World Journal of Biology Pharmacy and Health Sciences
eISSN: 2582-5542
Cross Ref DOI: 10.30574/wjbphs
Journal homepage: https://wjbphs.com/

(REVIEW ARTICLE)

Reviewing business analytics in healthcare management: USA and African perspectives

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World Journal of Biology Pharmacy and Health Sciences, 2024, 17(02), 080–088

Publication history: Received on 21 December 2023; revised on 02 February 2024; accepted on 04 February 2024

Article DOI: https://doi.org/10.30574/wjbphs.2024.17.2.0047

Abstract

This comprehensive review explores the application and impact of business analytics in healthcare management, focusing on the distinctive perspectives of the United States and Africa. In an era where data-driven decision-making is paramount, healthcare organizations globally are increasingly turning to business analytics to enhance efficiency, improve patient outcomes, and optimize resource allocation. The review begins by examining the state of business analytics in healthcare management within the United States, a pioneer in adopting advanced analytics solutions. The analysis encompasses the utilization of predictive modeling, data mining, and artificial intelligence to streamline operations, enhance clinical decision-making, and improve patient care. Case studies and success stories from leading healthcare institutions in the USA illustrate the transformative power of business analytics in areas such as patient risk stratification, resource optimization, and population health management. Contrastingly, the review delves into the unique challenges and opportunities that characterize the adoption of business analytics in healthcare across the African continent. Despite facing resource constraints and varying levels of technological infrastructure, African nations are increasingly recognizing the potential of analytics to address pressing healthcare challenges. The discussion encompasses initiatives and collaborations aimed at leveraging data analytics to improve healthcare delivery, disease surveillance, and resource management in the African context. The comparative analysis between the USA and Africa highlights the diversity of approaches and contexts in implementing business analytics in healthcare management. Factors such as data accessibility, infrastructure development, and cultural considerations emerge as critical determinants shaping the successful integration of analytics tools in healthcare decision-making. The review underscores the pivotal role of business analytics in reshaping healthcare management practices, while acknowledging the need for tailored strategies that align with the specific challenges and opportunities inherent in the USA and African healthcare landscapes. This study provides valuable insights for policymakers, healthcare administrators, and researchers seeking to navigate the evolving landscape of healthcare analytics on both a global and regional scale.

Keywords: Business Analytics; Health; USA; Africa; Healthcare Management; Review

1. Introduction

Business analytics plays a crucial role in healthcare management, offering insights into operational efficiency, patient care, and financial sustainability. In the context of the United States (USA) and African perspectives, the significance of business analytics in healthcare management is underscored by the need to address challenges and leverage

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opportunities unique to each region. The purpose of this review is to explore the application of business analytics in healthcare management, focusing on the USA and African perspectives. By examining the scope of business analytics in these regions, this review aims to provide a comprehensive understanding of the current landscape and potential future developments.

The significance of business analytics in healthcare management is evident in its ability to drive quality improvement, reduce errors, enhance efficiency, and lower costs (Maphumulo & Bhengu, 2019). Furthermore, the integration of big data and analytics in healthcare has been identified as a key driver for organizational improvement and innovation (Dash et al., 2019). This is particularly relevant in the context of the USA and African perspectives, where the delivery of quality healthcare services is essential for addressing diverse healthcare challenges.

The purpose of this review is to critically evaluate the role of business analytics in healthcare management, with a specific focus on the USA and African perspectives. By synthesizing existing literature, this review aims to provide insights into the current state of business analytics in healthcare management and identify potential areas for improvement and innovation. Additionally, the review seeks to explore the challenges and opportunities unique to the USA and African perspectives, offering valuable insights for healthcare practitioners, policymakers, and researchers.

The scope of this review encompasses an in-depth analysis of the application of business analytics in healthcare management, with a specific focus on the USA and African perspectives. By examining relevant literature and case studies, this review aims to provide a comprehensive overview of the current landscape, challenges, and opportunities in both regions. Furthermore, the review will explore the potential impact of business analytics on healthcare delivery, patient outcomes, and financial sustainability, taking into account the unique socio-economic and healthcare dynamics of the USA and African contexts.

This review aims to contribute to the existing body of knowledge on business analytics in healthcare management, with a specific focus on the USA and African perspectives. By synthesizing relevant literature and case studies, this review seeks to provide valuable insights for healthcare stakeholders and researchers, ultimately contributing to the advancement of healthcare management practices in these regions.

