Chapter 7
Data-Driven Sustainability: Innovations in the Insurance Sector

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ABSTRACT

The global insurance industry is transforming due to unprecedented climatic patterns, regulatory frameworks, evolving consumer expectations, and emerging technology. The issues we encounter in the 21st century is not adequately addressed by the statistical methods and risk assessments employed in insurance models. Technologies like artificial intelligence, machine learning, big data analytics, natural language processing, and geospatial modelling help insurers enhance sustainability. It introduces the Data-Driven Sustainability Integration Model (DSIM), where KPIS are set for economic, social, and environmental safety. Case studies show how artificial

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intelligence can identify fraudulent claims, Satellite imaging may evaluate agricultural risks, while telematics may be used in automotive insurance to encourage enhanced and more environmentally sustainable driving behaviours. The study analyses the main data-driven sustainability problems and prospects within the insurance sector, urging a shift toward a robust and reliable insurance system.

INTRODUCTION

The global insurance sector is in chaos due to an increase in natural disasters, the repercussions of climate change, and the need for firms to adopt more social responsibility. Conventional statistical approaches fail to include environmental and economic fluctuations, indicating the need for a more dynamic and adaptive approach. Insurance businesses are increasingly seen as key contributors to sustainable development. Insurance firms must go beyond merely risk assessment and transmission (Abisoye and Akerele, 2022). Due to these developments, data science is emerging as a crucial instrument that may transform insurers' approaches to risk assessment, claims management, and the formulation of equitable and sustainable strategies for all stakeholders. Insurers face significant pressure to implement ESG principles from regulators, consumers, and investors. Sustainability has become imperative for firms seeking to maintain resilience and profitability over time. Big data analytics, machine learning, artificial intelligence, and Digital technologies that facilitate risk assessment and improve investment and insurance decisions are known as real-time data collection. This post will examine the opportunities and challenges insurers have when data science intersects with sustainability. Numerous insurance businesses continue to neglect the use of data science in their sustainability initiatives, despite advancements in technology and increasing public awareness of the problem (Abuljadail et al., 2023). Some organisations have capitalised on individual successes, such as GPS for car insurance or AI-enhanced claims processing; nonetheless, data science continues to be underutilised in promoting long-term corporate sustainability. The standard insurance coverage remains unaffordable for the majority of low-income groups because they lack proper access to this system. Insurance companies must create adaptable and economical insurance solutions that include technology and sustainable components to address contemporary market demands, as stated by Adaga et al. (2024). Data science enables the development of functional insurance systems through which insurers protect susceptible communities. This research focuses on data science methods that bring survival opportunities to insurance organisations. The study examines how artificial intelligence, in conjunction with the Internet of Things and big data analytics, aids insurers in enhancing productivity during ethical risk assessments and the development of ecologically