Commercial Daily Delinquency Report Automation for a Banking Institution in Puerto Rico

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Abstract *— Commercial credit risk management entails the monitoring of key performance indicators, including delinquency ratios, for the commercial loan portfolio. The Commercial Credit Risk (CCR) team in a banking institution in Puerto Rico provides a Commercial Daily Delinquency Report for Business Units to provide visibility of delinquency metrics and direct risk mitigation efforts. However, the report is prepared manually and takes a considerable time to prepare. The CCR team embarked on a project to automate the report to create efficiencies and improve the allocation of resources. The Extreme Programming methodology was selected due to its suitability for the nature of the project and the team size. After the automation was finished, efficiency increased since the time required to complete the report was reduced by 75% and resource availability improved by 20%.*

Key Terms *— Automation, credit risk, delinquency, extreme programming*

INTRODUCTION

Credit risk management is a vital function in the commercial banking industry since it protects the assets of the company. However, this function entails the management and analysis of large sets of data and its transformation into usable information for business units, managers, and executives. Many times, this translates into reports being delivered during the afternoon and extended working hours for the credit risk team. Looking for ways to improve the response time and to better allocate the resources to other priorities, it was identified that the automation of reports could facilitate this objective. The automation of reports could gain efficiencies in the credit risk management practices, minimize errors, and provide business units in the banking institution increased visibility of the credit risk key performance indicators. The efficient monitoring of Key performance indicators helps mitigate the risk of financial losses due to portfolio deterioration, avoid regulatory criticism, and maintain stockholder's value. Also, the automation will support the reallocation of resources into other priorities of the area.

The project of the Commercial Daily Delinquency Report Automatization for a Banking Institution in Puerto Rico seeks to reduce the time it takes to produce the daily report and minimize the manual processes. This will be achieved by developing an automated procedure to consolidate data from five core systems, perform all the calculations and transformations needed, and present the information into a way that is easy to understand by Business Units. The current process takes 2 hours daily which is translated to 65 days a year or 13 working weeks. The objective of the project is to reduce the time spent on preparing the report by at least 50%.

This paper provides an insight into the historical background of credit risk monitoring, defines the terminology associated with credit risk, and describes the methodology selected to achieve the objectives of the project. It also discusses the major tasks involved in the project, the results, and concludes with a description of the findings.

LITERATURE REVIEW

Recent news of an impending recession, historical high inflation, rising interest rates, and failing banks in the United States have created a heightened cautionary environment for financial institutions. The latest financial crisis in the US happened just 15 years ago and both the regulatory

agencies as well as financial institutions have steadily strengthened the credit risk practices to better mitigate potential risks. Credit risk management is a systematic process of identification, analysis, measurement, and decision making relating to various factors of credit risk to an individual or an entity.

Specifically for the commercial portfolio, the value of commercial and industrial loans has grown significantly since the latest crisis in 2008 [1]. So now banks may ask themselves how to improve the monitoring of the commercial portfolio to promptly identify risks.

Delinquency ratios are a common performance indicator. However, gathering historical data and translating it into usable information can be cumbersome. The process of converting raw information into actionable intelligence is known as data analytics [2]. Since data analytics focuses on discovering patterns, the banking sector benefits from its application to predict risk based on observed performance.

As technology matures, innovation is easier for companies. Along with innovation the automation of processes helps deliver results faster, less prone to errors, and free resources for other higher-value projects [3]. There have been setbacks in the implementation of artificial intelligence in the banking sector, so it is important to take a strategic approach to be successful [3].

Taking this into consideration then the question is what methodology is better suited to implement the desired automation process. Extreme programming, an agile method for software development, ensures customer satisfaction, better quality, and efficient project management [4]. Extreme programming is suited for small teams in a highly collaborative environment. This methodology allows for releases in shorter timeframes which enable incremental improvements. Extreme programming is based on five core values: communication, simplicity, feedback, courage, and respect [4]. This methodology has gained popularity due to its flexibility in incorporating changes, the need for fast-paced software developments, and the engaging environment it creates.

METHODOLOGY

Team Description

The teams involved in the project were the Commercial Credit Risk Team (CCR) and the Strategic Planning Team (SP). The CCR team has expertise in credit risk management practices, key performance indicators, and the needs of stakeholders involved in the risk management practices. However, even though it is a very analytical team, it lacked the programming skills to automate the selected report.

In the other hand, the SP team is composed of programmers mostly focused on data analytics to optimize the institution's business practices, customer experience, and product offering. The SP team developed the code necessary for the automation of the report while the CCR team provided the mapping to the data sources, rules, transformation, calculations, and the validation of the automation results.