2. Business Analytics in Healthcare Management: USA

Business analytics in healthcare management in the USA has seen significant growth and development in recent years. The healthcare sector in the USA faces challenges related to the integration of healthcare systems and information management, hindering the transformation of IT value to business value (Wang et al., 2018). To address these challenges, business analytics has emerged as a valuable tool for healthcare organizations, offering capabilities and potential benefits for improving healthcare operations (Wang et al., 2018). The interdisciplinary nature of business analytics requires a combination of technical, analytical, and business skills, making it essential for healthcare professionals to acquire these competencies (Yin & Fernandez, 2020). The rise of corporate investments in analytics has allowed management to make more informed decisions, leading to improved decision-making effectiveness through knowledge absorptive capacity in healthcare (Wang & Byrd, 2017).

In the context of healthcare, business analytics has found applications in various areas, including predictive modeling for patient outcomes, data mining in clinical decision-making, and the use of artificial intelligence in healthcare operations. Predictive modeling has been instrumental in disease prediction, diagnosis, and treatment, resulting in an improvement in service quality and cost reduction (Islam et al., 2018). Data mining has been employed to support clinical decisions, disease surveillance, and population health management across the healthcare sector (Pritchett et al., 2018). Furthermore, the use of artificial intelligence in healthcare operations has facilitated the optimization of hospital management, cost reduction, and expediting diagnosis (Shubham, 2021).

The implementation of business analytics tools has been highlighted as a solution to support management decisions in healthcare organizations (Laghi et al., 2022). Additionally, the use of big data analytics, developed from business intelligence and decision support methods, has enabled healthcare organizations to evaluate a vast volume of information for evidence-based decision-making and activity planning (Faiyaad & Sadiki, 2022). The use of analytics in healthcare has been shown to reduce costs and increase efficiencies in both business and clinical areas, emphasizing its advantages for addressing the complexity of healthcare (Zhuhadar & Thrasher, 2019).

In conclusion, business analytics has become increasingly important in healthcare management in the USA, offering valuable insights and solutions to address the challenges faced by the healthcare sector. The applications of business analytics in predictive modeling, data mining, and artificial intelligence have demonstrated significant benefits in

improving patient outcomes, clinical decision-making, and healthcare operations. As the healthcare industry continues to evolve, the integration of business analytics will play a crucial role in driving informed decision-making and enhancing the overall efficiency and quality of healthcare services.

2.1. Case studies and success stories of Business Analytics in Healthcare Management: USA

Business analytics has been increasingly utilized in the healthcare management sector, particularly in the USA, to drive transformational impacts on patient care and resource allocation. Leading healthcare institutions have leveraged big data analytics to improve firm performance and align business strategy, as evidenced by (Akter et al., 2016). This alignment has been shown to moderate the relationship between big data analytics capability and firm performance, indicating the strategic importance of analytics in healthcare management. Furthermore, the use of predictive analytics has enabled healthcare organizations to mitigate preventable readmissions, make better and faster decisions, and support preventive care, as highlighted by (Wang et al., 2018). This has had a transformational impact on patient care by reducing uncertainty and enabling better decision-making.

In the context of resource allocation, business analytics has played a crucial role in identifying strong and weak points in workflow and facilitating informed decision-making, as emphasized by (Laghi et al., 2022). This has been instrumental in optimizing resource allocation within healthcare institutions, leading to more efficient and effective utilization of resources. Additionally, the use of analytics for care coordination research has been discussed by (Kumar et al., 2022), demonstrating how it can contribute to improved resource allocation and patient care through the development of new classification frameworks.

Moreover, the adoption of artificial intelligence (AI) and big data analytics has revolutionized efficiency, quality, and patient care in healthcare systems, as highlighted by (Abatal & Korchi, 2023). By leveraging predictive analytics, healthcare systems have been able to optimize resource allocation, improve care coordination, and enhance patient management. This has led to a significant transformation in the way healthcare resources are allocated and utilized, ultimately benefiting patient care and overall healthcare management.

In summary, the integration of business analytics in healthcare management in the USA has led to significant advancements in patient care and resource allocation. Leading healthcare institutions have successfully leveraged big data analytics and predictive analytics to drive strategic alignment, improve decision-making, and optimize resource allocation, ultimately leading to transformative impacts on patient care and operational efficiency.

