

Financial Performance Forecasting with AI

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This problem situation was written by Luis Arturo Bernal Ponce (larturo.bernal@tec.mx), with the purpose of serving as discussion material in classrooms, it is not intended to illustrate good or bad management practices. The story on this document is based on different people's experiences; some data has been modified at the request of the people and institutions involved.

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The Firm

XZCMetric Finance is a financial firm based in Mexico City that specializes in providing financial advisory and investment structuring services to medium-sized and large companies in the industrial and technology sectors. Since its foundation in 2005, the firm has expanded its operations throughout Latin America, serving over 200 corporate clients.

One of XZCMetric Finance's main activities is the development of forward-looking financial reports that allow its clients to understand the future behavior of their key performance indicators. In particular, the executives of client companies are highly interested in forecasting profitability metrics, such as Return on Equity (ROE). As part of its service offering, XZCMetric Finance provides clients with access to a proprietary technology platform where they can upload and manage their own financial data. This platform allows clients to run customized financial forecasts and simulate different business scenarios, enhancing the flexibility and relevance of the forecasts generated.

The Challenge

In recent years, heightened volatility in global financial markets —driven by economic uncertainty, geopolitical tensions, and abrupt shifts in interest rates— has made the accurate prediction of financial performance metrics more challenging than ever. Traditional linear models often fall short in capturing the complex, non-linear relationships embedded in financial data, particularly under such unstable conditions.

In response, the newly appointed Chief Data Officer (CDO) at XZCMetric Finance has proposed integrating machine learning (ML) techniques into the firm's financial forecasting process. This proposal is grounded in substantial empirical evidence demonstrating the superior performance of ML methods in financial prediction. For instance, Gu, Kelly, and Xiu (2020) show that ML algorithms significantly outperform traditional linear regression models in forecasting asset returns, due to their ability to model high-dimensional and non-linear interactions.

Image. The company has proposed integrating machine learning techniques into the firm's financial forecasting process.



Source. Meta AI, 2025.

Likewise, Fischer and Krauss (2018) find that deep learning architectures are more effective at capturing complex temporal dependencies in financial time series than classical econometric approaches. These findings underscore the potential benefits of adopting ML techniques within XZCMetric Finance’s advisory services.

During a recent executive meeting, the CFO emphasized:

“We can improve the quality of our recommendations if we use non-linear models capable of capturing complex patterns in the data. Furthermore, we could tailor the models for each industry or even to specific companies. But before implementing this approach on a large scale, we need to demonstrate that it truly delivers superior predictive value.”

Expected Solution

XZCMetric Finance’s financial analytics team has been tasked with developing a first proof-of-concept model, which refers to creating an initial working version of a model or system whose primary purpose is to demonstrate the feasibility of a proposed idea, method, or technology. To this end, they have been provided with a dataset containing financial records.

Additionally, the team is expected to define appropriate evaluation metrics and justify the choice of the optimal technique. Besides, a rigorous process of data cleaning is also required.

The model results must be presented to the senior management in 4 weeks. If the pilot proves successful, the solution will be scaled for all XZCMetric Finance clients.

The firm has access to a rich historical data set comprising annual financial information of companies in various sectors. The file data.xlsx, has two sheets, the sheet “data” and the sheet “description”, which includes the definition of each variable.

See database [HERE](#)

References

Fischer, T., & Krauss, C. (2018). Deep learning with long short-term memory networks for financial market predictions. *European Journal of Operational Research*, 270(2), 654–669. <https://doi.org/10.1016/j.ejor.2017.11.054>

Gu, S., Kelly, B., & Xiu, D. (2020). Empirical asset pricing via machine learning. *The Review of Financial Studies*, 33(5), 2223–2273. <https://doi.org/10.1093/rfs/hhaa009>