Journal of Advances in Developmental Research (IJAIDR)

E-ISSN: 0976-4844 ● Website: www.ijaidr.com ● Email: editor@ijaidr.com

Improved Claims Processing: Advanced Analytics for Faster and More Accurate Claims Handling In Healthcare or Insurance

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Abstract

This research focuses on examining the use of advanced analytics as an enabler for speeding up the claims decision-making process across healthcare and insurance industries. This research adopts an interpretivism research philosophy and a deductive approach. Overarching theories and frameworks are explored, and existing secondary qualitative data collected from industry reports, academic works, and case studies. Themes are employed to determine the areas of interest that concern advantages and disadvantages of implementing advanced analytics. Research proposes that while choosing advanced analytics provides large numbers of organizational benefits in terms of process standardization, costs cut down, and enhanced decision-making, there are constraints alike.

Keywords: Advanced Analytics, Claims Processing, Machine Learning, Artificial Intelligence, Operational Efficiency, Fraud Detection

I. Introduction

There are numerous issues such as claims processing delay or error, or even inefficiencies in the handling of the same throughout the healthcare as well as insurance sectors. These problems usually result in higher operational expenses and poor customers' satisfaction. Advanced analytics which is the use of data-based technology and processes such as machine learning and predictive modeling present a very good solution to these problems. Hence using smart solutions that can facilitate the process of claims processing can also enhance the probability of a rapid and accurate result. This research seeks to establish how advanced analytics can be used to improve the claims handling process and increase the speed of the decision-making process, the accuracy of the assessments made and the efficiency achieved due to reduced costs.

II. Research Aim and Objectives

Aim

The aim of this study is to determine how such complex techniques as advanced analytics are utilized within a health care setting or insurance claims processing to maintain or enhance the quickness and exactness of claims processing.

Objectives

- To assess the impact that analytics can bring on streamlining the timelines for claims processing within the healthcare or insurance environment.
- To evaluate how advanced analytics can help to increase the UC and decision-making accuracy in claims handling.
- To understand the possible cost efficiency benefits arising from the application of advanced analytics to claims adjustments.
- To determine some of the issues and factors, which may hinder the use of advanced analytics in healthcare or insurance claim applications.

III. Research Questions

- How does such a picture in terms of advanced analytics influence the throughput of claims in healthcare or insurance?
- How especially advanced analytics enhance and enhance the correctness of claims handling?
- What improvements in cost and cycle time can be realized from the implementation of advanced analytics in claims management?
- How do key issues in many healthcare or insurance organizations encounter in implementing advanced analytics for claims processing?

IV. Rationale

The reason that outlines the need to consider the application of advanced analytics in claims processing of healthcare and insurance industries relates to the fact that traditional systems face a number of problems such as inefficiencies, mismeasurements, and cases of frauds. Claims processing is most of the time consuming, inaccurate and expensive to both the clients and the insurance providers. Use of superior computerized techniques, for example, machine learning, predictive modeling, and artificial intelligence provides a potential solution to support the efficiency of the business processes, improve accuracy, and shorten the duration of the processes [1]. In this case, these tools can help organizations reduce expenditure by avoiding redundancy, identifying fraud, and expediting accurate decision-making processes. However, there are challenges that facilitate adoption like the need for skilled professionals, problems of data integration, and issues to do with privacy that need to be resolved.

V. Literature Review

Advanced analytics and its effect on the cycle time of claims handling

The time taken to process claims is one of the most sensitive areas of customers' satisfaction and business performance. Multiple authors highlighted how advanced analytics, such as machine learning or AI, can decrease the time taken for the process. As with the many claims that are simple or obvious, this is because machine learning can categorize and even assess the claims thereby decreasing the time taken in making the decision [2]. Surveys also discuss using procedural predictions to determine the possible outcomes of a claim and which the riskier claims are passed through to humans to review thus leading to faster results.

Fig. 1. Claims processing steps

The senior author established that turnaround of claims could be possible with the help of these tools; this is because the number of days taken to process the claims could be brought down by as much as 40% [3]. But the problem still persists as to how the speeding of this process does not affect the quality or correctness of the claims.

Promising Role of Advanced Analytics for the Improvement of Accuracy of Claims Handling

Claims processing should be extremely accurate in order to avoid fraud, as well as mistakes that add expense and decrease the company's reputation. Some works show that with the help of advanced analytics, a higher result accuracy can be achieved during claims assessment due to the automation of evaluating data [4]. It is stated that application of machine learning models especially in fraud detection leads to identification of hidden patterns that may refer to fraud cases.