3. Challenges and Opportunities in the USA

Addressing data privacy and security concerns in the USA presents both challenges and opportunities. The exponential growth of digital technologies in healthcare has raised concerns about cybersecurity, data privacy, and the management of big data (Barbazzeni et al., 2022). Policymakers and regulators are faced with tough challenges around data security and privacy as health technology becomes more critical to the advancement of medicine (Hassan et al., 2021). Major privacy and security challenges in e-healthcare include access control, authentication, data integrity, system availability, data loss, and network security (Seh et al., 2021). Furthermore, the synthesis of technology and the medical industry has contributed to the increasing interest in Medical Cyber-Physical Systems (MCPS), which brings forth new challenges in data privacy and security (Grispos et al., 2017).

Overcoming resistance to technology adoption is another significant challenge. Resistance to change (RTC) in employees against the adoption of innovative technology is a critical barrier to its implementation (Shahbaz et al., 2020). Healthcare organizations have neglected to acquire the essential tools, infrastructure, and technologies for effective control of big data, hindering the adoption of big data analytics (Shahbaz et al., 2019). Additionally, the current practice of not involving users in all stages of the innovation process of m-health, telemedicine, and self-managing technologies is contrary to best practices and poses a barrier to technology adoption (Ghasemzadeh et al., 2022).

Scaling analytics solutions for widespread implementation in the USA healthcare landscape is a complex task. The challenges for technology development in healthcare include data standardization, storage and maintenance, integration, and analytics (Moon-Koo & Park, 2016). Moreover, the future direction requires effective solutions to the scalability problem of privacy and security in the era of big data, especially in reconciling security and privacy models by exploiting the map reduce framework (Jain et al., 2016). The potential to use new emerging technology in palliative care is hindered by barriers such as expense, inter-operability issues, data privacy and security concerns, lack of effectiveness, equity, and the concern that technology will reduce face-to-face consults between patients and clinicians (Nwosu et al., 2021).

Future trends and innovations in the USA healthcare analytics landscape are promising, despite the challenges. The National Academy of Medicine has advocated for a "learning healthcare system" that produces constantly updated reference data during the care process, indicating a shift towards data-driven healthcare systems (McGraw & Mandl, 2021). The synthesis of information technology into the healthcare industry is creating opportunities and challenges for both practitioners and academicians, suggesting a growing interest and potential for advancements in healthcare analytics (Plachkinova & Grispos, 2018). The future of security and privacy in IoT-based healthcare systems is promising, as advancements in technology and research continue to offer solutions to the challenges faced by the industry (Obaid & Salman, 2022).

In conclusion, addressing data privacy and security concerns, overcoming resistance to technology adoption, and scaling analytics solutions for widespread implementation in the USA healthcare landscape present multifaceted challenges. However, these challenges also offer opportunities for innovation and advancement in healthcare analytics, paving the way for a data-driven healthcare system in the future.

4. Business Analytics in Healthcare Management: African Perspectives

Business analytics in healthcare management is gaining traction in African nations, offering the potential to revolutionize healthcare delivery. Big data analytics has emerged as a powerful tool, enabling evidence-based decision making and action-taking in healthcare organizations (Wang et al., 2018). However, the implementation of business analytics in African healthcare faces unique challenges. Resource constraints and technological infrastructure limitations pose significant barriers to the effective adoption of analytics in healthcare management (Kotzias et al., 2022). Additionally, the COVID-19 pandemic has exacerbated challenges in African healthcare, including shortages of healthcare workers, inadequate surveillance and diagnostic tools, and misinformation about the virus and vaccinations (Mudenda et al., 2022).

Initiatives and collaborations promoting analytics in African healthcare are crucial for addressing these challenges. Understanding the perspectives of healthcare workers in South Africa is essential for identifying the role of organizational support in addressing health risks and absenteeism (Gradidge et al., 2022). Furthermore, exploring the perceptions of national health insurance in South Africa's public and private healthcare sectors can provide insights into the readiness for collaborative efforts in healthcare management (Booysen & Hongoro, 2018).

In conclusion, while the potential benefits of business analytics in healthcare are evident, African nations face significant hurdles in its implementation. Collaborative efforts and initiatives are essential for addressing resource constraints, technological limitations, and the challenges exacerbated by the COVID-19 pandemic. Understanding the perspectives of healthcare workers and stakeholders is crucial for developing effective strategies to promote the adoption of business analytics in African healthcare management.

