Commercial research of analytical solutions

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Abstract

In this document, I will present the results of a Business Research of Analytic Solutions focused on Artificial Intelligence applies to Retail Banking applications. These solutions are aimed to offer the best applications of AI and data science to Retail Banking Institutions which wanted to take full advantage of all their data. This Retail Banking study was made for commercial purposes for the company RichIT besides academic purposes for the Universidad Politécnica de Yucatán, which was part of the 4th quarter internship during the period between February 19th and April 19th.

The importance of presenting this report is strongly connected with the relevance to acquire work experience in real-world environments and how well I performed my duties with RichIT during this period. A hundred and twenty hours have been covered while doing this research and a significant amount of experience has been acquired by the author. This internship has generated a huge impact on my student development. I discovered many Artificial Intelligence applications in terms of personal data security, banking frauds, processes optimization, predictions, and so on, although focused on retail banking institutions.

Index Terms

Retail Banking, Artificial Intelligence, Commercial Solutions, Business Model, Challenges, Benchmark, Use Cases.

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I. INTRODUCTION

There has been an increasing demand for financial services in today's world, and people are looking for better banking options that let them acquire credits or loans without asking for high amounts of money for approval. Retail Banking (also called Customer Banking) is the type of bank in charge of providing these financial services to the general public. Its primary purpose is to generate a greater bancarization. I must say that this type of banking is of entire interest due to its directed connection with the people and the percentage of the geographic population it covers with branches of each institution. However, as I mentioned before, as there are more and more people requiring financial services, many institutions offer these services, including retail institutions and FMCG institutions that are starting to provide financial services. As long as many institutions offer the same kind of product, the market will keep increasing, and we can assume that "Retail banking has notably changed from a mature market with benign competition to a growing market with aggressive competition." [3]

This investigation aimed to know the Artificial Intelligence use cases in Retail Banking but also is in great part aimed to understand this industry needs through its business model and the challenges of this industry.

In the present report, we will review some of the proposed use cases of Artificial Intelligence in Retail Banking in which we took into account the points already mentioned to generate a real and effective purpose of use case in which the company I was working with, RICH IT, could inquire deeper and take on next steps to go further with my investigation and proposals.

II. OBJECTIVES

The primary purposes of the Commercial Research of Analytical Solutions focused on Retail Banking were given by RICH IT since the first day, and all of them were aiming to produce a win-win situation between the intern and the company. There were three principal purposes for the document:

1) : Understand the basic aspects of Retail Banking Industry

2) : Conduct a research on AI applications in the Retail Banking industry and identify relevant use cases.

3) : Identify next steps to go further on the research.

All the objectives were achieved while doing this project, from both parts, intern and institution, there was extensive knowledge acquired and information with a potential value of usage or to inquire deeper. There was a presentation of the document in which RICH IT staff and the intern both together present the results and clarified if the objectives were obtained or not. Both parts perceived to gain valuable experiences and knowledge about how AI impacts the retail banking field and the different use cases to be applied in the future.

III. STATE OF THE ART

A. Business Model

Retail banking has a very interesting business model approach in which the institutions are financial entities, and customers are seen as investors [4]. Financial entities are responsible for looking after their relationship with their customers whilst managing the risks they take with them. On the other hand, investors are the people who got themselves into a retail banking system to have their money managed. They do not know they are seen as investors, but every time they deposit cash into their accounts the deposit is recognized as an investment which the institution must take care of and keep a balance with their investor accounts, then when the investors want to retire their money the action is taken as a collection of the money they invested, returning just the same amount which was invested, however, with other financial service, as credits or loans, the customers invest more than what they collect back.

B. Challenges

As any industry, retail banking institutions have challenges to solve in order to optimize the processes and to be more and more profitable. Despite of these challenges can be either internal issues or external issues, we can divide them into areas of interest such as:

1) Administration: Some of the problems which we can find into this area are; back office digitization, the need to connect the back office with the customer experience [5], and operational silos. All of them are mainly challenges due to the cost it generates to have administration processes with hand and paper. Not only is this a problem of costs but also of customer experience because it is easier for them to check out documents on their phones about their financial situations.

2) Finance: Inside the finance area of retail banking institutions there are two main challenge which are the value of fusions between institutions in order to increase the value of the services they offer. Other problem is the increment of the costs and the low return over the invest they get, therefore they need to find strategies to have a better return.

