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Strategies for exploring ai-driven business intelligence in the Malaysian insurance industry

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Abstract

Integrating Artificial Intelligence (AI) with Business Intelligence (BI) systems represents a strategic shift in the insurance industry, promising enhanced operational efficiency, strategic decision-making, and improved customer experiences. This transition has been gradual in the Malaysian insurance sector, hampered by challenges such as organizational resistance, skill shortages, regulatory complexities, and financial constraints. This study investigates the key strategies of AI-driven BI systems in the Malaysian insurance industry, aiming to bridge the gap between technological potential and practical application. Employing an integrated framework combining the Technology-Organization-Environment (TOE) model and Resource-Based View (RBV), the research examines external pressures and internal capabilities that influence strategic AI adoption. A qualitative case study approach was used to explore the phenomenon, featuring in-depth interviews with technical experts, middle management, and senior leaders from key industry players. Thematic analysis of the data identified critical barriers and enablers alongside strategic interventions that facilitate successful AI implementation. The findings provide a nuanced understanding of how Malaysian insurers can overcome adoption challenges through leadership commitment, workforce upskilling, technological infrastructure upgrades, and policy advocacy. Academically, this study enriches the existing literature by addressing the dearth of research on AI-driven BI adoption in emerging markets. Practically, it offers actionable recommendations for insurers to harness AI capabilities effectively, driving innovation and competitiveness in a rapidly evolving market. By proposing context-specific strategies, this research contributes to the broader discourse on digital transformation in the insurance sector, providing valuable insights for stakeholders striving to balance technological advancement with regulatory compliance and customer-centricity.

Keywords: Artificial intelligence, Business intelligence, Malaysian insurance industry, Infrastructural investment, Product innovation, Resource-based view, Digital, Transformation, Emerging markets.

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1. Introduction

Artificial intelligence (AI) is rapidly transforming industries worldwide, and its integration with business intelligence (BI) is revolutionizing how organizations leverage data for strategic decision-making. AI-powered business intelligence solutions systems, employing advanced algorithms, machine learning, and predictive analytics, offer unprecedented capabilities to analyze vast datasets, uncover hidden patterns, and generate actionable insights with speed and accuracy surpassing traditional BI approaches. This transformative potential is particularly relevant in the insurance industry, where vast amounts of data, from customer demographics and claims history to market trends and risk assessments, are key to enhanced operational efficiency, improved customer experiences, and more effective risk management. Globally, leading insurance companies are already reaping the benefits of AI-powered business intelligence solutions, demonstrating significant improvements in underwriting, fraud detection, and personalized customer service.

However, adopting AI-powered business intelligence solutions within the Malaysian insurance sector must align with global trends. While the Malaysian government has launched initiatives to promote AI adoption across various sectors, the insurance industry faces unique challenges, including regulatory complexities, a shortage of skilled talent, and cultural perceptions surrounding AI. This study aims to explore the current state of AI-powered business intelligence solutions within the Malaysian insurance industry. More importantly, it seeks to underscore the urgent need for strategies to accelerate adoption and maximize the benefits of this transformative technology. In essence, this research aims to bridge the gap between the potential of AI-powered business intelligence solutions and their practical application within the Malaysian insurance context.

2. Background of the Study

2.1. Global Perspective on AI-Driven Business Intelligence

In the era of rapid digital transformation, artificial intelligence (AI) has emerged as a pivotal technology reshaping industries worldwide. Integrating AI into Business Intelligence (BI) systems, or AI-powered business intelligence solutions, is revolutionizing how organizations process data, gain insights, and make strategic decisions [1]. AI-powered business intelligence solutions leverage advanced algorithms, machine learning, natural language processing (NLP), and predictive analytics to analyze vast amounts of data, uncover patterns, and generate actionable intelligence with greater speed and accuracy than traditional BI systems.

According to Gartner [2] global investment in AI is expected to reach $140 billion by 2025, with the insurance industry significantly contributing to this growth. Insurers are increasingly adopting AI-powered business intelligence solutions to enhance underwriting processes, detect fraud, personalize customer experiences, and improve operational efficiency [3]. The ability of AI to process unstructured data, such as images and text, allows insurers to analyze claims documents, social media content, and other non-traditional data sources, providing a competitive edge in risk assessment and customer engagement [4].

Technological innovations such as robotic process automation (RPA) and deep learning are being integrated into BI platforms, enabling insurers to automate routine tasks and focus on strategic initiatives [5]. For instance, AI-powered chatbots and virtual assistants enhance customer service by providing instant support and personalized recommendations [6].

2.2. Malaysian Business Landscape

2.2.1. Overview of the Malaysian Insurance Sector

The Malaysian insurance sector is a dynamic and evolving industry with significant growth opportunities driven by various factors, including economic development, regulatory changes, and shifting consumer preferences. This overview will cover the structure, key segments, and current trends.

2.2.2. Industry Structure

The insurance market in Malaysia is divided into two primary segments:

Life insurance: This segment includes whole-life policies, term life insurance, and investment-linked plans. Life insurance has been experiencing robust growth, mainly through takaful (Islamic insurance), which is gaining popularity among the Muslim population.

Non-Life Insurance: Also known as general insurance, this segment encompasses various types of coverage, including health, motor vehicle, property, and liability insurance. The non-life sector is projected to grow significantly due to increasing demand for motor and property insurance, driven by rising vehicle sales and heightened awareness of natural disaster risks.

As of 2024, the gross written premium for the overall insurance market is expected to reach approximately $21.05 billion, with life insurance dominating this figure [7].

2.2.3. Current Trends

1. Digital Transformation: The Malaysian insurance industry is increasingly adopting digital solutions. Insurers leverage data analytics and artificial intelligence technology to enhance customer service and develop personalized products that cater to individual needs.

2. Climate-Related Risks: The sector is responding to the growing importance of climate change by developing products that address insurability issues related to natural catastrophes. This includes innovations in catastrophe modeling and risk assessment [8].

3. Health insurance demand: There is a rising demand for health insurance products due to increasing medical inflation and greater public awareness of health issues. This trend is further supported by the government's initiatives to improve financial literacy regarding health coverage [7].

4. Takaful Growth: Takaful continues to grow as a significant market component, appealing to consumers seeking Sharia-compliant financial products. Malaysia ranks third globally in terms of Takaful assets [7].

5. Increased Premium Rates: Insurers are reassessing their risk exposure and adjusting premium rates accordingly due to rising claims from accidents and natural disasters. For instance, motor insurance is expected to grow by 8.9% in 2024 [9].

2.2.4. Current State of AI--Driven Business Intelligence in Malaysia

While global insurers rapidly adopt AI-powered business intelligence solutions, the Malaysian insurance sector has embraced these technologies more slowly. According to a 2023 survey conducted by Bank Negara Malaysia (BNM), the adoption of AI and machine learning in the Malaysian financial services sector, including the insurance industry, is still in its early stages. However, the industry has witnessed digital transformation, with the adoption of InsurTech solutions, AI, and machine learning to enhance efficiency, customer service, and risk management. The introduction of digital insurers and the upcoming Digital Insurers and Takaful Operators (DITO) framework will further accelerate innovation [10].

2.3. Government Initiatives and Policies

The Malaysian government has been proactive in promoting AI through various initiatives. The Malaysia AI Roadmap, launched by the Ministry of Science, Technology and Innovation (MOSTI), outlines plans to enhance the country's AI capabilities from 2021 to 2025 [11]. This roadmap focuses on six key pillars:

1. Establishing AI Governance: Developing a robust framework for ethical AI use.
2. Advancing AI R&D: Encouraging research and development within the AI ecosystem.
3. Escalating AI Digital Infrastructure: Improving productivity and economic growth through AI.
4. Fostering AI Talents: Addressing social challenges using AI in sectors like healthcare and education.
5. Acculturating AI: Creating a thriving innovation ecosystem.
6. Kickstarting an AI Ecosystem: Supporting the growth of AI startups and initiatives.

The government aims to position Malaysia as a leader in AI by 2030, with plans to develop over 900 AI startups and train more than 13,000 talents by 2026 through initiatives like the National AI Sandbox pilot program [12, 13].

