CRISP-DM Business Understanding

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The purpose of this document is to implement the CRISP-DM methodology [1] for a hypothetical "Chain Ladder Method Project for Provision Estimation" for the company *Chubb Limited*. More specifically, it will follow IBM´s steps for the first phase of the CRISP-DM process, which is denominated *Business Understanding*. The company´s information was obtained from its Annual Report [2] and its webpage [3]. This project might include hypothetical information in order to simulate the business case (for example, in the section "current solution").

Business Background

Introduction

Chubb is *the world's largest publicly traded Property and Casualty (P&C) insurance company and the leading commercial lines insurer in the U.S.*[3]. It operates in 54 countries accross six business segments: North America (NA) Commercial P&C Insurance, NA Personal P&C, NA Agricultural Insurance, Overseas General Insurance, Global Reinsurance, and Life Insurance. For the year 2022, the net premiums earned amounted USD 40.4 Billion.

For the purpose of this project, we will be concerned with the North America Commercial P&C Insurance segment, as we will develop a Chain Ladder Method Provision Forecast for **worker´s compensation insurance**. This insurance "*covers expenses related to medical bills and lost income if an employee sustains an injury in a workplace accident*".[4] Other products that this segment offers include: automobile, cyber risk coverage, property, general liability, among others. This segment is quite relevant for the company as it accounts for 42% of 2022 net premiums earned.
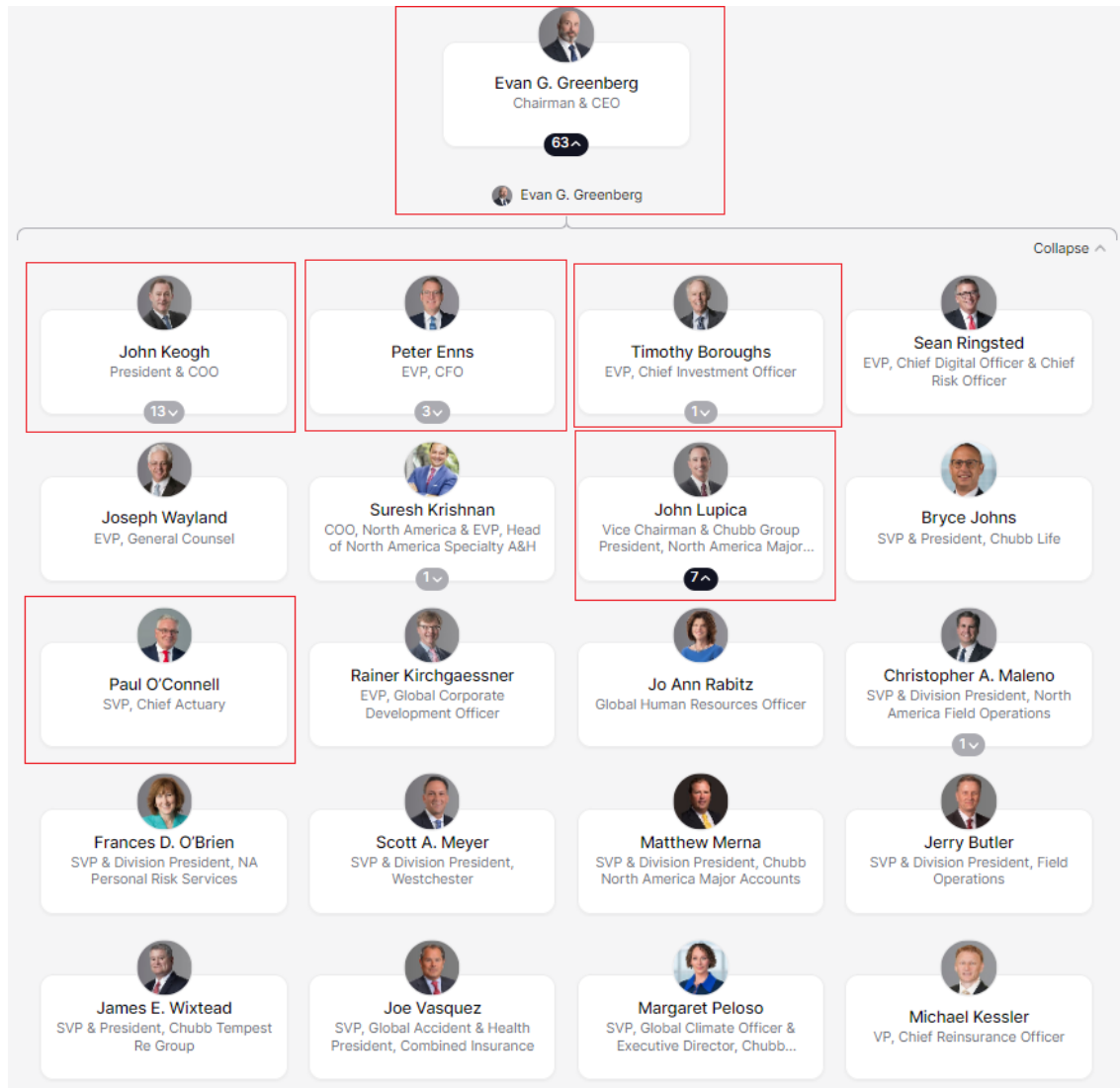

Chubb Limited at a glance[3]

Organizational Structure

Chubb Limited Organizational Chart, with key executives involved with the project[5]

The previous chart includes key executives and their roles for Chubb Limited. Executives highlighted in red are most likely the ones that will be involved in the project.

Evan G. Greenberg: Chairman and CEO.

John Keogh: President and COO. As Chief of Operations, he will assist with the underwriting and claims process details.

Peter Enns: CFO. As Chief Financial Officer, he will assist with the finance and accounting team to revise the effect of provision estimates on the financial statements.