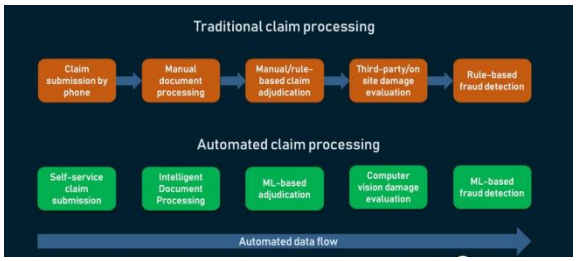

Fig. 2. Traditional and automated claim processing

NLP can be used to identify particular fields which contain the information needed, for instance, from health records or insurance policies, where all the necessary data is unsorted and sometimes hidden deep in texts. Such analyses also involve the detection of errors or inconsistencies as it compares data from one area to another using models of predictive analytics [5]. Insurance claim accuracy was reported to have been enhanced through the use of Machine learning algorithms by 25%. The fact that advanced analytics signals errors, misrepresented data or inconsistency the occurrence of such events, or potentials minimizes human error.

Improved Quality, Cost Reduction and Operation Efficiency through Analytic Solutions

Sophisticated computing empowers healthcare and insurance organizations to create a systematic way that has the potential to achieve real more operating efficiency and cheaper cost. Through handling repetitive jobs like data input, records evaluations and approval processes these technologies eliminate time-consuming labor processes thereby minimizing fees. According to various researches, application of BI in insurance allows to manage claims volumes and staff numbers proportional to it [6]. Besides, an increased use of analytics means that reclamations that are denied or need further examination are identified earlier, which means less time on processing unsuccessful reclamations. In healthcare, the analytics are used by hospitals and providers to adequately code their billing and thereby also reduce

rejected claims. Strategic application of AI technology, particularly when handling claims, brought about a lowering of operational costs by 30 percent.

Opportunities and Risks of Developing the Use of Other Types of Analysis in Claims Adjusting

There are several issues which have prevented the application of advanced analytics in claims processing. However, one of the biggest problems in big data management is the shortage of skilled data science and analytics workforce that many organizations fail to address [7]. Insurance firms said that they had a lot of problems when it comes to talent acquisition in the area of implementation and management of new and innovative technologies such as artificial intelligence and machine learning. Besides, implementing advanced analytics in conjunction with existing solutions, known as legacy systems, has multiple technical challenges: the systems can be outdated or lack the proper infrastructure to support new technologies [8]. The maintainers also experience high privacy and data security issues since claims involve personal medical and financial information. Companies have to obey rules and laws such as HIPAA and GDPR. Past studies also note the hesitation by organizations to adopt new technologies because of the cost and how they require a change in the patterns of production.

Research Gap

The literature on advanced analytics in claims processing especially in the healthcare and insurance sector is still sparse due to several gaps identified in the course of the study. However, as before, lots of research confirm the positive results of such technologies, including increasing speed and accuracy, as well as reducing costs andparameters.Further, there is a shortage of extensive investigation on the positive outcome of these technologies on claims handling processes and the customer [9]. Moreover, most of the research targets a single case or technology, or the combination of multiple analytics tools such as AI, machine learning, blockchain in a particular process, while few studies are conducted on the utilization of more than one tool in a claim process. Some of areas that are not well covered include the issue of data privacy and manageability as well as the question of regulation and the ethical use of artificial intelligence in assessment of claims.

VI. Research Methodology

This research employs an ***interpretivism research philosophy*** which seeks to understand the events, actions, and the meaning that people give to events, in this context the role of advanced analytics in claims processing of the healthcare and insurance units. Through the application of interpretivism, the study aims at obtaining a rich understanding on how organizations view, accept and deploy analytics technologies as well as their implications to claims management procedures [10]. This study therefore subscribes to a ***deductive research approach***, whereby patterns are deduced from the advanced analytical frameworks, claims processing ideas, and operational efficiency propositions. These theories are tested in the research through conducting a secondary data analysis, so that the research problem can be examined systematically, and at the same time it can be checked if the theories previously developed can be usefully applied to this particular sector.

Fig. 3. Research methodology

The adopted ***research design is exploratory*** because the study focuses on identifying new knowledge about adopting advanced analytics in relating to claims processing where existing studies are scarce. ***Secondary qualitative data*** are collected from journals, magazines, reports, case study and document review [11]. They are analyzed using a ***thematic analysis*** approach so as to see the trends in the patterns that are related to speed, accuracy and costs together with the challenges that surround advanced analytics when it comes to claims processing. Thematic analysis is also useful in organization and interpretation of data, which help in drawing useful inference.

VII. Data Analysis

Theme 1: Integrated advanced analytics can considerably enhance the rate of claims processing in healthcare and insurance sectors.