3) Customer Services and Experience: As the competence quickly increases, the institutions see themselves in the necessity of retaining their customers [6]and create long term relationships, this is because for customers it is easy to swap from an institution to another, although they are aware it is not the best. In addition, it is known that when you know your customers well, what they want and their needs, it would increase the probabilities to offer better and personalized options.

4) Risks: Risks is the area in charge of manage the investors and institution threatens. Nowadays when people is living a pandemic, cyber attacks are the main risks for them and for

every institution [8] that has a platform, these can produce frauds and identities stolen.

C. Artificial Intelligence in Banking

Artificial Intelligence as the time pass, increases its popularity, and retail banking institutions need to step up on the application of Artificial Intelligence solutions and there is a future ahead where every banking institution will have the necessity to emigrate to AI Banking. The global strategic consultancy McKinsey & Company shows that "Artificial intelligence technologies are increasingly integral to the world [2] we live in, and banks need to deploy these technologies at scale to remain relevant.", it has been difficult for many companies to adapt to AI solutions and applications, mostly, as a consequence of the lack of strategy of the AI implementation, low investment in Technological field, or poorly prepared data. The retail banking institutions must adapt to the digital and AI age so they can improve their human decision making besides optimize processes, reduce costs and have a better accuracy when offering a service or making a decision. One big application which Artificial Intelligence might have is the increment of customers engagement and the possibility to create ecosystems of long term relationships which can strengthen engagement significantly [7]. In order to get this point stronger.

D. Options in the market

There are some companies offering services or tools in order to solve these kind of problems already mentioned. Each company has a different approach and a different strategy to solve problems for retail banking, however, all of them are focused on the same field of AI. Between these companies we can find: OSP with Machine Learning and Data Mining, Lexis Nexis offering different services and tools for frauds and data analysis, Finn AI specialized in Chatbots, and Hexaware which offers different services of data analysis for banking.

IV. METHODS AND TOOLS

To perform this research we followed up a Systematic Review methodology. This methodology use three steps for including and excluding criteria. In this research we use the following components:

A. Inclusion and Exclusion criteria

Inclusion criteria are the parameters under which the documents, files, news, and sources are considered the most relevant and helpful to comply with the study's objectives. In contrast, exclusion criteria are the parameters under your sources that would be regarded as irrelevant, useless, or not let us comply with the research objectives.

To find real solutions and propose use cases knowing the researched information, it was important to gather the most relevant articles and exclude them under some parameters. The exclusion and inclusion criteria used for this systematic review are the following:

1) Inclusion Criteria:

- The papers focused on retail banking from massive, international and recognized banking corporations will be included.
- The papers or any other information from governmental websites or governmental documentation will be included if it is related to the banking field.
- The documentation will be included if it was extracted from a reliable source of academic or scientific articles.
- All the articles or papers that are related to the AI in banking solutions will be included.
- The papers must have been published within the last 20 years.
- Papers or documents from institutions offering AI or Machine Learning solutions for Retail Banking.

2) Exclusion criteria

- Exclusion of the papers related to the application of front-end software solutions.
- Exclusion of the paper published before 2000.
- The papers that do not have any information about retail banking will be excluded.
- All the articles which are about retail banking but not focused on the principal aspects to achieve the objectives of this investigation will be excluded.
- The articles or papers from institutions offering software development solutions will be excluded.
- Exclusion of papers or articles poorly documented with a brief description of a topic.
- Exclusion of papers which lacks of author beyond the institution which is publishing the paper.

B. Sources and Key Words

As part of the research strategy a selection of sources to find the main articles to develop this investigation was done, besides the choice of keywords, which helped me to find reliable and valuable documents.

All of the keywords were related to the retail banking and banking solutions approached to AI and Data Analysis.

Retail Banking	Retail Banking Solutions
AI Banking	Banking
AI Retail Banking	AI Solutions
Customer Analysis	Data Science in Retail Banking
ML in Retail Banking	

The research sources used to retrieve the source material and documents relevant to the study are listed below:

- JSTOR
- Google Scholar
- University of Michigan Library

V. DEVELOPMENT

To develop this investigation, the process of Inclusion and Exclusion was carried on using the previously defined criteria refining the results as the research progressed. In the first documental search, there was a total collection of 40 papers gathered that were filtered to have the most relevant documentation about Retail Banking Industry and the applications of

Artificial Intelligence Solutions. From the 40 papers gathered, once filtered, there were left behind 30 and only used 10.

