INTERACTIVE SESSION TECHNOLOGY

Siemens Makes Business Processes More Visible

Siemens AG is a German manufacturing conglomerate that produces systems and components for industrial automation, healthcare, energy, building, and transportation markets. The company is headquartered in Munich and Berlin, with 372,000 employees worldwide, and global revenue of €83 billion (approximately U.S. $99 billion) in fiscal 2017. Siemens is the largest industrial manufacturing company in Europe, with branch offices abroad. This is clearly a company that prizes innovation and continuous improvement of the efficiency and quality of its business processes.

Siemens has thousands of business processes, some of which are very complex. Management was seeking better ways of making the business more efficient and turned to business process mining technology. In 2014 the company established a unit called Process DAsh (which stands for Data Analytics, smart handling) to actively support global process optimization in all Siemens divisions. It started collecting and analyzing ERP data to identify bottlenecks in its production, delivery, and payment processes using Celonis Process Mining analysis and visualization software for this purpose. Celonis partners with SAP, and its software runs on the SAP HANA in-memory database platform.

Process mining software analyzes data in enterprise application event logs to determine how business processes are actually working in order to identify bottlenecks and other areas of inefficiency so that they can be improved. The technology can analyze millions of transaction records and spot deviations from normal workflows. A push of a button produces a snapshot of an entire business process. Process DAsh used the Celonis software to take all the individual data in a large number of information systems and use them to construct logical models of existing business processes and automatically visualize them. The software documents actual processes in real time, as the sequence of events is taking place.

When process mining software is used to analyze the transaction logs of an ERP or CRM system, data visualization capabilities in the software can show users what processes are running at any given time. An organization might use process mining software to find the cause of unexpected delays in invoice processing by examining the logs of the accounts payable module in its ERP system. Users can see at a glance where inefficiencies occur through bottlenecks, unnecessary detours, and manual interventions, or where compliance issues might arise. Some process mining software, including Celonis, enables users to drill down to view the individual documents associated with a process.

Celonis has capabilities for comparing users' target operating models to the as-is process, providing an automated fit-gap analysis. Celonis analyzes root causes for deviations and performance loss, highlighting the issues which have the greatest impact on process performance. At the touch of a button, the user can see a comparison between the target and actual process and also visualize the main cause of delays and additional expenditure.

If a process model doesn't already exist, the software will try to create one automatically, sometimes using artificial intelligence techniques such as machine learning (see Chapter 11). If a process model is available, the process mining software will compare it to the event log to identify discrepancies and their possible causes. For process modeling, Siemens uses a Celonis tool called Pi Conformance and Machine Learning. The software predicts which customer orders are likely to arrive late using algorithms that continuously learn from Siemens' performance.

Siemens started using Celonis analysis and visualization tools to learn how quickly it pays its suppliers. Some suppliers offer discounts for early payment. Siemens was often unable to take advantage of these discounts because it was unable to pay quickly enough. The company used process mining to analyze data from its ERP, accounting, and payment approval systems to understand why this was happening. Siemens also used process mining to study inefficiencies in the way it takes orders from and is paid by its customers (order-to-cash processes).

Before implementing the Celonis software, Siemens had to manage its business processes manually. Individual supervisors were responsible for specific processes. When things did not go as planned, such as when a machine broke down or a parts shipment arrived late, there was no easy way to

determine exactly how these occurrences impacted overall operations.

There was some resistance to process mining among some long-term Siemens managers who thought they already knew how to handle processes efficiently. Lars Reinkemeyer, head of Siemens global process mining services, was able to promote analytics adoption by identifying individuals who were receptive to process mining and enlisting them to promote the new technology. Since Siemens AG implemented process mining, it has been able to identify slowdowns in parts procurement, late product deliveries, and billing inefficiencies that were costing the company millions of dollars. Siemens AG now has over 2,500 users of Process DAsh worldwide.

Sources: Lindsay Clark, "Siemens Success Sets the Scene for Growth in Process Mining," *Computer Weekly*, April 12, 2018; Julian Baumann, "Siemens Is the World's Biggest User of Process Mining," www.celonis.com, accessed April 22, 2018; "Success Story Siemens," www.celonis.com, accessed April 22, 2018; Margaret Rouse, "Process Mining Software," searchERP.com, Jun 30, 2017; and Ed Burns, "Siemens Uses Process Mining Software to Improve Manufacturing Visibility," SearchBusinessAnalytics.com, December 15, 2016.

CASE STUDY QUESTIONS

1. Identify the problem in this case study. What management, organization, and technology factors contributed to the problem?
2. Describe the capabilities of process mining software. Was this an effective solution? Explain your answer.
3. How did process mining change decision making at Siemens?
4. What management, organization, and technology issues need to be addressed when implementing process mining systems?

enter region and time of day to understand how sales of a product vary by region and time. If you were Starbucks, you might find that customers in the East buy most of their coffee in the morning, whereas in the Northwest customers buy coffee throughout the day. This finding might lead to different marketing and ad campaigns in each region. (See the discussion of pivot tables in Section 12.4.)

- **Dashboards/scorecards:** These are visual tools for presenting performance data defined by users.
- **Ad hoc query/search/report creation:** These allow users to create their own reports based on queries and searches.
- **Drill down:** This is the ability to move from a high-level summary to a more detailed view.
- **Forecasts, scenarios, models:** These include the ability to perform linear forecasting and what-if scenario analysis and analyze data using standard statistical tools.

Predictive Analytics

An important capability of business intelligence analytics is the ability to model future events and behaviors, such as the probability that a customer will respond to an offer to purchase a product. **Predictive analytics** use statistical analysis, data mining techniques, historical data, and assumptions about future conditions to predict future trends and behavior patterns. Variables that can be measured to predict future behavior are identified. For example, an insurance company might use variables such as age, gender, and driving record as predictors of driving safety when issuing auto insurance policies. A collection of such predictors is combined into a predictive model for forecasting future probabilities with an acceptable level of reliability.

FedEx has been using predictive analytics to develop models that predict how customers will respond to price changes and new services, which customers