Cycles and Schedules

After selecting the teams participating in the project, the project schedule was determined. The selected methodology involved short sprints composed of five phases: planning, managing, designing, coding, and testing. The planning phase focused on determining the high-level automation requirements. Managing consisted of weekly meetings to assess progress and redirect efforts when appropriate. Designing then included the definition of the fields mapping, rules or formulas, and transformation. Coding was when the code was developed, and the testing phase validated the results from the code with the expected results.

Initially the duration of the project was determined to be 8 weeks to complete two 4-week extreme programming cycles. This timeframe was designed to allow both teams to work on an initial automated report, test the results, and correct variances during the second cycle.

Designing and Validation

The first step in the cycle once the schedule and cycle are determined, was to develop the specification for each field to be programmed. The CCR team needed to map each information field in the daily report to its source, and specify validation rules, fixed fields, calculated fields, and data transformation requirements. Once the mapping was determined then the SP team began working on the code based on given specifications.

After the development of the code, the SP team provided the results for the automated report and the CCR team compared with the manual report prepared as of the date of the automated report. To facilitate the testing phase, the CCR team used a code currently used in the area that compares two reports with the same structure and highlights differences. The differences were documented in a log and discussed with the SP team to adjust sources, rules, calculations, or transformation as needed during the second cycle.

RESULTS

Cycle 1

After the end of the testing phase of the first cycle, differences between the automated report and the manual report were identified. A log was prepared to document the progress in each cycle as well as differences identified and the correction plan to address each one.

Of a total of 27 information fields, 7 were deemed completed since no differences between the automated and manual reports were found. Differences in the other 20 fields were documented, detailed, and discussed with the SP team to make the adjustments necessary during Cycle 2. Being able to document how many fields still needed updates in the code helped the team focus their efforts on these so the project was able to be completed in the allotted timeframe. After the discussion of the results from the first cycle the team was ready to start Cycle 2. As with Cycle 1, it included the following phases: planning, managing, designing, coding, and testing.

Cycle 2

Cycle 2 sprint was focused on the fields that presented differences in Cycle 1. The CCR team reviewed the differences and determined the root cause of the issues. Issues were attributed to filters that needed to be included, standardization of transformations (example: using FL instead of US for region), and selection of information source. The CCR team reviewed the mapping developed during Cycle 1 and made the necessary adjustments. The SP team then adjusted the code previously developed and delivered a revised data output to the CCR team for validation. Like the Cycle 1 testing and validation process, the CCR team compared the automated output with the report prepared manually and identified differences. The testing for Cycle 2 resulted in 17 additional data fields marked as completed and 3 fields still marked as failed due to differences.

Figure 1 shows the results from Cycle 1 and Cycle 2 in terms of data fields that passed the validation during each sprint. A significant reduction in failed data fields can be appreciated from Cycle 1 to Cycle 2.

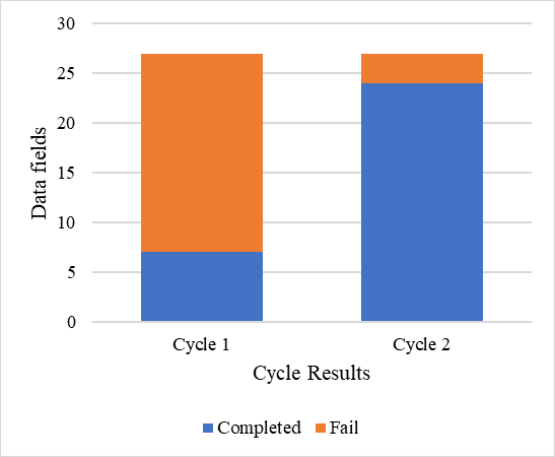

Figure 1
Completion progress of data fields

The CCR team evaluated the fields with differences and determined that they were not critical for the report since they were not directly

related to delinquency metrics. So, given that the teams used the timeframe allotted for the project, it was determined that the fields were going to be eliminated from the report and worked on later.

CONCLUSION

At the beginning of the project, it took one person the equivalent of 13 work weeks a year to complete the Daily Commercial Delinquency Report. The CCR unit is composed of 4 members which cand be considered a small team to manage the credit risk of a $6 billion portfolio. Being able to automate the report freed a considerable amount of time to focus on other functions of the department that cannot be automated due to their nature. In a fast-paced work environment, this kind of efficiencies have a great impact that resonates throughout the institution in terms of improved credit risk management practices, improved resource allocation, improved return on investment, and improved employee satisfaction.

Even though some fields still presented differences after the completion of all sprint cycles, the project was deemed successful since the fields were not critical for the purpose of the report and could be revised later.

After the conclusion of the project the institution was able to assess the impact of innovation in terms of efficiency and employee engagement. This automation process could be replicated for other reports and well as other areas to continue improving productivity. Units that produce recurrent standardized reports should be analyzed to assess which reports can be automated. The reports could be ranked by its possible impact and determined next automation projects based on priorities determined.

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