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The Role of Artificial Intelligence in Marketing Supplemental Health Insurance: A Scoping Review for Challenges and Opportunities

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Abstract

Context: The health insurance sales network is one of the essential pillars of the health insurance industry, and redefining this role can significantly impact the performance and effectiveness of health insurance companies. The main objective of this research is to identify and analyze the challenges and opportunities involved in redefining the role of the health insurance sales network in the era of digital transformation using artificial intelligence (AI).

Methodes: To explore the principles of using AI for managing the health insurance sales network, a scoping review technique was employed. A comprehensive search strategy was implemented in the PubMed, Scopus, and Google Scholar databases until the end of August 2024, using keywords related to AI, health insurance, and sales networks. The inclusion criteria encompassed peer-reviewed articles in English that focused on AI applications in health insurance sales, while the exclusion criteria involved studies not directly related to health insurance or AI. The inclusion criteria required peer-reviewed, fully identified studies with abstracts and full texts published by August 2024. The exclusion criteria included unavailable full texts, irrelevant or duplicate articles, and low-quality content. The study selection process followed PRISMA guidelines, including an initial screening of titles and abstracts, followed by a full-text review. A flow diagram illustrating the selection process is provided in the full text.

Results: The results were categorized into seven main areas: The application of AI in identifying potential health insurance customers, automation of health risk assessment, targeting new health insurance products, segmentation of policyholders, predicting customer churn, estimating customer lifetime value (CLV), and predicting healthcare costs. The analysis also considered the limitations of the included studies, such as potential biases in AI algorithms and challenges related to data privacy.

Conclusions: The findings indicate that AI, in addition to increasing efficiency and reducing costs, enhances relationships between health insurance companies and policyholders. Given the specific complexities of medical data and the need for personalized solutions in health insurance, AI can play a crucial role in the digital transformation of this industry. Therefore, investing in AI technologies is essential for health insurance companies to maintain leadership in today's competitive market and provide higher-quality healthcare services to policyholders.

Keywords: Artificial Intelligence, Health Insurance Sales Network, Scoping Review, Challenges, Opportunities, Health Insurance

1. Context

The insurance sales network is one of the key factors in the insurance industry, and redefining this role can have significant impacts on the performance and effectiveness of insurance companies. Redefining the role of the sales network involves changing the goals, processes, and strategies related to sales and customer service. This change may occur for various reasons, such as increased competition, evolving customer needs, technological advancements, and regulatory changes.

In a 2012 article examining the customer retention process in insurance using concepts of customer

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satisfaction and relationship quality, it was noted that the insurance sales network should shift towards a more consultative approach and pay greater attention to customers' health needs. In other words, instead of focusing solely on selling products, it should prioritize guiding customers, providing information about health coverage, and assessing their healthcare needs (1, 2).

In this regard, the health insurance sales network should leverage modern technologies, such as medical data analysis and digital tools, to better identify customers' health status and provide optimized healthcare services. Additionally, continuous training and updates for sales representatives in the fields of medical advancements and health insurance are of particular importance, ensuring they can act as credible and reliable health advisors. This change in role can enhance customer experience, increase loyalty, and ultimately contribute to growth in sales and market share in the health insurance sector. The role of the health insurance sales network has significantly evolved, especially in today's rapidly changing world, where medical technology and healthcare needs are constantly shifting. The role of the health insurance sales network can be defined as follows.

1.1. Consultation and Guidance

The health insurance sales network is no longer limited to selling products. Instead, it acts as an expert consultant, helping customers choose the best healthcare coverage options based on their specific needs and health conditions. This shift in approach leads to increased customer satisfaction and long-term loyalty (3).

1.2. Use of Technology

The sales network should be optimized through the use of modern technologies such as medical record data mining, health data analysis, and digital tools. These tools enable sales representatives to gather accurate information about customers' healthcare needs and provide better services (4).

1.3. Building Long-Term Relationships

The sales network should manage customer relationships in a way that fosters continuous and long-term connections. These relationships can be strengthened through after-sales services, regular communication, and periodic assessments of customers' health needs and expectations (5).

1.4. Training and Updating

To maintain competence and relevance in the ever-changing world of medicine and health insurance, sales network members should receive continuous training and stay updated on the latest developments in the health insurance industry and medical technologies (6).

