Assessment and Office of Research and Data Services to consider how to incorporate such formal measurements of data analytics support developed in response to Recommendation 1. Management's complete response is reprinted in Appendix II.

OIG's Evaluation of Management's Response. Management's proposed actions are responsive; therefore, the recommendation is resolved and will be closed upon verification of the action taken.

Recommendation 3: Incorporate the results of analytics impact measurements in the Division's outreach efforts.

Management's Response. Management concurred with this recommendation. The Division of Economic and Risk Analysis will assess how to incorporate formal measurements of data analytics support in targeting resource allocation when working with end users in other offices and divisions. Management's complete response is reprinted in Appendix II.

OIG's Evaluation of Management's Response. Management's proposed actions are responsive; therefore, the recommendation is resolved and will be closed upon verification of the action taken.

Other Matter of Interest

Although we did not assess the SEC's data management practices, we recognize that analytics and data management are directly connected. Moreover, data management is critical to the SEC's mission and the agency's November 2018 Data Management Strategy, which includes agency-wide data management initiatives for reducing costs, streamlining services, and enhancing information security. According to the SEC's Data Management Strategy, over the next 3 years, the agency will prioritize data management capabilities and establish the following three data management initiatives:

1. modernizing the SEC's existing enterprise data warehouse;

2. creating a comprehensive data catalog; and

3. defining and implementing a common enterprise framework for categorization, access, and usage of datasets based on data sensitivity.

Although the SEC's Data Management Strategy does not focus on analytics, it does acknowledge the direct connection between analytics and data management. That is, delivery of advanced analytics requires secure and efficient access to high-quality data. The document also recognizes that many of the agency's planned initiatives build both data management and analytics capabilities and will require partnerships between information technology and business units. For example, the Data Management Strategy indicates that agency Office of Information Technology staff (with contractor support) will work with business leads, including staff from DERA, Enforcement, IM, TM and OCIE, to accomplish the agency's enterprise data warehouse work. The Data Management Strategy also designates essential resources and roles for end users and other stakeholders.

The SEC's Data Management Strategy notes its timeline is ambitious and is dependent upon funding and personnel availability, as well as successful collaboration across many groups. Tentative timelines for the three initiatives listed above include "goal" or "go live" dates in 2019. However, this schedule is "highly notional." Those involved will establish and revise proposed schedules in an iterative manner beginning at the kick-off of a new initiative, and will include input from many groups, including the SEC's Data Support Group, project leads, key stakeholders, the agency's Data Management Working Group, and the Data Management Board.

Because of the increasing importance of analytics to the mission of the SEC, and because data management is the foundation of analytics, it is important to highlight and verify completion of the steps the SEC plans to take to improve in this area. Although we are not making any recommendations regarding data management at this time, we will monitor the SEC's plans and progress in this area.

Appendix I. Scope and Methodology

We conducted this evaluation from July 2018 through April 2019 in accordance with the Council of the Inspectors General on Integrity and Efficiency *Quality Standards for Inspection and Evaluation* (2012). Those standards require that we plan and perform the evaluation to obtain evidence sufficient to provide a reasonable basis for our findings and recommendations. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our evaluation objectives.

Scope and Objective. The evaluation covered analytics support provided by ORA and ORDS between July 13, 2016, and November 28, 2018.[12] The overall objective was to assess DERA's controls over integration of DERA analytics into the core mission of the SEC. Specifically, we sought to assess:

- impact and usage of these analytics with respect to Enforcement and OCIE; and

- interactions between DERA and the SEC's other divisions and offices.

We conducted fieldwork at the SEC's headquarters in Washington, DC. We also interviewed (via telephone) staff from the SEC's New York regional office.

Methodology. To gain an understanding of DERA's analytics initiatives, we reviewed:

- analytics support completed by ORA and ORDS during our scope period;

- available user lists and usage data for two analytics tools DERA helped develop; and

- a 2017 assessment of the SEC's data management capabilities.

We also interviewed DERA management, including the Assistant Directors of ORA and ORDS, as well as staff from other SEC divisions and offices[13] to determine the following:

- the nature of support DERA provides to the SEC's other divisions and offices (particularly, Enforcement and OCIE) and the impact that support has on division and office missions;

- the extent to which the SEC's other divisions and offices coordinate with each other and DERA to assess their analytics needs and the impact of tools and economic analyses;

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[12] ORA and ORDS are the offices within DERA that provide analytics support to DERA's other offices, as well as to the SEC's other divisions and offices. Therefore, we focused our review on ORA and ORDS.

[13] The other divisions and offices were Enforcement, OCIE, IM, TM, OCR, and CF.

- how usage is tracked for tools incorporating ORA analytics; and

- which staff should be included in our survey.

In November 2018, we administered a voluntary and confidential web-based survey to 95 staff members from Enforcement, OCIE, IM, OCR, and CF who were likely to request DERA's analytics support. Among other things, we used the survey results to assess: (1) staff's awareness of DERA's role in supporting the SEC's mission; (2) staff's understanding of the services DERA provides; (3) the nature, frequency, and results of interactions between DERA and the SEC's other divisions and offices; and (4) whether DERA helped address the most essential areas requiring economic and data expertise. Respondents were not required to answer every question. Sixty-six of the staff members surveyed either completed or partially completed the survey (a response rate of about 70 percent).