2.4. Cultural Perceptions of AI

Malaysians exhibit a growing awareness of AI, with approximately 63% of respondents acknowledging its existence, yet only about 25% actively use AI applications. This discrepancy highlights cultural resistance and skepticism regarding AI's benefits and implications for job security [14]. Many individuals express concerns about the perceived threats that AI poses to employment, leading to a cautious approach towards its integration into the workplace [15].

2.5. The "Bring Your Own AI" Trend

A notable trend is the emergence of a "Bring Your Own AI" (BYOAI) culture, where 83% of Malaysian workers utilize personal AI tools at work. This trend reflects a proactive stance among employees to enhance productivity despite organizational hesitance. While this self-initiated adoption indicates a demand for AI, it also suggests a lack of effective, cohesive leadership strategies to integrate these technologies [16, 17].

2.6. Current Adoption Rates

Despite these efforts, actual adoption rates of AI technologies could be much higher. Reports indicate that only about 28.9% of Malaysian respondents currently utilize AI tools in their work environments, significantly lower than in countries like the United States, where approximately 77% of companies engage with AI technologies [16].

However, there is a notable trend among knowledge workers in Malaysia, with 84% reportedly using AI at work to enhance productivity, which is higher than the global average of 75%. This indicates employees' growing acceptance and reliance on AI tools [17].

2.7. Future Outlook

Looking ahead, the Malaysian government has initiated several programs to foster an environment conducive to AI innovation, including the Malaysia Digital Economy Blueprint (MyDIGITAL). These initiatives aim to enhance digital infrastructure and promote skill development in line with technological advancements [16].

Experts emphasize the need for Malaysian businesses and policymakers to carefully assess the potential benefits of AI across various sectors, such as agriculture and manufacturing. The transformative potential of AI could lead to increased productivity and efficiency if effectively harnessed.

As Malaysia continues its journey towards digital transformation, fostering an environment conducive to innovation while addressing existing challenges will be crucial for maximizing the benefits of AI technology [12, 13, 15].

2.8. Problem Statement

Despite the global advancements and proven benefits of AI-powered business intelligence solutions in the insurance industry, the Malaysian insurance sector still needs to fully embrace these technologies. The slow adoption rate poses significant risks, including decreased competitiveness, inability to meet evolving customer expectations, and operational inefficiencies that could impact profitability and sustainability [18].

The global digital transformation underscores the urgency of the problem. Customers increasingly demand personalized, seamless digital experiences, and insurers that fail to deliver may lose market share to more agile competitors, including InsurTech startups and foreign insurers operating in Malaysia [19]. Moreover, operational inefficiencies resulting from reliance on legacy systems hinder the ability of Malaysian insurers to optimize costs and respond swiftly to market changes.

Evidence of the problem is highlighted in a study conducted by Boston Consulting Group [18] Malaysian companies lag behind their global and regional peers in digital transformation, with only 17% adequately prepared for success. Adoption of embedded AI, in particular, is significantly behind, with Malaysian companies scoring an average of 4.7 on AI adoption compared to Southeast Asia's 7.1 and the global average of 7.4. A report by the Asian Institute of Insurance (AII) [20] found that only 15% of insurers have integrated AI-powered business intelligence solutions into their core operations. Key challenges identified include organizational resistance to change, lack of skilled talent, inadequate technological infrastructure, and regulatory complexities.

The slow adoption of AI-powered business intelligence solutions impacts stakeholders such as customers, employees, shareholders, and regulators. Customers may experience suboptimal service levels, employees may face increasing workloads due to inefficient processes, and shareholders may see diminished returns. While aiming to ensure stability and consumer protection, regulators recognize the need to balance oversight with facilitating innovation [21].

Addressing these challenges aligns with Malaysia's national objectives of becoming a high-income nation and a leader in the digital economy, as outlined in the MyDIGITAL blueprint [22]. Therefore, it is critical to investigate the factors impeding the adoption of AI-powered business intelligence solutions, assess the effectiveness of current implementations, and develop strategies tailored to the Malaysian context.

2.9. Research Objectives

- To develop strategies to increase the adoption and enhance the effectiveness of AI-driven business intelligence in the Malaysian insurance sector.

2.10. Research Questions

- What strategies can be implemented to increase the adoption and enhance the effectiveness of AI-driven business intelligence in the Malaysian insurance sector?

2.11. Significance of the Research

This research holds significant implications across practical, academic, and policy spheres. From a practical standpoint, the findings of this study will provide valuable insights for insurance companies operating in Malaysia. By identifying the specific challenges hindering the adoption of AI-powered business intelligence solutions, this research will empower insurers to develop targeted interventions and overcome these obstacles. Ultimately, this research will equip Malaysian insurers with the knowledge and strategies to improve operational efficiency, enhance customer satisfaction, and strengthen their competitive position in a rapidly evolving market.

Academically, this study contributes to the growing body of knowledge surrounding AI adoption in emerging markets. It addresses a significant gap in the literature by focusing specifically on the Malaysian insurance sector, providing empirical data and insights that can inform future research and theoretical development. The study also extends the application of existing theoretical frameworks, such as the Technology-Organization-Environment (TOE) model, to a new context, further enriching our understanding of the factors influencing technology adoption.

Finally, this research carries important policy implications. By highlighting the challenges and opportunities associated with AI-powered business intelligence solutions, the study will inform policymakers and regulators in Malaysia about the necessary steps to create a supportive regulatory environment. This includes developing guidelines and frameworks for ethical AI use in insurance and ensuring consumer protection while fostering innovation. The research will also offer recommendations for aligning national policies with industry needs, accelerating the digital transformation of the Malaysian insurance sector, and contributing to the nation's broader economic goals.

2.12. Scope of the Research

This research focuses on insurance companies operating within Malaysia, encompassing the life and general insurance sectors. The technological scope is delimited to AI-driven business intelligence technologies, including machine learning, predictive analytics, and AI-powered data processing tools. The study will primarily examine developments and data from the past five years (2018-2023) to ensure the relevance and currency of the findings.

Certain areas are excluded from the scope of this research. Specifically, the study will not cover non-AI BI systems, other financial sectors outside of insurance (e.g., banking or fintech), or AI applications unrelated to business intelligence. This focused approach allows for a deeper and more nuanced investigation of the specific challenges and opportunities related to AI-powered business intelligence solutions within the Malaysian insurance industry.

2.13. Definition of Terms

- Artificial Intelligence (AI): The simulation of human intelligence processes by machines, particularly computer systems, which includes learning, reasoning, and self-correction [23].
- Business Intelligence (BI): Technologies, applications, and practices for the collection, integration, analysis, and presentation of business information to support better decision-making [24].
- AI-Driven Business Intelligence: Integrating AI technologies into BI processes to enhance data analysis capabilities, automate insights generation, and improve decision-making efficiency [25].
- Machine Learning: A subset of AI involving algorithms that enable systems to learn from data and improve performance over time without explicit programming [26].
- Data Analytics: The process of examining datasets to conclude the information they contain, increasingly with specialized systems and software [27].
- Digital transformation: the integration of digital technology into all business areas, fundamentally changing how organizations operate and deliver value to customers [28].
- Emerging Markets: Nations with rapid growth and industrialization and with social or business activities, such as Malaysia [29].
- InsurTech: A blend of "insurance" and "technology," encompasses various innovations designed to enhance the insurance industry through the application of technologies such as artificial intelligence (AI), big data analytics, blockchain, and machine learning (ML). These technologies facilitate automated underwriting processes, improve risk assessment, and enhance claims processing, while digital distribution channels and cloud computing solutions enable broader reach and operational scalability. Additionally, telematics support usage-based insurance models, and smart contracts automate policy administration, contributing to more efficient and transparent operations. Emerging trends like peer-to-peer insurance and on-demand coverage reflect a shift towards customer-centric solutions, ultimately enhancing the insurance sector's overall customer experience (CX) [30].

3. Theoretical Frameworks and Models

This chapter examines theoretical frameworks for adopting AI-driven Business Intelligence (BI) in the Malaysian insurance industry. We analyze key theories, assess their applicability to this context, and highlight their strengths and weaknesses. This analysis justifies the adoption of an integrated framework combining the Technology-Organization-Environment (TOE) and Resource-Based View (RBV) for this study.

