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%.

Introduction

Credit risk management is a vital function in the commercial banking industry. 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. 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 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.

Background

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.

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 [1]. 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 [2]. 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 [2].

Problem

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%.

Methodology

Extreme programming, an agile method for software development, ensures customer satisfaction, better quality, and efficient project management [3]. Extreme programming is suited for small teams in a highly collaborative environment. As shown in Figure 1, 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 [3]. 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.

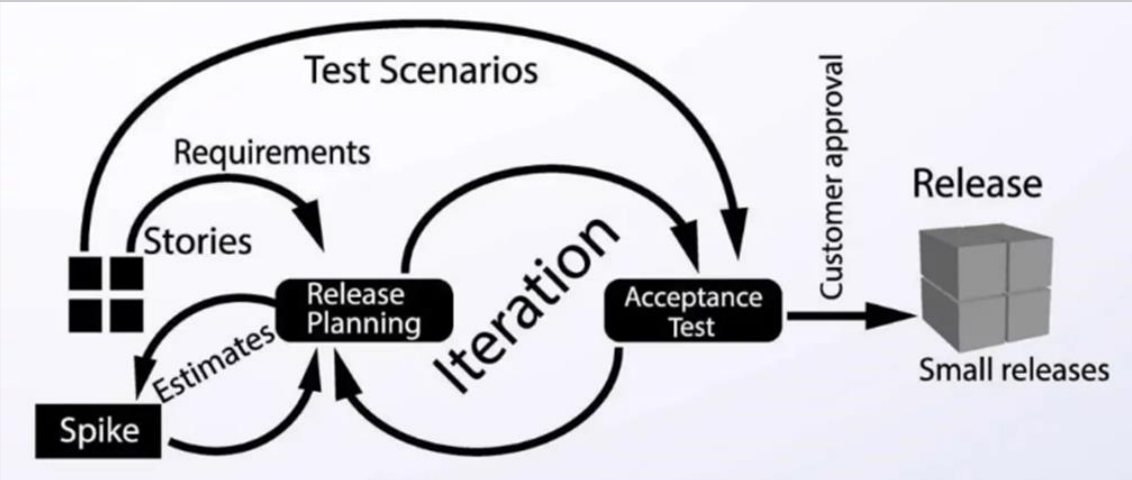

Figure 1. Extreme Programming Methodology Cycle

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. Two teams participate din the project, the Commercial Credit Risk team (CCR) and the Strategic Planning team (SP).

The first step in the cycle 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.

Results and Discussion

After the end of the testing phase of the first cycle, differences between the automated report and the manual report were identified. 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.

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 2 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.

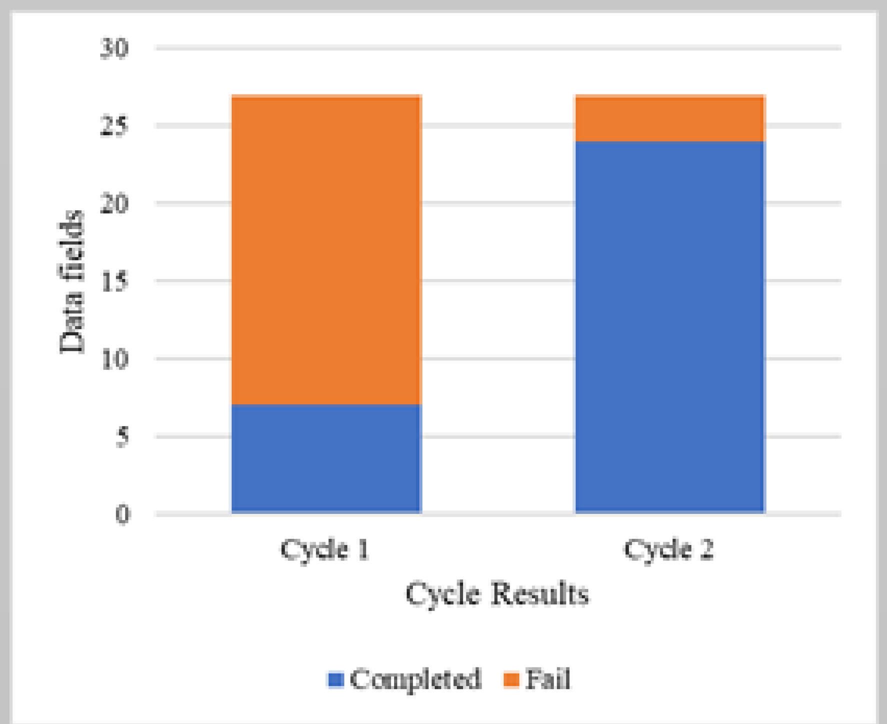

Figure 2. Completion progress of data fields

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.

Conclusions

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.

Future Work

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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