We also sent an optional questionnaire to 38 staff members from Enforcement and OCIE who had received analytics support from ORA or ORDS. Among other things, we used the questionnaire responses to assess: (1) whether the analytics support received fulfilled its intended purpose, (2) whether DERA personnel were helpful in explaining the functionality/usefulness of the analytics support provided, and (3) how the analytics support impacted the work of the staff who received it. Respondents were not required to respond to every question. Twenty-four of the 38 staff members responded to the questionnaire (a response rate of about 63 percent).

Finally, we reviewed the SEC's Strategic Plan for FY 2018 through FY 2022 and the SEC's FY 2020 Annual Performance Plan to understand the agency's goals, objectives, and performance measures related to analytics. As discussed in this report, we determined that it might be difficult to develop meaningful impact measurement metrics for some DERA analytics projects. Nonetheless, our recommendations, if implemented, should help the SEC meet certain agency goals and objectives, consistent with GAO's *Standards for Internal Control in the Federal Government*.

Internal Controls. We reviewed DERA's management assurance statements and risk control matrices for FYs 2016 and 2017 to determine whether DERA had identified any deficiencies or weaknesses in its controls and to identify internal controls relevant to our evaluation. We identified potentially relevant risk controls in both of the matrices, and we assessed how DERA addressed those risks. Based on our assessment, we determined that DERA took the necessary steps to mitigate the risks. Additionally, we noted that neither management assurance statement we reviewed identified control deficiencies.

We also observed a quarterly update meeting for both ORA and ORDS. At these meetings, ORA and ORDS staff brief DERA management on the status, completion percentage, and project end dates associated with ongoing projects. Finally, we reviewed DERA's Project Management Office handbook, which explains DERA's project management methodology and is intended to guide DERA project managers through the project management lifecycle in order to achieve project success. We also

interviewed staff from the Project Management Office to further understand the Division's project management controls.

Computer-processed Data. We did not rely significantly on computer-processed data to address our objectives. Therefore, we did not test system controls or the reliability of any computer-processed data.

Prior Coverage. In the past 5 years, there have been no prior SEC OIG or GAO reports regarding DERA's analytics initiatives. However, we reviewed a consultant's July 2017 internal assessment of the SEC's data management capabilities—*Strengthening SEC's Data Management Capabilities Final Compendium*.

Appendix II. Management Comments

MEMORANDUM

TO: Rebecca L. Sharek
             Deputy Inspector General for Audits, Evaluations, and Special Projects
             Office of Inspector General

FROM: S.P. Kothari
             Director and Chief Economist
             Division of Economic and Risk Analysis

RE: Division of Economics and Risk Analysis's Response to the Office of
             Inspector General's Report, *Although Highly Valued by End Users, DERA
             Could Improve Its Analytics Support by Formally Measuring Impact,
             Where Possible*

DATE: April 25, 2019

The Division of Economic and Risk Analysis ("DERA") submits this memorandum in
response to the Office of Inspector General's ("OIG") draft report titled *Although Highly
Valued by End Users, DERA Could Improve Its Analytics Support by Formally
Measuring Impact, Where Possible* ("Report").

As noted in the Report, DERA aims to develop rigorous data analytics in support of the
Commission's missions, including high-quality, data-driven analysis that is produced and
supported by DERA's Office of Risk Assessment ("ORA") and Office of Research and
Data Services ("ORDS"). These offices work closely with other offices and divisions in
support of agency enforcement and risk-based examination programs by providing
guidance on the collection and analysis of data, designing and facilitating high-quality
data analyses, and developing solutions that make market information accessible to
internal and external audiences. DERA appreciates OIG's acknowledgment that agency
end users highly value DERA's analytics support and believe such analytics are
indispensable for the agency to achieve its missions. As you also acknowledge, DERA
staff is currently engaged in outreach to other offices and divisions, and DERA
management and end-users consider that formally measuring the impact of analytics
efforts may be difficult.

DERA welcomes the OIG's recommendations to improve its formal measurement of the
impact of its analytics support, where possible. Our response to the recommendations is
below.

Recommendation 1: Work with end users of its analytics projects to develop metrics, where possible, for formally measuring analytics support impact.

DERA concurs with this recommendation. DERA will work with end users of its analytics projects to develop methods to formally measure the impact of analytics support, where possible.

Recommendation 2: Modify existing internal tracking processes to include, where possible, analytics impact measurement.

DERA concurs with this recommendation. DERA will review its existing project management methodology for data analytics projects undertaken by ORA and ORDS staff to consider how to incorporate such formal measurements of data analytics support developed in response to Recommendation 1.

Recommendation 3: Incorporate the results of analytics impact measurements in the Division's outreach efforts.

DERA concurs with this recommendation. DERA will assess how to incorporate formal measurements of data analytics support in targeting resource allocation when working with end users in other offices and divisions.

DERA appreciates the opportunity to review and comment on the Report. Please contact Chyhe Becker, Deputy Director and Deputy Chief Economist, if you have any questions.

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Comments and Suggestions

If you wish to comment on the quality or usefulness of this report or suggest ideas for future audits, evaluations, or reviews, please send an e-mail to OIG Audit Planning at AUDplanning@sec.gov. Comments and requests can also be mailed to the attention of the Deputy Inspector General for Audits, Evaluations, and Special Projects at the address listed above.