3.1. Technology-Organization-Environment (TOE) Framework

The TOE framework Tornatzky et al. [31] provides a more comprehensive organizational-level analysis, considering technological, organizational, and environmental contexts. This framework is particularly suitable for analyzing the adoption of AI-powered business intelligence solutions in Malaysian insurance, as it encompasses the multifaceted factors influencing organizational decisions. However, it does not explicitly address the development and leveraging of internal resources for competitive advantage.

3.2. Resource-Based View (RBV)

The RBV Barney [32] emphasizes internal resources and capabilities as sources of competitive advantage. Applied to AI-powered business intelligence solutions, RBV highlights the importance of developing unique AI capabilities and fostering an innovative culture. However, RBV alone may not fully capture the influence of external pressures and technological change, which are significant in the rapidly evolving field of AI.

3.3. Integrated TOE-RBV Framework

This study adopts an integrated TOE-RBV framework to address the limitations of individual models. This framework provides a holistic approach, considering both external influences (TOE) and internal capabilities (RBV). This is crucial for understanding the adoption of AI-powered business intelligence solutions in Malaysian insurance, where factors like technological infrastructure, organizational culture, regulatory compliance, and strategic alignment are interconnected. A visual representation of this integrated framework is provided in Figure 1.

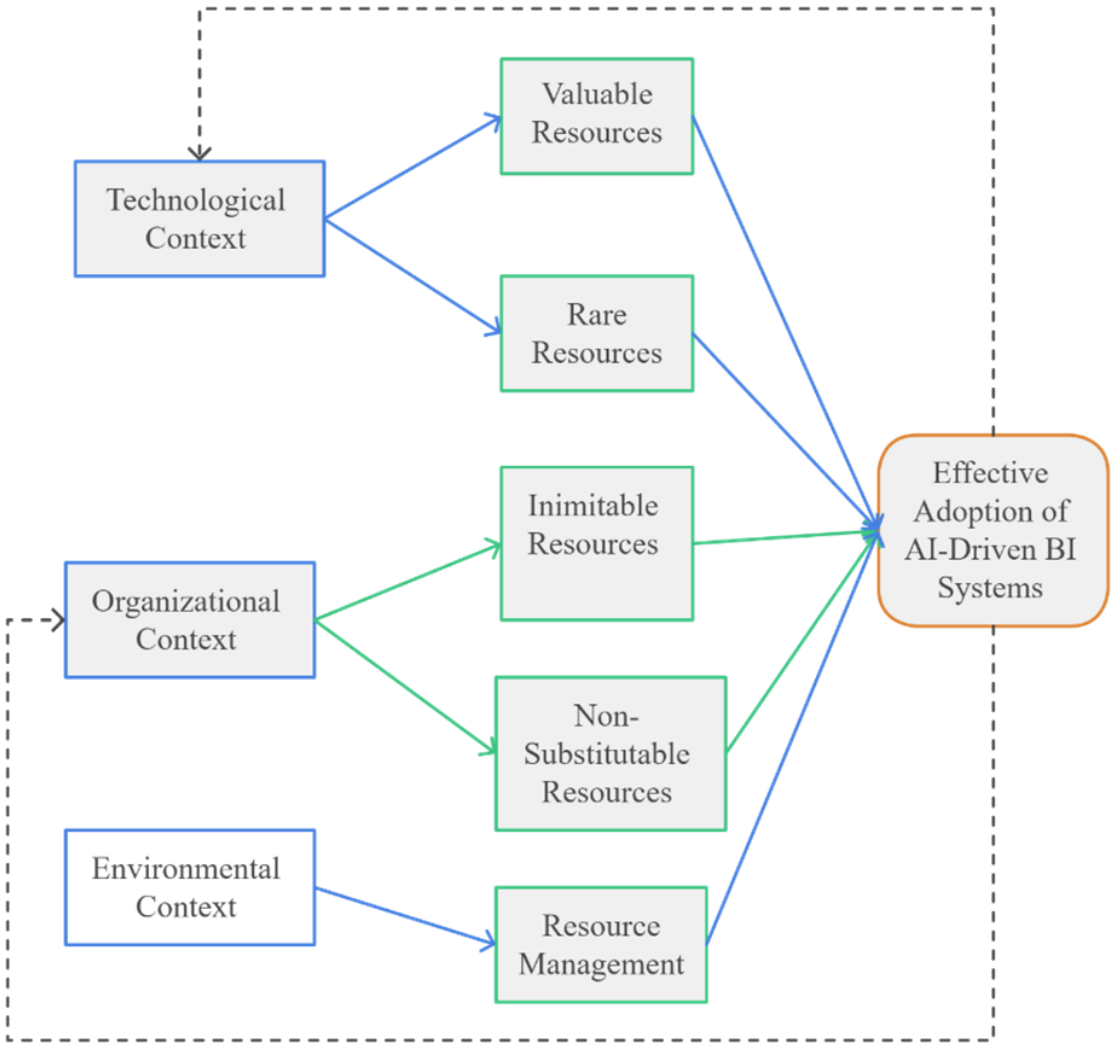

Figure 1.
Illustrates the theoretical framework for AI-driven Business Intelligence Adoption in the Malaysian Insurance Industry.

Source: Legends:
Blue: TOE Framework Components.
Green: RBV Components.
Orange: Outcome.
Dashed Gray: Feedback Loops.

3.4. Relevance to the Malaysian Insurance Industry

The integrated TOE-RBV framework is particularly relevant to the Malaysian insurance industry. The technological context considers compatibility with existing systems, often legacy systems in Malaysian companies, and data readiness. Organizational factors include leadership commitment, which is crucial in Malaysia's hierarchical culture, and resource availability. Environmental factors encompass regulatory compliance with the Personal Data Protection Act (PDPA) [33], competitive pressures and customer expectations. The RBV perspective emphasizes developing unique AI capabilities for competitive advantage, including talent development and fostering an innovative culture.

3.5. Identification of Literature Gaps

Despite the existing literature, more research is needed to apply integrated frameworks to the adoption of AI-powered business intelligence solutions, specifically within the Malaysian insurance industry. Many studies focus on single theories or general technology adoption, neglecting this sector's specific challenges and opportunities. Furthermore, cultural factors unique to Malaysia, such as high power distance and collectivism, must be explored. This study aims to address these gaps by providing a context-specific analysis, employing an integrated framework, and offering tailored strategies for the Malaysian insurance industry.

3.6. Strategies to Increase Adoption and Enhance Effectiveness

Insurance companies need to implement strategic initiatives to overcome the identified challenges and fully realize the benefits of AI-powered business intelligence solutions. This section explores strategies supported by literature and industry best practices that can facilitate the adoption and enhancement of the effectiveness of AI-powered business intelligence solutions in the Malaysian insurance sector.

3.6.1. Leadership Commitment

3.6.1.1. Role of Leadership

Leadership commitment is paramount for driving successful technological innovation, including adopting AI-powered business intelligence solutions within organizations. Leaders play a crucial role in setting the vision, allocating resources, and shaping the organizational culture to embrace change and innovation. Transformational leadership, characterized by the ability to inspire and motivate employees towards a shared vision [34], is particularly effective in driving successful technology adoption.

As Alamelu [35] outlines, effective leadership in the context of the adoption of AI-powered business intelligence solutions requires several key skills. Leaders must clearly articulate the strategic importance of AI and how it aligns with the organization's overall goals. This includes painting a compelling picture of the potential benefits for various stakeholders and setting realistic expectations for the implementation process. AI initiatives may need a clear vision and strong advocacy from leadership to gain traction.

Resource allocation is another critical aspect of leadership's role. Leaders must ensure adequate financial, human, and technological resources are dedicated to AI-powered business intelligence solutions projects. This may involve investing in infrastructure upgrades, recruiting skilled talent, and providing employee training and development opportunities. Without sufficient resources, even the most promising AI initiatives are likely to fail.