In summary, the health insurance sales network has transformed into a core communication and consulting hub that contributes to the success and growth of the health insurance industry by leveraging technology and establishing sustainable relationships with customers. The strategies related to these changes focus on innovation. The novelty of this study lies in its analysis and examination of new strategies aimed at improving customer experience and optimizing the performance of the health insurance sales network, rather than merely addressing traditional sales methods. This paper emphasizes that by utilizing modern technologies such as medical data analysis, artificial intelligence (AI), and digital tools, health insurance sales networks can create more effective and meaningful relationships with their customers while facilitating the sales process and enhancing after-sales services.

1.5. Research Objectives

The primary objective of this research is to identify and analyze the challenges and opportunities in redefining the role of the health insurance sales network in the era of digital transformation using AI. The central question that this study seeks to answer is: "How can artificial intelligence help the health insurance sales network address customers' healthcare needs more effectively while improving its performance?"

Numerous studies have examined the role of the insurance sales network and the impact of modern technologies on optimizing its performance, each with its own strengths and weaknesses. Here, we review several relevant studies, highlighting their commonalities and distinctions from the current research. Various research efforts have focused on the use of modern technologies, such as medical record data mining and digital tools, within the health insurance sales network. The strengths of these studies include their ability to accurately identify customers' healthcare needs and provide more optimized health

services. However, their weaknesses may include an inability to explore the cultural and social impacts on the acceptance of these technologies in the health sector (7).

Research emphasizing the importance of continuous training for health insurance sales representatives suggests that such education can enhance their competence and credibility in health consulting. The strengths of these studies include a focus on the role of credible advisors in the success of health insurance sales networks. However, their weaknesses may involve insufficient attention to financial and time-related challenges in implementing specialized medical training programs. In summary, while these studies highlight the benefits of ongoing education for sales representatives, they often overlook critical barriers that could hinder effective training initiatives. Addressing these challenges is essential to maximizing the impact of training programs on the performance and trustworthiness of health insurance sales representatives (8, 9).

The commonalities and distinctions of these studies can be analyzed from multiple perspectives. In terms of commonalities, all research efforts emphasize the importance of addressing customers' health needs, utilizing modern technologies in the medical field, and training health insurance sales representatives. The distinction of this research lies in its focus on the challenges and opportunities involved in redefining the role of the health insurance sales network during the digital transformation era. It provides a deeper analysis of the impact of AI on the performance of health insurance sales networks. Furthermore, the central question of this study — seeking to identify challenges and solutions in the health insurance field — reflects an innovative approach that may have received less attention in previous research. This research background indicates that, despite existing studies, there remains a need for a more thorough examination of the challenges and opportunities arising from digital transformation in the health insurance industry.

1.6. Research Questions

- What are the main challenges facing the health insurance sales network in the era of digital transformation?

- What solutions can help the health insurance sales network respond more effectively to customers' healthcare needs?

- How does AI play a role in optimizing the performance of the health insurance sales network and the delivery of healthcare services?

2. Methods

2.1. Type of Study

To explain the principles of using AI for managing the health insurance sales network, a scoping review technique of selected studies was employed.

2.2. Research Question

Using AI, which challenges and opportunities can help the insurance sales network respond more effectively to customer needs while improving its performance?

2.3. Inclusion and Exclusion Criteria

2.3.1. Inclusion Criteria

Studies published in conference proceedings and journals that adhere to appropriate formatting guidelines, including full identification of authors and publication details. Studies are limited to scientific articles that include both an abstract and a full text. Only studies published up to August 2024 are considered.

2.3.2. Exclusion Criteria

Articles without full-text availability. Studies that are not relevant to the main research question (based on title, abstract, and content). Duplicate articles in terms of title or content. Articles excluded due to low-quality content.

2.4. Search Timeframe and Databases

Relevant meanings and keywords related to the topic were searched in various databases including PubMed, Scopus, and Google Scholar, without any start date limitation up to the end of August 2024. Subsequently, studies with relevant titles were searched based on subject categorization and using the following keywords along with their Persian equivalents in the aforementioned databases. These keywords are:

(Digital Transformation[Title]) OR (health Insurance Industry[Title]) AND (Challenges[Title]) OR (Opportunities[Title]) OR (Distribution Networks[Title])

OR (Technology Adoption[Title]) OR (Customer Experience[Title]) OR (Innovation[Title]) OR (Regulatory Changes[Title]) OR (Market Trends[Title]) AND (Artificial Intelligence[Title].

2.5. Data Categorization

The data required by the article's author includes qualitative implementation and interpretation of data.

