European Journal of
Technology
(EJT)

The Impact of Artificial Intelligence on Business Processes

Jasmin Praful Bharadiya

European Journal of Technology
ISSN 2520-0712 (online)
Vol.7, Issue 2, pp 15 - 25, 2023

www.ajpojournals.org

The Impact of Artificial Intelligence on Business Processes

Jasmin Praful Bharadiya[1*]

[1]Doctor of Philosophy Information Technology, University of the Cumberlands, USA,
*Corresponding Author's Email: jasminbharadiya92@gmail.com

Article history

Submitted 25.05.2023 Revised Version Received 03.06.2023 Accepted 04.06.2023

Abstract

Purpose: The purpose of the study is to examine the challenges faced by businesses in integrating and effectively utilizing artificial intelligence (AI) technology. It aims to provide a comprehensive understanding of how AI technologies generate business value and the anticipated benefits they offer. The study also seeks to identify the facilitators and inhibitors of AI adoption and usage, explore different types of AI use in the organizational environment, and analyze their first- and second-order impacts.

Methodology: The study employed the comprehensive literature review research design. The researchers conducted a systematic search using predefined criteria in databases such as Scopus and Web of Science. The search yielded 21 relevant papers that were analyzed and synthesized for this study. The data collection method relied on the examination of existing literature. Data analysis involved identifying key themes, trends, and insights from the selected papers. The researchers conducted a qualitative analysis to extract relevant findings and synthesized the information to derive meaningful conclusions.

Findings: The study revealed several insights regarding the integration and use of AI in businesses. This indicated that organizations struggle with understanding how AI technologies can generate value and how to effectively incorporate them into their operations. Lack of comprehensive knowledge about AI and its value generation processes was identified as a major barrier. Additionally, the study highlighted the facilitators and inhibitors of AI adoption and usage. It identified various types of AI applications in the organizational environment and explored their impacts on business operations. The findings shed light on the challenges businesses face in leveraging AI technology and suggested areas for further research.

Recommendations: To practitioners: The study emphasizes the importance of acquiring comprehensive knowledge about AI technologies and their potential value generation processes. To policy makers: The study highlights the need for supportive policies and regulations to foster AI adoption. It suggests creating an enabling environment that promotes AI research and development. Theory and Validation: The study may have been informed by existing theories related to AI adoption, organizational change, or innovation. Practice: To practitioners, the study underscores the importance of understanding the value and potential of AI technologies. Policy: To policy makers, the study emphasizes the need for policy frameworks that promote AI adoption and address associated challenges.

Keywords: *Artificial Intelligence, Method, Business Process, AI-Based Methods, Systematic Review, Data Mining, Data Warehouse, Decision Support System, Supply Chain Management, Quality Management System*

1.0 INTRODUCTION

The process of obtaining, converting, managing, and analyzing huge amounts of data using a mathematical model to get knowledge and information to assist in complicated decision-making is known as business intelligence. (Wetering, R.V.D) Data mining, decision support systems, and data warehouses are components of business intelligence. The study on business intelligence systems covers a wide range of interconnected topics. Progress in Business Intelligence System literature review is the main goal of this study.

Business process management (BPM) is a discipline that involves concepts, methods, and techniques, to design, enact, measure, and configure business processes. Adam Smith, Frederick Taylor, and Henry Ford were essential precursors of today's configuration of BPM, by respectively showing the advantages of the division of labor, science management, and production lines in the industry. In recent decades, we–the world–has become a digital society; data are collected everywhere. Data come from mobile phones, personal computers, and smart home appliances. As data are "constantly growing", organizations face challenges surrounding the exploration of such data, in regard to adding value to their operations. (March, S.T.; Smith, G.F) Business Intelligence (BI) tools and process-aware information systems (PAISs) may help to extract knowledge from data via computer tools and decision-makers. However, these tools may be limited when dealing with large volumes of data, since the output has to be analyzed further by specialists in an environment where time is critical.