Finally, leaders play a crucial role in shaping organizational culture. By promoting innovation, learning, and adaptability, leaders can create an environment that embraces change and encourages experimentation. This cultural shift is essential for reducing resistance to new technologies and fostering a climate where employees are empowered to explore and implement AI-driven solutions. Effective leadership is, therefore, not just about endorsing AI adoption; it's about actively championing the change, providing the necessary resources, and fostering a culture that embraces innovation.

3.6.2. Case Examples

AIA Malaysia: The CEO championed a digital transformation strategy that included AI-powered business intelligence solutions initiatives. By actively promoting the vision and involving employees at all levels, the company achieved successful adoption and improved operational efficiency and customer engagement [36].

Prudential Malaysia: Leadership emphasized innovation as a core value, investing in AI technologies to enhance customer experiences. The commitment from top management facilitated cross-departmental collaboration and accelerated implementation [37].

These examples illustrate how leadership commitment can drive successful AI adoption by aligning organizational efforts and overcoming internal barriers.

3.6.3. Change Management Practices

3.6.3.1. Kotter's 8-Step Model in Practice

Implementing AI-powered business intelligence solutions represents a significant organizational change that requires careful management. Kotter [38] 8-Step Change Model provides a structured approach:

1. Establish a sense of urgency: Highlight AI adoption's competitive pressures and opportunities. Communicate the risks of inaction to create motivation for change.
2. Form a powerful guiding coalition: assemble a cross-functional team with representatives from leadership, IT, operations, and other key departments to lead the change effort.
3. Create a vision for change: Develop a clear vision articulating how AI-powered business intelligence solutions will benefit the organization and its stakeholders. Ensure the vision is compelling and achievable.
4. Use multiple channels to consistently communicate the vision and strategies. Address concerns and feedback from employees.
5. Empower others to act on the vision: remove obstacles that hinder change, such as outdated policies or resistant individuals. Encourage innovation and risk-taking that are aligned with the vision.
6. Generate short-term wins: identify and celebrate early successes to build momentum. Short-term wins validate the effort and demonstrate tangible benefits.
7. Consolidate improvements and produce more change: Use credibility from early wins to tackle more significant challenges. Promote continuous improvement and avoid complacency.
8. Anchor new approaches in the culture: embed AI-powered business intelligence solutions into organizational practices and norms. Reinforce the change through leadership development and succession planning.

Applying Kotter's model ensures that change is managed systematically, addressing both technical and human aspects of adoption.

3.6.4. Employee Engagement

Employee engagement is crucial for successfully adopting and implementing any new technology, including AI-powered business intelligence solutions. When employees are actively involved and invested in the change process, they are more likely to embrace the latest technology and contribute to its successful integration within the organization. Cameron and Green [39] emphasize that engaged employees are more supportive of change initiatives and play a key role in their success. Several strategies can foster employee engagement when adopting AI-powered business intelligence solutions.

Providing comprehensive training and development opportunities is essential. Employees must be equipped with the necessary skills and knowledge to utilize AI-powered business intelligence solutions tools effectively. Training programs

should be tailored to different roles and learning styles, ensuring all employees feel confident and competent in using the new technology.

Involving employees in the decision-making process is another key strategy for fostering engagement. When employees feel that their voices are heard and their input is valued, they are more likely to support the change and actively participate in its implementation. This participatory approach can significantly reduce resistance to new technologies and foster a sense of ownership among employees.

Maintaining open and transparent communication throughout the adoption process is also crucial. Regularly communicating updates, addressing employee concerns, and providing clear explanations about the benefits and implications of AI-powered business intelligence solutions can help build trust and reduce anxiety associated with change.

Finally, recognizing and incentivizing employee contributions can further enhance engagement. Acknowledging and rewarding employees who actively embrace and effectively utilize AI-powered business intelligence solutions can motivate others to do the same and create a positive feedback loop that reinforces the adoption process. By implementing these strategies, organizations can foster a culture of engagement and empower their employees to become active participants in successfully adopting AI-powered business intelligence solutions.

3.6.5. Talent Development and Acquisition

3.6.5.1. Training Programs

Training programs are essential for developing internal capabilities and effectively implementing AI-driven Business Intelligence (BI) systems. These programs should provide employees with both fundamental and advanced skills in areas such as AI, machine learning, data analytics, and BI tools. To accommodate the diverse levels of technical expertise within an organization, training must address a wide range of employee needs, from those requiring basic literacy in AI concepts to those needing more specialized technical knowledge to operate and maintain AI-driven systems [40].

In-house training programs are especially beneficial, allowing organizations to tailor content to their strategic objectives and operational needs. These programs can range from foundational courses, which introduce employees to the basics of AI and data analysis, to advanced workshops that provide deeper insights into the technical workings of AI tools and algorithms. Such an approach not only boosts employee confidence in using AI systems but also contributes to the overall digital transformation of the organization [41].

In addition to individual learning, cross-functional training programs are essential to bridge the gap between business and technical teams. By encouraging collaboration between IT departments and other business units, organizations can ensure that employees across different functions understand how AI technologies can be integrated into their respective areas. For instance, marketing and sales teams may benefit from learning how AI can enhance customer segmentation and targeting, while operational teams could explore how AI-driven analytics can improve decision-making and resource allocation [42]. Such interdisciplinary training promotes a more cohesive approach to AI adoption across the organization.

Another key strategy is supporting continuous learning through certification programs and partnerships with external training providers. Employees should be encouraged to pursue AI and data science certifications to keep their skills current. By partnering with established training institutes or educational platforms, organizations can provide access to specialized courses beyond in-house training capabilities. This ensures that the workforce remains adaptable and prepared to integrate AI into evolving business processes [43].

Ultimately, investing in comprehensive training programs enables organizations to create a culture of continuous learning and innovation. By equipping employees with the necessary skills and knowledge to navigate the complexities of AI technologies, businesses can enhance their competitiveness, drive efficiency, and sustain long-term growth in a rapidly digitizing world.

3.6.6. Partnerships with Educational Institutions

Partnerships between businesses and educational institutions are critical in addressing the skills gap in AI adoption within the insurance sector. These collaborations provide companies with access to a steady stream of qualified talent and allow academic institutions to align their curricula with industry needs. One effective form of such partnerships is through internship programs. These programs offer students specializing in AI and data science an opportunity to gain practical, hands-on experience, which enhances their learning and prepares them for the workforce. In return, organizations benefit from having access to potential employees, reducing the costs and time associated with recruitment [44].

Research collaborations foster innovation by enabling businesses to work closely with academic institutions on joint projects. This arrangement allows companies to stay at the forefront of technological advancements while assisting academic researchers in applying their knowledge to real-world problems. Such partnerships have enhanced innovation, particularly in AI and data science [45]. By engaging in these collaborations, the insurance industry can leverage academic expertise to explore new AI applications, improving efficiency and service delivery.

Moreover, curriculum development through collaboration with educational institutions ensures that students graduate with the skills required by businesses. Organizations can work with universities to design courses that align with the evolving needs of the insurance industry, particularly in AI and data analytics. This proactive approach helps to reduce the skills mismatch and ensures that the next generation of graduates is ready to contribute meaningfully to their employers [46].

In conclusion, partnerships with educational institutions through internships, research collaborations, and curriculum development are essential for bridging the skills gap in AI and ensuring a robust pipeline of skilled professionals. These

collaborations benefit academia and industry by promoting innovation and preparing a workforce capable of meeting the demands of an AI-driven economy.

3.6.7. Technological Partnerships and Collaborations

3.6.7.1. Vendor Relationships

Vendor relationships are instrumental in successfully implementing AI-driven Business Intelligence (BI) systems within the insurance industry. Collaborating with technology vendors provides access to specialized expertise, advanced resources, and innovative solutions that organizations may need more internally. Selecting the right vendor is critical to ensuring the success of AI initiatives, as vendors with proven experience in AI-powered business intelligence solutions implementations can offer valuable insights and tailor solutions that meet specific organizational needs.

Selecting vendors should involve a thorough evaluation of their technical capabilities, industry experience, and previous track record in the insurance sector. By partnering with vendors with extensive experience with AI in the insurance industry, organizations can mitigate the risks associated with the complexity of such technological projects. These vendors are better positioned to understand the insurance sector's unique challenges, such as data privacy concerns, regulatory compliance, and integration with legacy systems. Thus, the selection process becomes a strategic decision, heavily influencing the success of AI-powered business intelligence solutions implementations [47].