2.6. Collection and Reporting of Results

Results are presented clearly and transparently, emphasizing practical implications and gaps in scientific literature, categorized into seven areas:

- Application of AI for customer search
- Application of AI for risk assessment automation
- Targeting new businesses
- Customer segmentation
- Predicting customer churn
- Predicting customer lifetime value (CLV)
- Predicting claims

3. Results

This section presents a summary of the key results from the scoping review. The findings highlight the diversity and breadth of research conducted in the field and help identify patterns, gaps, and new research opportunities.

3.1. Application of Artificial Intelligence for Customer Search

Artificial Intelligence can be utilized to search for customers across various types of insurance, including life, health, pension, disability, liability, auto, home, rental, and natural disaster insurance. This technology enables insurance companies to identify potential customers and offer more suitable services by analyzing data and recognizing patterns. The use of AI in customer searches not only enhances process efficiency but also improves the overall customer experience. By leveraging this technology, insurance companies can build stronger relationships with customers and increase their conversion rates. The AI significantly supports insurance customers through these techniques:

3.1.1. Use of Chatbots

The AI chatbots can be deployed on websites and social media platforms to engage with potential customers around the clock. These chatbots are capable of answering basic questions (5, 6).

3.1.2. Purchase Behavior

The AI can utilize predictive analytics to forecast future shopping trends and behaviors. These predictions help sales teams adjust their strategies to align with the needs of the target market (5).

Chatbots are one of the revolutionary inventions of AI, assisting millions of customers in addressing their basic questions and concerns through online conversations or messaging. The data generated in the insurance industry is distinct and complex compared to other industries involving financial transactions. Therefore, the challenges in this sector are unique and intricate, requiring customized solutions.

3.1.3. Personalizing Communications

The AI can be used to personalize communication with customers. By analyzing existing data, companies can tailor their messages and offers to meet the specific needs of each customer, leading to an increase in insurance sales conversion rates (5).

3.1.4. Lead Scoring

By utilizing AI algorithms, companies can score leads based on their likelihood of converting into customers. This enables sales teams to focus their efforts on leads with higher potential, allowing for more efficient use of resources (5).

3.2. Application of Artificial Intelligence for Automating Risk Assessment

To reduce human errors, increase speed, and achieve more accurate data analysis, information technology tools and techniques, such as AI and machine learning (ML), can be employed to facilitate and enhance risk management processes. By leveraging these technologies, organizations can more effectively identify existing risks and implement appropriate control measures to mitigate them (7, 8). Artificial intelligence, using these techniques, can greatly assist in automating risk assessment.

3.2.1. Big Data Analysis

Artificial intelligence can analyze vast amounts of data with high speed and accuracy. This capability allows insurers to make more precise risk predictions

and provide more personalized insurance offers based on the analysis. For example, AI can examine historical data, customer behavior, and even real-time data from IoT devices to generate a comprehensive picture of risk factors (7, 9).

3.2.2. Reducing Processing Time

The AI-based automated systems can significantly shorten the time required for risk assessment. For instance, risk evaluation processes that previously took weeks can now be completed within minutes. This enables insurers to deliver faster services to customers and reduce operational costs (7).

3.2.3. Improving Predictive Accuracy

The AI-based models enhance the accuracy of risk predictions through advanced algorithms. Research has shown that utilizing AI can improve prediction accuracy by up to 25%, enabling insurers to manage risks more effectively and offer more competitive premiums (8).

3.2.4. Fraud Detection

The AI is highly effective in identifying unusual patterns that may indicate fraudulent activities. By analyzing claims data and comparing it with other sources, such as social media, AI can detect anomalies and reduce the financial risks associated with fraud (8).

3.2.5. Personalizing Insurance Services

The AI enables the development of customized insurance proposals by thoroughly analyzing each applicant's information. This personalization includes adjusting prices and insurance terms based on the specific risk profile of each customer, leading to increased customer satisfaction and loyalty (6).

3.3. Targeting New Businesses

Overall, AI, by providing advanced tools and techniques, enables the insurance sales network to be more successful in targeting new businesses and establishing stronger relationships with customers. This information highlights the significant potential of AI in transforming insurance sales processes and enhancing their efficiency. The AI can analyze geographic data to assess information related to different areas and identify suitable locations for launching new businesses. These analyses include demographic, socio-economic, and health data, which help decision-makers identify new markets (6, 10-12).