In the last fifty years, the topic of Artificial Intelligence (AI) has received renewed attention from academic scholars. The Dartmouth Research Project defined AI as the problem of "making a machine behave in ways that would be termed intelligent if a human being behaved like this" (Davenport, T.H) Therefore, AI has to be understood as the ability of a system to act intelligently and to do so in ever wider regions, correctly interpreting external data and using these teachings to attain specific objectives and activities by a flexible configuration (Kaplan & Haenlein, 2019). In this sense, the AI is a different concept from the Internet of Things (IoT) and Big Data, albeit connected. The IoT allows the acquisition of external data to be used as input for AI, while Big Data includes data collected by any means (Maita, A.R.C). Furthermore, intelligent systems can faithfully reproduce human behaviours, "which have cognitive, emotional and social intelligence" In the same way, AI and machine learning are available in several ways (Brynjolfsson & Mcafee, 2017). Still, the aim is to provide and manage intelligent products, services and experiences through the sharing of information for cooperation or creation of optimal and sustainable value (Diorio). However, AI is still in its infancy, and it is difficult to predict what will be the future of AI. For a better understating and implementation of AI, the world must consider AI requirements and expectations, i.e., enforcement, employment, ethics, education, entente and evolution (Kaplan and, (Prusak, L; Blom, S).

Globally

- Artificial intelligence (AI) is being rapidly adopted across industries worldwide. Companies are leveraging AI technologies to improve efficiency, enhance decision-making processes, and drive innovation.
- Global tech giants such as Google, Microsoft, Amazon, and IBM are investing heavily in AI research and development. They are developing advanced AI algorithms, frameworks, and platforms to cater to various business needs.

- International organizations and governments are recognizing the potential of AI and are formulating policies and regulations to promote its responsible and ethical use. They are also investing in AI education and training programs to develop a skilled workforce.

Regionally

- Different regions around the world are experiencing varying levels of AI adoption. Some regions, such as North America, Europe, and Asia-Pacific, are at the forefront of AI innovation and application. They have well-established AI ecosystems, including research institutions, startups, and corporate AI labs.
- Regional collaborations and partnerships are being formed to accelerate AI advancements. For example, the European Union has launched the European AI Alliance to foster cooperation and exchange knowledge in AI development and deployment.
- Governments in certain regions are actively supporting AI initiatives through funding programs, tax incentives, and regulatory frameworks. They aim to position their regions as AI hubs and attract AI-related investments and talent.

Locally

- AI adoption and implementation vary at the local level depending on factors such as economic development, industry focus, and technological infrastructure.
- Local businesses are exploring AI applications to enhance their operations, optimize processes, and gain a competitive edge. They are leveraging AI for tasks such as data analysis, customer service automation, predictive maintenance, and personalized marketing.
- Local governments and educational institutions are collaborating to develop AI skills and talent within the local workforce. They are offering AI training programs, workshops, and hackathons to equip individuals with the necessary knowledge and skills to work with AI technologies.
- Local AI communities, meetups, and conferences are emerging to facilitate knowledge sharing, networking, and collaboration among AI enthusiasts, professionals, and researchers

The validation of the study's findings was achieved through a rigorous literature review process. The researchers conducted a comprehensive search using predefined criteria in reputable databases such as Scopus and Web of Science. They identified 21 relevant papers that were analyzed and synthesized for the study. The data collection method involved examining existing literature, while data analysis included identifying key themes, trends, and insights from the selected papers. The qualitative analysis conducted by the researchers helped extract relevant findings, which were then synthesized to derive meaningful conclusions. By relying on a systematic approach and analyzing multiple sources, the study aimed to provide a comprehensive understanding of the challenges, facilitators, and impacts of AI adoption in business processes. This rigorous methodology and analysis process added credibility to the study's findings and conclusions.