5. Comparative Analysis

The integration of business analytics in healthcare management varies significantly between the USA and Africa. In the USA, there is a well-established framework for the application and development of business analytics in healthcare management (Simunaniemi et al., 2022). This is evident in the adoption of various analytics approaches, including comparative analytics, to compare the performance of healthcare systems under different interventions (Baron, 2021). On the other hand, Africa faces challenges in healthcare management, such as poor leadership, inadequate management, and a lack of clear philosophy and goal setting, resulting in a complete failure in public sector healthcare delivery (Maphumulo & Bhengu, 2019). These contrasting approaches highlight the disparities in the adoption and implementation of business analytics in healthcare management between the two regions.

Several factors influence the successful integration of analytics tools in healthcare management. Data accessibility is a critical factor, and the gradual introduction of business analytics in all healthcare institutions is essential to identify strong and weak points in workflow and make informed decisions (Laghi et al., 2022). Infrastructure development is also crucial, as the adoption of digital technologies and business intelligence is foundational for the transformation of healthcare systems (Laurenza et al., 2018). Additionally, cultural considerations play a significant role, as evidenced by the need to develop a theoretical framework using social representation theory to study the social dynamics associated with implementing big data analytics in the healthcare sector (Weerasinghe et al., 2018).

Lessons learned and transferable insights between the USA and Africa are essential for advancing healthcare management. In the USA, the use of healthcare analytics has been instrumental in mitigating risks and impacts,

especially during the COVID-19 pandemic, by combining predictive analysis, data visualization tools, and business suites to deliver actionable insights and optimize utilization (Shubham, 2021). Furthermore, understanding patient demographics and utilizing simple data analytic techniques has provided substantial insights into clinical service delivery and business management (Pritchett et al., 2018). In contrast, Africa can benefit from formalizing small businesses, developing strategic cultures, and providing entrepreneurship and business management training to enhance the performance of small businesses in the healthcare sector (Agbobli et al., 2017). Additionally, there is a need to enhance the management capacity of healthcare systems in Africa, particularly by focusing on improving the managerial competencies related to financial and business management (Okonkwo et al., 2019; Sammut & Ngoye, 2019).

In conclusion, the comparative analysis of reviewing business analytics in healthcare management in the USA and Africa reveals contrasting approaches, influencing factors, and transferable insights. While the USA demonstrates advanced adoption and application of business analytics in healthcare management, Africa faces challenges that require infrastructure development, cultural considerations, and capacity building. By leveraging the lessons learned from both regions, there is an opportunity to enhance healthcare management globally through the effective integration of business analytics.

6. Future Outlook and Emerging Trends

The integration of business analytics in healthcare management is a rapidly evolving field, with significant implications for both the USA and African healthcare systems. In the USA, the application of business analytics in healthcare operations has been a subject of recent research, with a focus on service operations and the lessons that can be learned from healthcare operations (Baron, 2021). This indicates a growing interest in leveraging data mining and analytics to improve service delivery and operational efficiency within the healthcare sector. Similarly, in South Africa, there has been a critical review of the challenges facing the quality improvement in healthcare post-apartheid, highlighting the need for innovative strategies to enhance the healthcare system (Maphumulo & Bhengu, 2019). This underscores the importance of exploring emerging trends in business analytics to address the unique challenges faced by African healthcare systems.

Furthermore, the emergence of big data analytics in operations management, particularly in the context of healthcare, has been a topic of discussion, emphasizing the potential for leveraging big data research to enhance healthcare delivery (Choi et al., 2018). Additionally, the literature provides insights into the use of big data analytics for healthcare organization management, emphasizing predictive analytics capability and interoperability as key characteristics of effective management systems in healthcare organizations (Cozzoli et al., 2022). These findings suggest a shift towards data-driven decision-making and the adoption of advanced analytics tools to optimize healthcare management processes.

Moreover, the role of data analytics in public healthcare and social services in Finland has been highlighted, demonstrating efforts to address cost pressures and efficiency needs through knowledge-based management guided by data analytics-derived information (Choroszewicz & Alastalo, 2021). This indicates a global trend towards leveraging data analytics to improve decision-making and resource allocation in healthcare systems. Similarly, a broader view of recent trends in big data and business analytics development has been provided, emphasizing the significance of staying abreast of the latest advancements in data analytics for informed decision-making in healthcare management (Ajah & Nweke, 2019).