In addition to selecting experienced vendors, joint development projects can further enhance the value derived from these partnerships. Through collaboration, organizations and vendors can co-create customized solutions specifically designed to address the unique challenges and opportunities within the insurance sector. This co-development approach ensures that the solutions are tailored to the organization’s needs and allows for greater flexibility in adapting to evolving business requirements. Moreover, by engaging in joint development, organizations can leverage the vendor's expertise to create innovative AI-driven solutions that offer a competitive edge in the market.

Knowledge transfer is another vital aspect of vendor relationships, particularly in building internal capabilities for managing and maintaining AI-powered business intelligence systems. Many vendor agreements include provisions for training and support, which are essential for ensuring that internal teams have the skills and knowledge required to operate AI technologies effectively. This knowledge transfer is crucial for fostering sustainable internal capabilities to manage AI-driven systems independently over time, reducing reliance on external vendors. Establishing a robust knowledge transfer strategy ensures that organizations continuously improve their AI capabilities and adapt to future technological developments [47].

In conclusion, successful vendor relationships in the context of adopting AI-powered business intelligence solutions are built on selecting experienced partners, engaging in joint development, and prioritizing knowledge transfer. These partnerships provide organizations with the tools and expertise to effectively implement AI technologies, enhancing operational efficiency and innovation within the insurance industry.

3.6.8. Industry Consortia

Participation in industry consortia offers organizations in the insurance sector a valuable platform for collaboration, knowledge exchange, and collective advocacy. These consortia, which typically consist of industry stakeholders, including businesses, technology providers, and regulatory bodies, facilitate the sharing of best practices, success stories, and lessons learned. Through participation, organizations can gain insights into emerging trends, new technologies, and innovative applications relevant to adopting AI-driven Business Intelligence (BI) systems. This exchange of knowledge enables companies to refine their strategies by learning from the experiences of their peers and adopting proven approaches to AI implementation [48].

In addition to knowledge sharing, industry consortia play an essential role in collective advocacy. By presenting a unified voice on key issues, such as regulatory policies, data governance, and technological standards, consortia can influence policymakers and regulators. This collective advocacy is crucial in shaping a regulatory environment that supports AI adoption, addressing data privacy, security, and ethical considerations. Engaging with industry consortia allows organizations to contribute to developing standards that reflect the unique needs of the insurance sector, ensuring that regulatory frameworks are aligned with technological advancements and industry best practices [48].

Another significant benefit of participating in industry consortia is the opportunity for collaborative innovation. By joining forces with other industry players, organizations can engage in joint projects to explore new AI technologies and applications. These collaborative initiatives enable companies to pool resources, reduce costs, and share risks associated with technological experimentation. Furthermore, collaborative innovation can accelerate the development of AI-powered business intelligence solutions that address common industry challenges, such as improving customer service, enhancing risk management, and automating claims processing. Such partnerships foster innovation and help build a more robust ecosystem for AI adoption in the insurance sector.

In conclusion, participation in industry consortia offers numerous advantages for insurance organizations seeking to adopt AI-powered business intelligence solutions. Through knowledge sharing, collective advocacy, and collaborative innovation, these consortia provide a platform for addressing common challenges and driving technological advancements in the industry. Engaging with industry groups allows organizations to remain competitive and stay at the forefront of AI adoption.

3.6.9. Policy Advocacy and Engagement

3.6.9.1. Regulatory Collaboration

Engaging with regulators is vital for adopting AI-driven Business Intelligence (BI), especially within highly regulated industries such as insurance. Collaboration with regulatory authorities ensures that AI technologies are developed and deployed in compliance with legal frameworks and industry standards. This approach helps businesses not only navigate the complexities of AI regulation but also shape a supportive regulatory environment that fosters innovation.

One of the primary methods of regulatory collaboration is through dialogue and consultation. Insurers should actively participate in regulatory consultations, providing feedback on proposed regulations that affect AI usage. By doing so, they can influence the development of policies conducive to successfully adopting AI technologies, ensuring that these frameworks accommodate the industry's unique challenges. For instance, as Bank Negara Malaysia (BNM) has shown through its ongoing consultations with financial institutions, collaboration between regulators and businesses is essential for crafting balanced regulations that support innovation while safeguarding public interests [49].

In addition to dialogue, pilot programs and regulatory sandbox initiatives provide a practical framework for testing AI applications in a controlled environment. These initiatives allow businesses to experiment with AI-driven solutions under regulatory supervision, mitigating the risks of non-compliance while gaining valuable insights into the potential real-world impacts of AI systems. Collaborating with regulators on such pilot projects can also lead to the development of best practices that can be shared across the industry, thereby enhancing the overall adoption of AI technologies. Bank Negara Malaysia's Financial Technology Regulatory Sandbox is an example of this approach, as it enables businesses to test AI and other fintech solutions while ensuring that regulatory compliance remains a priority [50].

Another crucial aspect of regulatory collaboration is compliance assistance. Organizations can reduce the risks associated with AI adoption by seeking guidance from regulators on complex legal and compliance requirements. Regulatory bodies often offer support in navigating evolving laws concerning data privacy, algorithmic transparency, and ethical AI practices. This guidance helps insurers avoid costly legal penalties and ensures that AI-powered business intelligence systems are implemented responsibly and ethically, in line with national and international regulations.

In conclusion, regulatory collaboration is fundamental in enabling the adoption of AI-powered business intelligence solutions within the insurance sector. Through active dialogue, participation in pilot programs, and seeking compliance assistance, organizations can foster an environment where AI technologies can flourish while maintaining alignment with legal and ethical standards.

3.6.10. Industry Standards

According to the World Economic Forum [51] my ethical AI principles can be distilled into epistemic and general principles. They can provide a baseline for assessing and measuring the ethical validity of an AI system. The landscape of these principles is intended to be used to compare and contrast the AI practices currently adopted by organizations, and they can then be embedded to help develop ethically aligned AI solutions and culture.

- Epistemic principles constitute the prerequisites for investigating AI ethicality and represent the conditions of knowledge that enable organizations to determine whether an AI system is consistent with an ethical principle. They include principles of interpretability and reliability.
- General ethical AI principles, meanwhile, represent behavioral principles valid in many cultural and geographical applications and suggest how AI solutions should behave when faced with moral decisions or dilemmas in a specific field of usage. They include principles on accountability, data privacy, and human agency.