Timothy Boroughs: CIO. He will assist with effects of provision estimations on the company´s investments.

John Lupica: NA P&C Vice Chairmain. In charge of NA worker´s compensation insurance.

Paul O´Connell: Chief Actuary. He will oversee the estimation method.

Describe Problem Area

As an insurance company, Chubb Limited must have a provision estimating future payments on reported and unreported claims for losses and related expenses. As per their annual report, "the process of establishing loss and loss expense reserves for P&C claims can be complex and is subject to considerable uncertainty as it requires the use of informed estimates and judgments based on circumstances known at the date the loss is recognized." This is a key process for the company as this provisions have legal and financial implications. Insurance companies must adequately estimate this provision estimate, as provisions are classified as a liability in the financial statements, and at the same time are recognized as an expense. Chubb must reflect an accurate estimate for investors to know potential claims that could arise. If provisions are not correctly presented, the company could be underestimating its expenses.

(in millions of U.S. dollars, except share and per share data)	December 31 2022	December 31 2021
Liabilities		
Unpaid losses and loss expenses	$ 76,323	$ 72,943

Unpaid losses and loss expenses sum USD 76.3 Billion[1]

As per December 31, 2022, the amount of the provisions was a total of USD 76.3 Billion. This is the biggest liability on the financial statements of the company, making a correct estimation method a key process for the company. Arriving at such estimates is a difficult process which will be addressed by the Chain Ladder project.

Describe Current Solution

The company currently estimates this provision via the "Provision Committee". This committee has monthly meetings and is composed by the Chief Actuary and industry experts. The Chief Actuary and the industry experts arrive to a estimate based on their experience and the estimates other companies are using. This is a subjective way to arrive to provisions, as their estimates depend on their opinion rather than on an objective and structured model.

Business Objectives

Due to pressures from accounting standards and regulatory entities, the company has the following objectives:

1. Construct an objective and structured model for provision estimates.
2. Be able to forecast provisions for following years.
3. Provide provision estimates timely for the accounting department for every month.

Business Success Criteria

Success Criteria is as follows:

1. Provision estimates are provided every month for the accounting department 10 days before month-close.
2. The estimates are closer to reality when compared to the previous method. There must be an improvement in estimates of at least 15 per cent. To evaluate this, the previous method will be used for six following months in order to make the comparison.

Assesing the Situation

For this project, the support from the executives earlier mentioned will be needed. The project requires access to data about previous claims and it must include, at least: Claim date, amount, year of the accident, payments done, claim liquidation information. The project, throughout its different stages, requires the support from IT and personnel such as data analysts, a machine learning engineer, and a data engineer.

Resource Inventory

As this method will rely on data, there are hardware requirements for storing the information. Specific requirements in hardware will be further discussed with management.

The Company currently stores its data in databases located in their headquarters which are controlled by the IT department. These include datasets related to claims and actuarial assumptions mostly. The CEO must give a written permission for the data analysts to access these datasets.

Requirements, Assumptions, and Constraints

1. The information is highly confidential, so the project team must sign a form under which they can´t share any information externally.
2. We are assuming there is sufficient data for the model to produce correct estimates.
3. The model must be understood by management and the actuaries.
4. The company has sufficient budget for the project.

Risks and Contingencies

The project has a schedule of 19 weeks. There is a risk of extending the schedule if problems arise during any of its stages. The stages that are more at risk are data understanding and data preparation, as many issues could arise regarding the data to be used.

Chubb Limited is a huge company and has a solid budget for this project. They can accept increases in the original budget of up to 50 per cent.

If the data is of poor quality, the model won´t be appropiate and management must decide if it is worth to continue with it or it will be postponed until the company fixes is data recollection process.

Cost/Benefit Analysis

This project involves the active participation of management, actuaries, and engineers. Its estimated cost per hour of work of the whole team is of USD 3,000/hour. With a duration of 19 weeks, the estimated cost of the project is of USD 2.2 Millions.

This cost is low when compared to the benefits of this project. As for Dec. 31, 2022, provisions amounted USD 76.3 Billion. If there is an error of 5 per cent in the provisions, this could sum up to USD 3.8 Billion. If provisions are overestimating that amount, the real provisions would be USD 3.8 Billion lower and the company could invest that money. If it was the other way around, the company is underestimating its expenses and this could affect investors.

Comparing the amount of provisions to the cost of the project, we belive the benefits for Chubb Limited are by far greater.

Project Plan

Phase	Time	Resources	Risks
Business understanding	2 weeks	All analysts	Legal and Accounting Implications
Data Understanding	3 weeks	All Analysts	Data problems, technology problems
Data Preparation	7 weeks	Data Analysts	Data problems, technology problems
Modeling	3 weeks	ML Engineers	Adequate Model Finding
Evaluation	2 weeks	All Aanalysts	Incorrect Forecasting, Accounting Problems
Deployment	2 weeks	Data Engineer/ ML Engineers	Legal and Accounting Implications

References

[1] Chubb Limited. (2023). Form 10-K: Annual report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 for the fiscal year ended December 31, 2022. United States Securities and Exchange Commission. https://investors.chubb.com/financials/sec-filings/default.aspx

[2] IBM. (n.d.). Business Understanding - IBM SPSS Modeler. IBM SPSS Modeler Documentation. https://www.ibm.com/docs/en/spss-modeler/saas?topic=guide-business-understanding

[3] Chubb. (2023, August 24). Chubb Insurance. Chubb. https://about.chubb.com/

[4] StateRequirement. (n.d.). What Is Property and Casualty Insurance? StateRequirement. https://t.ly/2U01V

[5] The Org. (n.d.). Chubb. The Org. https://theorg.com/org/chubb