In the context of healthcare organizations, the adoption of big data analytics for people management has been explored, highlighting the potential for data-driven decision-making to enhance personnel management in healthcare settings (Sousa et al., 2019). This underscores the growing importance of leveraging analytics for strategic workforce planning and performance optimization within healthcare organizations. Additionally, the lack of sound financial management and leadership in the public healthcare system in South Africa has been identified as a contributing factor to the mismanagement of healthcare facilities, emphasizing the need for improved financial literacy and management practices in the healthcare sector (Millen & Stacey, 2022).

From a cultural perspective, the impact of traditional healing on psychiatric management in rural African communities has been acknowledged, highlighting the need for integrating traditional healing services with mental health services provided by primary healthcare, indicating the importance of cultural considerations in healthcare management (Altamih & Elmahi, 2023). Furthermore, the critical preparedness and operational response actions directed for the acute and post-acute COVID-19 pandemic in Brazil have been discussed, emphasizing the need for strategic planning

and technology-enabled critical pathways in healthcare management, which is relevant for both the USA and African healthcare systems (Torres et al., 2021).

In conclusion, the future outlook and emerging trends of reviewing business analytics in healthcare management for both the USA and African perspectives are characterized by a growing emphasis on leveraging big data analytics, improving service operations, addressing quality improvement challenges, and integrating cultural considerations into healthcare management. These trends underscore the transformative potential of business analytics in enhancing healthcare delivery and management, with implications for both developed and developing healthcare systems.

7. Recommendation

The comprehensive review of business analytics in healthcare management across the USA and African perspectives has yielded several crucial insights. In the USA, the utilization of advanced analytics tools has significantly improved decision-making processes, resource allocation, and overall operational efficiency in healthcare organizations. Conversely, African healthcare systems face unique challenges, such as limited infrastructure, data availability, and skilled personnel, hindering the widespread adoption of business analytics.

Key findings also highlight the potential benefits of implementing business analytics in healthcare settings, including enhanced patient outcomes, cost savings, and improved strategic planning. The disparities between the two regions underscore the importance of context-specific solutions to address the diverse needs and challenges faced by healthcare management systems globally.

Policymakers should prioritize initiatives that support the integration of business analytics in healthcare management, focusing on providing resources, training programs, and infrastructure development. In the USA, policymakers can build upon the existing momentum, emphasizing the need for interoperability and data standardization. In Africa, targeted investments should be made to address the foundational challenges, fostering an environment conducive to the adoption of analytics tools. Healthcare administrators can leverage the findings to develop tailored strategies for their respective regions. In the USA, administrators should explore opportunities to optimize existing analytics capabilities and invest in emerging technologies. African healthcare administrators should collaborate with policymakers to create incentives for technology adoption, promote data literacy, and establish partnerships to overcome infrastructure barriers.

Researchers can contribute by focusing on region-specific challenges and developing innovative solutions. Cross-cultural collaborations between researchers in the USA and Africa can foster knowledge exchange, helping to bridge the gap in analytics implementation. Additionally, research efforts should prioritize the development of scalable and adaptable analytics solutions to accommodate diverse healthcare landscapes.

The future of business analytics in global healthcare management hinges on a collaborative and adaptable approach. Policymakers should foster international partnerships and knowledge exchange forums to facilitate shared learning and best practices. The development of standardized frameworks and protocols will enable seamless data sharing and interoperability, fostering a more interconnected global healthcare landscape. Healthcare administrators should continue investing in workforce training and development, ensuring a skilled workforce capable of harnessing the power of analytics tools. Emphasis should be placed on building a culture of data-driven decision-making and continuous improvement.

Researchers should explore emerging technologies such as artificial intelligence and machine learning to enhance predictive analytics and precision medicine. Collaborative efforts should focus on developing scalable and affordable solutions, particularly for resource-constrained regions.

8. Conclusion

In conclusion, the integration of business analytics in healthcare management offers immense potential for improving patient outcomes, resource efficiency, and strategic planning. By addressing region-specific challenges and fostering collaboration, stakeholders can pave the way for a more data-driven and interconnected global healthcare ecosystem.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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