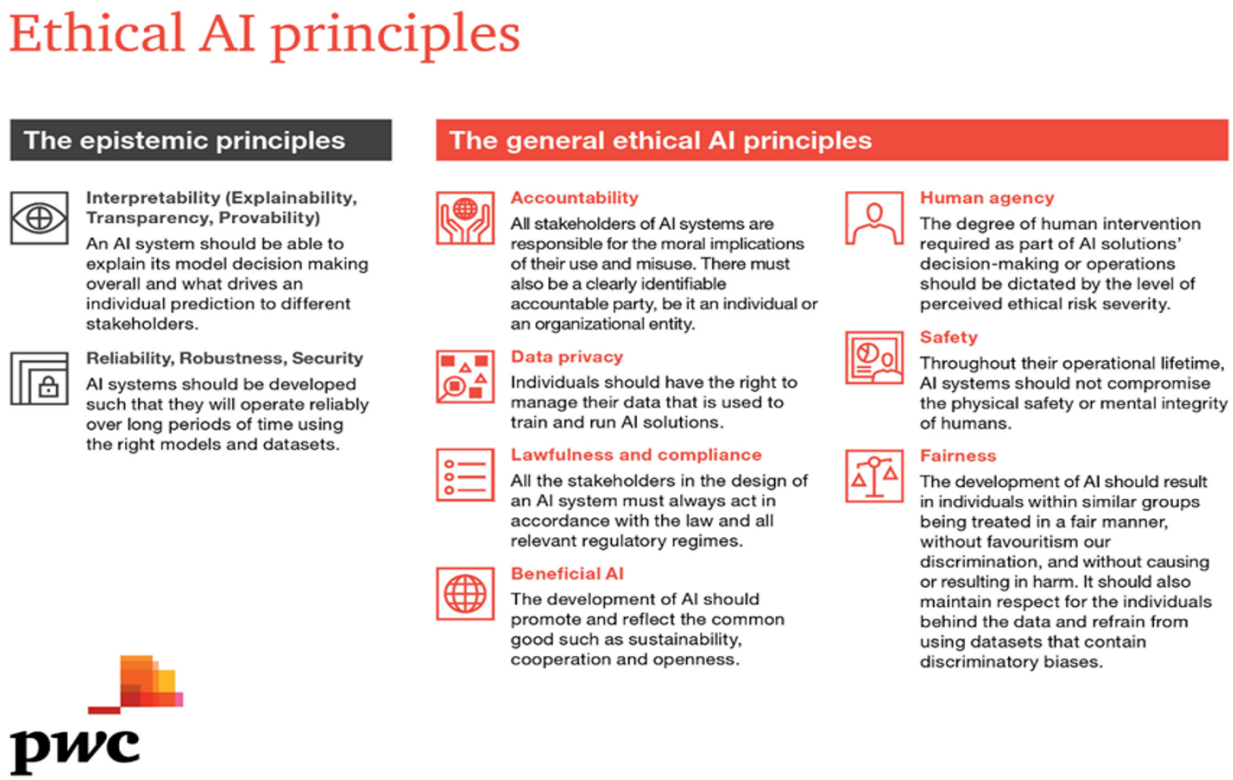

Figure 2.
9 Ethical AI principles.
Source:
World Economic Forum [51].

This is aligned with the European Commission's Ethical Guidelines for Trustworthy AI, which outline a framework to ensure AI systems are lawful, ethical, and robust [52]. The guideline emphasizes seven essential requirements: human agency and oversight, technical robustness and safety, privacy and data governance, transparency, diversity, non-discrimination and fairness, societal and environmental well-being, and accountability. The guidelines aim to promote AI that respects fundamental rights and ethical principles throughout its lifecycle.

3.7. Financial Strategies

3.7.1. Investment Justification

Building a strong business case is crucial for securing investment in AI initiatives, particularly when organizations must justify significant upfront costs associated with AI-driven Business Intelligence (BI) systems. One of the most effective ways to establish the viability of such investments is through a comprehensive cost-benefit analysis. This analysis involves quantifying the tangible and intangible benefits that AI-powered business intelligence solutions can bring to an organization, including potential cost savings, increased revenue, and enhanced customer satisfaction. The cost-benefit analysis serves as the foundation of any investment decision, as it enables organizations to weigh the immediate costs against long-term gains, ensuring that the benefits of AI adoption outweigh the initial expenditure [53].

Additionally, a thorough risk assessment should accompany the investment justification process. Given the complexity and novelty of AI technologies, organizations must identify potential risks such as data security concerns, regulatory hurdles, and operational challenges. Developing strategies to mitigate these risks is essential to reassure stakeholders and ensure that uncertainties do not derail the AI adoption process. Effective risk management frameworks help prevent issues and demonstrate the organization's preparedness, further strengthening the investment case.

Return on investment (ROI) projections are another critical aspect of justifying AI investments. By providing realistic ROI forecasts, organizations can illustrate the financial returns that AI-powered business intelligence solutions systems will likely generate. Sensitivity analysis is valuable in this context, allowing businesses to project ROI under various scenarios and assumptions. This helps demonstrate the investment's robustness even in the face of uncertain market conditions or fluctuating business performance. Clear, data-driven projections enhance stakeholder confidence, making it easier to secure funding approvals [54].

In conclusion, justifying investment in AI-powered business intelligence solutions requires a structured approach that includes a comprehensive cost-benefit analysis, detailed risk assessment, and realistic ROI projections. These strategies help build a compelling business case, ensuring decision-makers are confident in the long-term value of AI investments.

3.8. Accessing Funding

Securing adequate funding is critical for organizations seeking to adopt AI-driven Business Intelligence (BI) systems. Given the substantial costs associated with AI technologies, diversifying funding sources is essential for reducing financial

risk and ensuring project sustainability. Various avenues, including government grants, strategic partnerships, and internal funding mechanisms, can be explored.

Government grants and incentives provide significant support for businesses, particularly those in industries such as insurance, where technology adoption is crucial for maintaining competitiveness. In Malaysia, agencies like the Malaysian Investment Development Authority (MIDA) offer programs to assist organizations in integrating advanced technologies like AI. These grants are often targeted at promoting innovation, increasing productivity, and enhancing operational efficiency. For example, MIDA incentivizes organizations to invest in Industry 4.0 technologies, enabling them to alleviate the financial burden of large-scale AI implementation [55].

Another essential funding source comes from strategic partnerships. Organizations can access favorable financing terms or co-investment opportunities by forming alliances with technology firms or AI vendors. These partnerships are mutually beneficial, as technology firms are often eager to showcase the effectiveness of their AI solutions through collaborative projects. In some cases, technology vendors may also offer cost-sharing models, reducing the initial capital expenditure required for adopting AI-powered business intelligence solutions systems [55].

Internal funding mechanisms represent an additional avenue for securing the necessary capital. Many organizations establish innovation funds or reallocate budgets from efficiency improvements to support AI projects. By reinvesting savings from other operational efficiencies, companies can reduce their dependency on external funding and maintain greater control over the implementation process. This approach also ensures that the funding remains aligned with the organization's strategic priorities, supporting long-term growth and innovation [55].

In conclusion, accessing a diversified funding pool is essential for successfully adopting AI-powered business intelligence solutions systems. Government grants, strategic partnerships, and internal funding mechanisms offer unique advantages that can alleviate financial constraints and provide organizations with the flexibility to implement AI technologies effectively.

3.9. Addressing Ethical and Social Considerations

3.9.1. Ethical AI Practices

Implementing ethical AI practices is essential for organizations adopting AI-driven Business Intelligence (BI) systems, particularly in the insurance sector, where trust and transparency are paramount. By adhering to ethical guidelines, organizations can build trust with stakeholders and ensure that AI technologies are used responsibly. One of the key steps in this process is the establishment of AI ethics committees. These committees, often composed of cross-functional teams, oversee the ethical considerations in AI development and deployment. The role of these committees is to ensure that AI systems align with broader organizational values and societal expectations regarding fairness, transparency, and accountability [56].

Developing comprehensive ethical guidelines is another fundamental practice. These guidelines should outline clear principles of fairness, transparency, data privacy, and accountability. Organizations must ensure that AI systems do not inadvertently perpetuate biases or lead to discriminatory outcomes. Bias mitigation strategies are critical in this context, requiring regular audits and testing of AI algorithms to identify and correct potential biases. By implementing such processes, organizations can ensure that AI-driven decisions are equitable and do not unfairly disadvantage any group [56].

Moreover, transparency is a key aspect of ethical AI deployment. Organizations should be open about how AI systems function and how decisions are made, particularly in customer-facing applications. Providing clear explanations about AI processes helps build users' trust and mitigates concerns over the "black box" nature of AI algorithms. Transparency also extends to data handling practices, ensuring customers are fully informed about how their data is collected, stored, and used. This level of openness is essential for maintaining trust and meeting regulatory requirements around data privacy and protection [52].

Ethical AI practices are also linked to compliance with existing regulations, such as data protection laws. Organizations must ensure that their AI-driven systems comply with relevant laws, such as the Personal Data Protection Act (PDPA) in Malaysia, which governs the use and processing of personal data. This includes implementing robust data security measures and ensuring that AI applications adhere to legal standards for data governance [33].

In conclusion, implementing ethical AI practices is essential for organizations aiming to adopt AI-powered business intelligence solutions in a responsible and trustworthy manner. Organizations can foster trust and support the responsible deployment of AI technologies by establishing AI ethics committees, developing clear ethical guidelines, mitigating biases, and ensuring transparency and compliance with data protection laws.