3.4. Predicting Customer Churn

Various ML algorithms have been utilized to predict whether a customer is likely to leave a company across different industries, including insurance. Logistic regression, decision trees, support vector machines (SVM), artificial neural networks (ANN), and several other classification algorithms have effectively contributed to predicting customer churn (6). Additionally, hybrid models such as LGBM and XGBoost have demonstrated strong performance in all aspects of churn prediction compared to individual models (13). The application of these algorithms enables insurance companies not only to anticipate customer departures but also to develop effective strategies for retaining their clients.

3.5. Predicting Customer Lifetime Value

Predicting CLV is a crucial metric in marketing and customer management, representing the total revenue or profit a customer generates throughout their relationship with a business. Information related to the products or services purchased by customers, along with socio-economic and demographic data, is used to forecast CLV. This prediction helps in understanding customer attitudes and behaviors, contributing to the successful retention of policies (14). The use of predictive methods to calculate CLV has specific advantages and disadvantages, which are outlined below.

3.5.1. Advantages

These include identifying valuable customers, detecting customer churn, and predicting future revenue.

3.5.2. Disadvantages

These encompass the need for historical data, model complexity, high implementation costs, the potential for errors, and market fluctuations.

3.6. Predicting Losses

Insurance losses or premium losses present a significant challenge in the insurance industry. Artificial intelligence has contributed to this sector by forecasting losses using various ML algorithms. Overall, AI provides

advanced tools and techniques that enable insurance companies to better predict losses and develop effective risk management strategies. These advancements benefit not only the companies but also enhance customer experiences. The methods employed include analyzing historical data, predicting future trends, reducing human errors, utilizing advanced and complex models such as deep neural networks and hybrid models, detecting fraud, and improving decision-making in risk management and premium determination (6, 14, 15).

4. Discussion

The article explores the application of AI in the insurance industry and its impact on customer acquisition and the automation of risk assessment. The use of AI in customer acquisition enables insurance companies to analyze data and identify patterns, allowing them to recognize potential customers and provide more tailored services. Techniques such as chatbots, predicting customer buying behavior, personalizing communications, and lead scoring are effective methods that enhance process efficiency and improve the customer experience. Recent research indicates that AI can increase customer conversion rates by up to 30% and foster stronger relationships between insurance companies and their clients (16).

The AI's role in the insurance sector extends to various areas, including predictive analytics for understanding customer behavior, enhancing service delivery through conversational AI, and automating risk assessments to streamline operations. By leveraging these technologies, insurers can improve their engagement strategies, reduce operational costs, and ultimately drive higher customer satisfaction (5).

Automating risk assessment is another key application of AI in the insurance industry. By utilizing AI tools, companies can more effectively identify risks and implement appropriate control measures to mitigate them. The benefits of using AI in this area include big data analysis, reduced processing time, improved predictive accuracy, and fraud detection. Studies indicate that employing advanced algorithms can increase the accuracy of risk predictions by up to 25% and significantly reduce the time required for risk assessment. These advancements not only enhance operational efficiency but also improve the customer experience, ultimately benefiting insurance companies.

4.1. Limitations

The analysis in this study also took into account the limitations of the included studies, such as potential biases in AI algorithms and challenges related to data privacy.

4.2. Conclusions

The article explores the role of AI in the digital transformation of the health insurance sales network. AI has enhanced customer acquisition processes and health risk assessments by providing advanced tools and techniques. Through AI, health insurance companies can identify potential customers and offer personalized healthcare services, improving the experience of insured individuals and increasing insurance coverage rates.

Additionally, automating health risk assessments through the analysis of medical data and advanced algorithms enhances the accuracy of predictions related to individuals' health status while significantly reducing the time required for disease risk evaluations. The findings of this research indicate that AI not only improves efficiency and reduces healthcare costs but also strengthens relationships between health insurance companies and insured individuals.

Given the unique challenges faced by the health insurance industry, such as the complexity of medical data and the need for customized solutions for each patient, AI serves as an effective strategy for driving digital transformation within this sector. Therefore, investing in AI technologies is essential for health insurance companies to maintain a competitive edge in today's healthcare market and provide higher-quality healthcare services to their insured clients. This not only enhances the performance of insurance companies but also contributes to improved community health levels and reduced overall healthcare system costs.

Footnotes

Authors' Contribution: Study concept and design: M. R.; Acquisition of data: S. S., M. S., and M. S.; Analysis and interpretation of data: H. H.; Drafting of the manuscript: S. S. M., S. R., and M. S.; Critical revision of the manuscript for important intellectual content: M. R. H. H.; Administrative, technical, and material support: M. R. and H. H.; Study supervision: M. R. and H. H.

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