The filtering for all of these papers was made using the inclusion and exclusion criteria and verifying the document relevance related to the study objectives. During this process, I first discarded the documents related to the understanding of the industry. I gathered a total of 17 but applying the exclusion criteria about "Exclusion of papers or articles poorly documented with a brief description of a topic" and the exclusion criteria about "Exclusion of papers which lacks of author beyond the institution which is publishing the paper." and "Exclusion of the paper published before 2000." I discarded 14 of them.

For the use cases and AI applications on retail banking section I gathered a total amount of 10 documents in which 7 were totally discarded using the exclusion criteria of "Exclusion of the papers related to the application of front-end software solutions.", "The articles or papers from institutions offering software development solutions will be excluded and "Exclusion of papers which lacks of author beyond the institution which is publishing the paper"

Finally when covering the last objective of the investigation which was about the next steps of AI solutions in the retail banking industry I gathered a total amount of 13 documents, however, I had to discard 9 of them applying different exclusion criteria such as "All the articles which are about retail banking but not focused on the principal aspects to achieve the objectives of this investigation will be excluded. " and "Due to the extensive field that banking means, the papers that do not have any information about retail banking will be excluded.".

At the end of the filtering process I had fifteen papers and articles on which I based my whole investigation. In addition, according to the performed analysis the final documents were the most relevant and well documented ones, therefore I based my proposals for uses cases on these ones.

VI. RESULTS

A. Industry Understanding

For the first investigation objective, results showed that retail banks have specific geographic locations in areas where it is easily accessible to the entire population to make a growing percentage of the population bankable. Hence, customers generally go to the service bank closer to their city or locality. The most offered services by retail banking institutions are; loans, credit cards, debit cards, financial advice, and saving accounts. Something important to add is the fact that having a long-term institution-client relationship is not by chance, since it is a customer service process in which a relationship is established in which the use of services by the customer is monitored, measuring their effectiveness [11] from the client's perspective and measuring the income from the institution's perspective to later analyze the results in a general and mutual value way.

B. Use Cases Proposal

On the uses cases stage we could identify different use cases proposals for retail banking based on documented challenges of the industry, which were mentioned on the third section of this article. The different uses cases are given as proposals and they are open to change and improvement. As a result of the investigation. Presented proposals include applications for Artificial Intelligence and Data Science solutions in retail banking:

- Fraud prevention through behavior analysis in users (customers)
- Prevention of cyberattacks and loss or theft of information due to bot attacks through user behavior analysis.
- Optimization of Marketing strategies with the analysis of the results of previous (and finished) campaigns of the company. [9]
- Prediction of better services and / or products as a whole for the optimization of offers [10].
- Analysis of characteristics for customer segmentation in order to offer services with a high percentage of acceptance.
- Prediction of the next best service to acquire for the generation of personalized offers for a specific client.
- Analysis of fraudulent transactions through historical data.
- Identify the unique customer by making comparisons between similar accounts to avoid user duplication.
- Prediction of account churn.
- Prediction of delinquent accounts.

All of the proposals were identified and documented with their related problems and proposal of data, however, we will see in the next point how to improve these proposals.

C. Future Work

The next steps to take on further on this study were also identified in order to take advantage of the information already documented, however, it does not necessary mean that the investigation must be closed, instead, the investigation should be taken as the first approximation to enhance use cases proposals with further detail including data and algorithms used to implement the proposal. The following are the three principal next steps to continue and get a deeper knowledge.

- Do simulations or demonstrations of the use cases in a test environment either with real data or dummies.
- Deepen the use cases in order to know: if the proposed data can be provided by the industry or if we can consider other types of data. Other techniques and / or algorithms can also be analyzed to propose a better solution.
- There are more use cases to be analyzed and applied in the retail banking industry, so it is important to keep abreast of the challenges of the industry and in due course analyze other use cases that may be of great impact.

VII. CONCLUSION

Once finished this investigation, I would like to highlight some important points seen. As a matter of fact, some of the use case proposals were being applied for some enterprises and I added them as a way to optimize the solution. The AI can be applied almost in every area of retail banking institutions and

one applied it can generate a huge impact on the obtainment of insights to make strategic decision. Institutions that already implement AI on their systems, areas and process are staying ahead on this data revolution.

For any company wanting to venture into the retail banking economy market, it is highly important for them to know that the retail banking is an increasing market and there is a lot of competition. It is important as well to know and understand the industry so you can dig deeper into the subject and focused on specific areas of attention or points not taking in account during this research.

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