3.10. Building Trust

Building trust is a critical component in adopting AI-driven Business Intelligence (BI) systems, particularly in industries such as insurance, where data handling and decision-making processes can have significant implications for stakeholders. Trust is established by ensuring that AI technologies are transparent, accountable, and compliant with regulations. Organizations that effectively communicate the purpose and functioning of AI systems can alleviate stakeholder concerns and increase acceptance of these technologies.

Transparency is essential in fostering trust. Organizations must communicate how AI systems operate, including how decisions are made and what data is used. This is particularly important for customer-facing AI applications, where users may be wary of "black box" algorithms that lack clear explanations. Providing transparency in AI-driven decision-making helps build confidence among stakeholders, as they feel more informed and reassured about the system's functionality and

fairness. Furthermore, transparency about data handling practices, such as collecting, storing, and protecting data, enhances trust, particularly in an era where data privacy concerns are prevalent [57].

Accountability is another pillar of trust-building. Organizations must establish precise accountability mechanisms to address any errors or issues that may arise from using AI technologies. This includes creating formal processes for handling grievances, responding to user complaints, and making necessary adjustments to AI systems. Organizations can reinforce stakeholder trust by demonstrating a commitment to correcting mistakes and continuously improving the system. Additionally, having oversight bodies or ethics committees in place ensures that AI technologies are aligned with ethical standards and organizational values, further bolstering trust [58].

Lastly, compliance with regulations is crucial for demonstrating an organization's commitment to ethical and responsible AI use. Adhering to data protection laws, such as the Personal Data Protection Act (PDPA) in Malaysia, ensures that organizations safeguard customer data and respect user privacy. Compliance with industry standards and regulatory requirements helps organizations mitigate legal risks and build trust by showing that AI systems operate within legal boundaries.

In conclusion, building trust in AI-powered business intelligence solutions requires transparency, accountability, and regulatory compliance. By adopting these practices, organizations can foster stakeholder confidence, enhance the adoption of AI technologies, and ensure that AI implementations are sustainable and ethically sound.

4. Methodology

4.1. Research Design

This study adopts a qualitative research methodology to explore the complexities and nuances of adopting AI-powered business intelligence solutions in the Malaysian insurance industry. Qualitative research is appropriate when the goal is to understand phenomena from the perspectives of those experiencing them, allowing for exploring meanings, experiences, and interpretations [59]. The study's exploratory nature necessitates a methodology that can capture the depth and richness of participants' insights regarding the effectiveness of AI-powered business intelligence solutions systems.

Within the qualitative paradigm, a case study design is particularly suitable for this research. According to Yin [60] a case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are unclear. Stake [61] emphasizes that case studies allow for exploring the particularity and complexity of a single case, capturing the activity in essential circumstances.

These questions necessitate an in-depth, contextualized understanding that a qualitative case study can provide. Merriam and Tisdell [62] note that case studies are appropriate when researchers are interested in insight, discovery, and interpretation rather than hypothesis testing. The case study approach enables the researcher to collect detailed information through multiple sources, facilitating a comprehensive analysis of the effectiveness of AI-powered business intelligence solutions from different organizational perspectives.

4.2. Participant Selection and Sampling Strategy

The study aims to include a purposive sample of nine participants across different organizational levels within the Malaysian insurance industry. Specifically, the sample will comprise approximately two or three participants from the following groups: technical specialists, middle management, and senior management. This stratification allows for exploring diverse perspectives on the effectiveness of AI-powered business intelligence solutions.

Participants will be selected from three to four insurance companies operating in Malaysia, encompassing both life and general insurance providers. Including multiple companies enhances the transferability of the findings by capturing variations across different organizational contexts [63]. Companies will be chosen based on criteria such as significant market share, a history of at least five years of operation, and active implementation of AI-powered business intelligence solutions systems.

Sampling criteria for participants include:

- Technical Specialists: At least two years of experience working directly with AI-powered business intelligence solutions systems, involvement in day-to-day technical operations, and expertise in data analytics or related fields.
- Middle Management: Roles that involve overseeing departments where AI-powered business intelligence solutions are integrated, with responsibility for operational decision-making, and requiring at least five years of industry experience.
- Senior Management: Positions such as CEOs, CIOs, or directors with strategic oversight of AI initiatives, involvement in organizational decision-making at the highest level, and substantial experience in the insurance sector.

The sample size is justified based on qualitative research standards, where depth of information is prioritized over breadth. Guest et al. [64] suggest that data saturation often occurs within the first 12 interviews when participants are relatively homogeneous regarding their experiences with the phenomenon under study. Creswell [65] recommends a sample size of 5 to 25 for case studies, while Mason [66] notes that saturation in qualitative studies typically occurs within 15 interviews. Given the stratified nature of the sample and the focus on different organizational levels, the proposed sample size is sufficient to achieve saturation and provide comprehensive insights.

Data analysis for the study was conducted manually. An interview guide, which provides a structured framework defining key themes and questions used during data collection, is included with the extended data. Participants also received a participant information sheet outlining the study's goals, methods, and confidentiality precautions. Informed participation was ensured through a consent form signed by participants prior to the interviews. Additionally, selected

passages from the manually coded and transcribed interview data illustrate the study's thematic analysis methodology. These resources, part of the expanded data repository, were essential to the data analysis.

4.3. Data Collection Procedures

Data collection will proceed through a three-phase approach, aligning with the participant groups:

Phase 1: Technical Specialists

The first phase involves conducting in-depth interviews with technical specialists. This phase establishes a foundational understanding of how AI-powered business intelligence solutions systems function within daily operations. Technical specialists can provide detailed insights into the practical challenges and successes of implementing AI technologies, data management practices, and the technical effectiveness of BI tools.

Interviews will explore system usability, integration with existing technologies, data quality issues, and perceptions of how AI-powered business intelligence solutions affect operational tasks. This phase sets the stage for understanding the technical underpinnings influencing organizational experiences with AI-powered business intelligence solutions.

Phase 2: Middle Management

The second phase concentrates on middle management, which acts as a link between technical teams and senior leadership. Interviews with middle managers will examine how AI-powered business intelligence solutions are incorporated into operational workflows, their influence on decision-making processes, and the challenges encountered in aligning technical capabilities with business objectives.

This phase examines themes such as change management, employee adoption, performance metrics, and operational efficiencies. Middle managers can provide insights into the organizational dynamics that facilitate or hinder the effective use of AI-powered business intelligence solutions systems.

Phase 3: Senior Management

The final phase involves interviews with senior management to gain strategic perspectives on the impact of AI-powered business intelligence solutions. Senior leaders can discuss the rationale behind AI investments, expectations regarding competitive advantage, and the perceived return on investment.

Topics will include the strategic alignment of AI initiatives with organizational goals, challenges in implementing AI at a strategic level, and visions for the future role of AI-powered business intelligence solutions in the insurance industry. This phase completes the comprehensive exploration by connecting technical and operational insights to overarching organizational strategies.

The sequential approach enables the integration of findings from each phase, thereby constructing a comprehensive understanding of the effectiveness of AI-powered business intelligence solutions across organizational levels.

4.4. Data Analysis Plan

Data analysis will follow a thematic analysis approach as Braun and Clarke [67] described. The process involves several steps:

1. Familiarization with Data: Interviews will be transcribed verbatim to ensure accuracy. The researcher will read and re-read transcripts, noting initial observations and reflections.
2. Generating initial codes: Transcripts were coded line-by-line, identifying meaningful data units related to the research objectives. The researcher created a codebook, grouping similar segments.
3. Searching for themes: Coded data were reviewed to identify themes, which are broader patterns that capture significant aspects of the phenomenon under study.
4. Reviewing and refining themes: Themes were refined, merged, or discarded based on their relevance to the research questions and the richness of supporting data.
5. Defining and Naming Themes: The final set of themes was clearly defined and named, providing a logical framework for the findings.
6. Integrating findings: Themes were related to the research objectives, theoretical frameworks, and the literature, allowing for interpretation and contextualization.

The researcher maintained reflexive notes throughout this manual coding process to track analytical decisions and ensure transparency [68].

4.5. Justification for Manual Analysis

Choosing a manual coding approach rather than software-assisted analysis allows for a more hands-on, reflective engagement with the data. While software tools can be efficient, manual analysis can enhance the researcher’s intuitive grasp of the data and foster a more profound interpretative process [69].