This theme explains how the action of integrated advanced analytics can considerably enhance the rate of claims processing in healthcare and insurance sectors. Most of the initial workings involving data input, categorization of claims, validation and the like can be best handled by machine learning and AI and thus requires little or no handling manually [12]. Claims management and handling is enhanced by predictive analytics to make forecasts on potential results by evaluating previous historical claims information hence helping firms to recognize simple claims and draw attention to other complex ones that need special attention. Technology also leads to customer benefits in form of faster approvals of claims, timely responses to customers' inquiries and follow-up [13]. Such technologies have also been found to cut processing time by up to 40% thereby improving on times taken to provide solutions and pleasing the end users. Nevertheless, they present the main issue of achieving such speeds without detriment to the precision required or the service quality clients expect.

Theme 2: Adoption of the complex analytics can enhance probability of claims processing and decrease a potential of fraud, especially in the health care and insurance industries.

This theme focuses on the ways in which adoption of the complex analytics can enhance probability of claims processing and decrease a potential of fraud, especially in the health care and insurance industries. NLP is most helpful in gathering specific required data from textual data like medical records or policies that are not missed at any cost [14]. In addition, if necessary, predictive models can provide checks, matched against external databases, within the claims data for possible error or frauds. Several studies show that the deployment of these technologies helps minimize human mistakes and incorrect estimates of claims. Also, advanced analytics can update its decision-making based on new data, changing its approach based on new input. This theme also relates to the issue of how to maintain

the automated processes while still being able to monitor them at an individual level in a way that produces the greatest level of accuracy.

Theme 3: The opportunities which arise from implementing advanced analytics in the process of claims processing.

This theme examines the opportunities which arise from implementing advanced analytics in the process of claims processing: cost reduction and improvement of the efficiency of the work. Analytics tools tend to minimize the tasks that require manual labor because they themselves perform repetitive functions like data entry, data verification and approval cycles. Business intelligence anticipates the claim volumes and is of great assistance in staffing because it does not lead to overstaffing or understaffing [15]. Furthermore, it is also possible to predict potentially denied or challenged claims, thus helping businesses avoid unproductive cases at an early stage. In a similar manner, in the healthcare industry, analytic applications in billing and coding results improve the aspect of low claim rejection. According to research, organizations that incorporate the claims processing systems have their processing costs slashed by up to 30% [16]. This theme reveals the application of analytics within the operational area in order to increase efficiency regarding the aspects of work process, employee assigning, and raising service quality contributing to profitability.

Theme 4: Healthcare and insurance organizations are struggling to adopt advanced analytics for claim processing.

This theme explores how healthcare and insurance organizations are struggling to adopt advanced analytics for claim processing. A major challenge is the lack of experienced talent needed to work in the realms of data science, artificial intelligence, and machine learning that organizations are unable to maximize the opportunities presented by these fields. Furthermore, application of advanced analytics into the existing legacy systems poses technical challenges in that such systems are inherently incompatible with modern AI solutions. Issues arise with data privacy and, especially when handling personal data in claim management and reporting, the GDPR and HIPAA among others [17]. Further, many internal forces such as cost implications of change and disruption of existing organizational practices hinder the adoption of new technologies. Reducing the barriers in question needs a consistent approach such as training, updating legacy systems, ensuring that the facilities meet security requirements, and fostering an innovation culture in the organisations.

VIII. Future Direction

Some future trends or development of claims in the context of healthcare and insurance can be however identified, from the likelihood that advanced analytics and emerging technologies increasingly shape the claims process. The shift towards machine learning, artificial intelligence, and predictive analytics only improves as they catch on for their ability to automate advanced level work, identify fraudulent activities, and enhance the precision of decision making across endeavors [18]. Real time data analysis enables the processing of claims to be done much faster whilst providing our clients with personalized services. However, for these technologies to be successfully implemented the following obstacles have to be addressed: data privacy, regulation, and talent.

IX. Conclusion

The envisaged use of advanced analytics in claims processing in both the healthcare and insurance industries shall go a long way towards improving efficiency as well as the speed to which they are processed. The allegations suggested that by using machine learning, AI and implementing predictive analytics, claim handling work processes would lessen, incidents and errors would decrease and overall, claims handling would occur at a faster pace hence customer satisfaction would improve and expenses would be cut. But the implementation of these technologies that brings efficiencies in the business processes is not without its drawbacks; these include the availability of skilled personnel, compatibility with existing information systems, issues to do with ownership of data and compliance with the law. Advanced analytics presents a golden chance to revolutionize claims processing in a manner that is hard to turn down, but to successfully do this, it is important to consider the technical and organizational enablers of change

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