Moreover, manual analysis ensured that the researcher’s contextual knowledge, cultural sensitivity, and theoretical insights informed the coding and theme development, ultimately contributing to a richer and more nuanced analysis.

4.6. Issues of Trustworthiness

Ensuring trustworthiness in qualitative research involves addressing credibility, transferability, dependability, and confirmability [68].

- Credibility refers to confidence in the truth of the findings. I will use triangulation to enhance credibility by collecting data from multiple sources (technical specialists, middle management, senior management) and

comparing perspectives. Member checking will be conducted by sharing summaries of findings with participants to verify accuracy and resonance with their experiences.

- Transferability pertains to how findings can be applied to other contexts. By providing rich, detailed descriptions of the research context, participants, and findings, readers can assess the applicability of the results to different settings. Including multiple insurance companies and diverse participant roles enhances the potential for transferability.
- Dependability involves demonstrating that the research process is logical, traceable, and well-documented. An audit trail will be maintained, detailing all aspects of the research process, including data collection procedures, coding decisions, and theme development. Peer debriefing will also contribute to dependability by subjecting the research process to external scrutiny.
- Confirmability ensures that the findings are shaped by the participants rather than the researcher's bias. Reflexivity practices, such as maintaining a reflexive journal and engaging in self-awareness, help mitigate personal biases. The audit trail documents decisions made throughout the research, providing transparency.

4.7. Ethical Procedures

Ethical considerations are critical, particularly given the involvement of human participants and the sensitivity of organizational information in the insurance industry.

- Informed Consent: An information sheet detailing the goals, methods, possible risks, and advantages of the study was provided to participants. Prior to participation, written informed consent was obtained, ensuring that participants were fully aware of their rights, including the freedom to withdraw at any time without penalties.
- Confidentiality and Anonymity: Confidentiality will be maintained by assigning pseudonyms to participants and companies. Identifying information will be removed from transcripts and reports. Data will be stored securely on password-protected devices; only the researcher can access raw data.
- Data Security: All electronic data will be encrypted, and physical documents will be stored in a locked cabinet. Data will be retained for a period consistent with ethical guidelines and institutional policies, after which it will be securely destroyed.
- Ethical Approval: Before commencing the study, ethical approval will be sought from the relevant institutional review board or ethics committee. The study will adhere to the Malaysian Insurance Institute's ethical principles and comply with industry-specific regulations.
- Professional Relationships: Given my professional background in the industry, care will be taken to avoid conflicts of interest. Participants will be assured that their participation is voluntary and will not impact professional relationships. Transparency about the researcher's role and the purpose of the study will be maintained throughout.

5. Findings

Four main themes emerged, each reflecting distinct approaches organizations adopt to overcome challenges, improve workforce capabilities, and solidify the value proposition of AI-powered business intelligence solutions.

1. Talent Development, Upskilling, and Partnerships
2. Phased Implementation and Pilot Testing
3. Robust Change Management and Communication Strategies
4. Data Governance and Security Frameworks

5.1. Talent Development, Upskilling, and Partnerships

Addressing the talent shortage involves multiple strategies, including continuous training programs, mentorship initiatives, and forming partnerships with universities. By building a skilled workforce, organizations ensure they have the human capital required to fully exploit AI's potential.

Participant C mentioned their approach:

We invest heavily in upskilling our workforce through training programs, workshops, and certifications, and collaborate with universities for research projects and internships.

This holistic focus on talent development ensures a sustainable expertise pipeline, enabling more effective AI integration.

5.2. Phased Implementation and Pilot Testing

Organizations mitigate adoption risks by adopting phased approaches, starting with pilot projects to test AI tools in controlled environments. This strategy allows them to assess performance, address technical hurdles, and refine solutions before scaling up, ultimately reducing costs and complexity.

Participant A emphasized this approach:

We adopt a phased implementation strategy to mitigate risks. Starting with pilot projects allows us to test AI solutions... and make necessary adjustments before full-scale deployment.

Such prudence ensures that investments in AI-powered business intelligence solutions are validated and optimized for organizational context, contributing to higher success rates.

5.3. Robust Change Management and Communication Strategies

Participants recognized the importance of organizational culture and the need for structured change management tactics. Early employee involvement, transparent communication, and highlighting quick wins all help reduce resistance and foster a more receptive culture for AI-powered business intelligence solutions.

Participant B noted:

Involving team members early in the process and maintaining open communication channels helps us tailor the tools to their needs and build trust.

These strategies create an environment where employees feel supported, understood, and engaged, which is critical for effective adoption.

5.4. Data Governance and Security Frameworks

Establishing solid data governance frameworks and implementing strict security measures enhances trust, compliance, and reliable insights. Organizations create the conditions necessary for AI-powered business intelligence solutions to thrive by focusing on data integrity, standardization, and protection.

5.5. Participant E commented

We implement multi-layered security measures and adhere to strict data governance policies, ensuring that the data feeding our AI tools is both reliable and secure.

Robust data governance and security facilitate the adoption and enhance AI-powered business intelligence solutions' perceived value and credibility.

Finally, establishing data governance and security frameworks underpins the reliability and credibility of AI-powered business intelligence solutions and insights. Ensuring data integrity, protection, and compliance sets the stage for confident decision-making and sustained organizational trust in these systems.

By weaving together these themes, the analysis reveals a multifaceted environment where technical, human, regulatory, and strategic dimensions intersect. AI-powered business intelligence solutions are not simply a technological upgrade but a transformational endeavor requiring careful orchestration of resources, capabilities, and cultures.

6. Discussion

To ensure that AI-powered business intelligence solutions initiatives gain traction and achieve sustained effectiveness, insurers are implementing various strategies. Addressing skill gaps through talent development, upskilling, and partnerships ensures that organizations have the human capital to operate and refine AI tools.

Adopting a phased implementation and pilot testing approach mitigates the risks and uncertainties associated with new technologies. By validating solutions in controlled environments and iterating based on performance metrics and user feedback, organizations reduce financial risks and increase user confidence.

Robust change management and communication strategies are employed to overcome cultural resistance and ensure smooth adoption. Early employee involvement, transparent communication about AI's role, and showcasing early successes help foster acceptance and trust.

Finally, establishing data governance and security frameworks underpins the reliability and credibility of AI-powered business intelligence solutions and insights. Ensuring data integrity, protection, and compliance sets the stage for confident decision-making and sustained organizational trust in these systems.

7. Limitations of the Study

Based on interviews with nine participants, this qualitative case study provides in-depth insights but may limit generalizability. While the data offer rich contextual understanding, the experiences may only represent part of the Malaysian insurance industry or other regions. Additionally, the rapidly evolving nature of AI technology means that the relevance of these findings may shift as new solutions and regulatory frameworks emerge.

Further, as interviews rely on participant self-reporting, social desirability bias is possible. Participants may present their organizations in a favorable light or underemphasize challenges.

8. Recommendations for Future Research

Future research could adopt a mixed-methods approach to combine qualitative depth with quantitative breadth, providing a more representative picture of the industry's progress and challenges. Comparative studies across financial services sectors or international contexts could uncover unique cultural or regulatory dynamics. Additionally, longitudinal research would reveal how the adoption of AI-powered business intelligence solutions evolves, how skill gaps close over time, and how regulatory frameworks adapt to technological change.

9. Conclusion

This study has examined the strategic solutions associated with adopting AI-powered business intelligence solutions in the Malaysian insurance sector, interpreting the findings through the TOE and RBV frameworks. The results underscore that successful adoption is not solely about selecting advanced technologies; it also depends on aligning with external regulations, nurturing internal capabilities, ensuring data reliability, and creating environments where employees readily leverage AI insights.

By understanding and addressing these complex, interrelated factors, insurers can navigate the AI-powered business intelligence solutions landscape more effectively, enhancing operational efficiencies, strategic decision-making, and competitive positioning. This research contributes to a growing body of knowledge on AI adoption in emerging markets, offering practical and theoretical guidance for stakeholders seeking to harness the transformative potential of AI-powered business intelligence solutions.

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