European Journal of Technology
ISSN 2520-0712 (online)
Vol.7, Issue 2, pp 15 - 25, 2023

2.0 METHODOLOGY

In order to make sure that our analysis covered all pertinent material to date, the review was undertaken in six discrete steps, adhering to the accepted procedure of a systematic literature review (Kitchenham, 2004). First, a review process was created, outlining the selection and organisation of keywords and phrases. Second, in order to narrow down the articles that were relevant to our review, the inclusion and exclusion criteria for those papers were determined. Third, pre-defined phrases that were keyword combinations were used to do the paper search. Before doing data extraction and synthesising the results, the articles that the search turned up were critically evaluated in Figure 1.

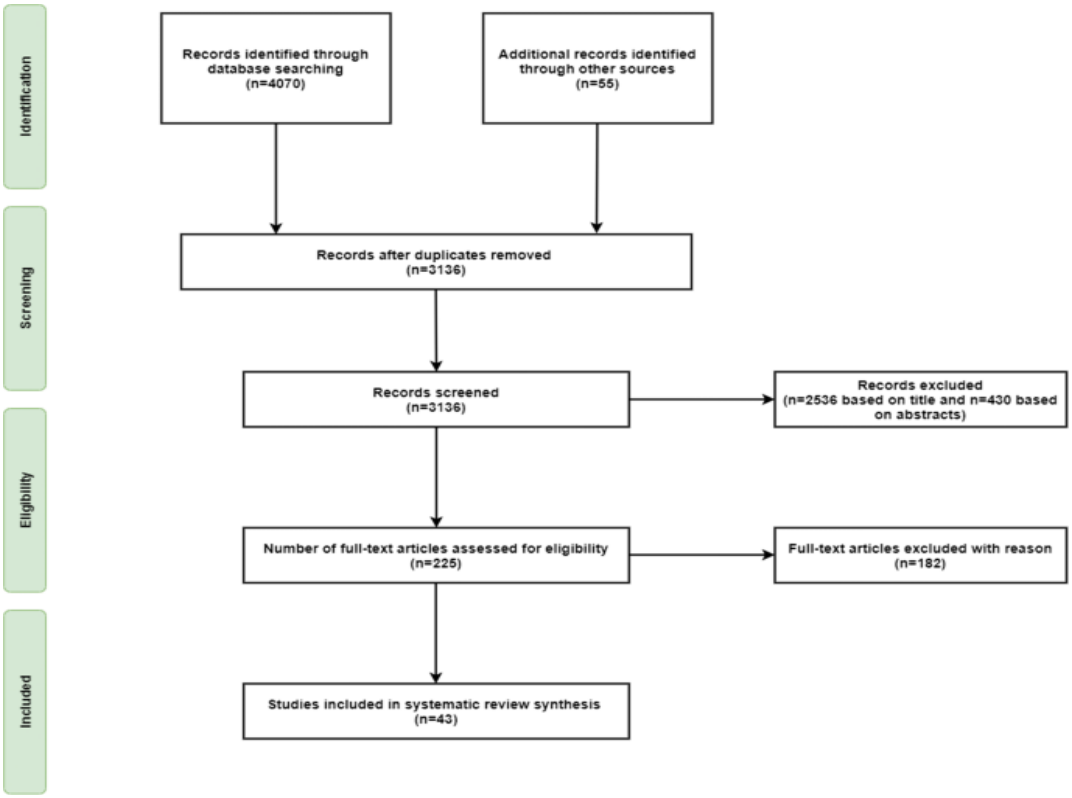

Figure 1: Flow Diagram of Selection Studies in This Meta-Analysis.

Individual Approach

Business intelligence system 46, 67% of publications explore various theoretical, and software approaches. The definition, methodology, architecture, case study, and software used in business intelligence systems are written about in the articles. The manufacturing resource management system (MRMS) first assesses the state of the business environment and the framework for business intelligence systems (Wetering, R.V.D). It then examines the theories and practises related to these systems and assesses the need for an automated negotiation method based on the manufacture requirements and latency of manufacturing resource state and order research. By doing research, the crucial success element for business intelligence system success aims to close the knowledge gap between practitioners and academics. The design of the low-cost business intelligence system is presented, which is made up of the low-cost business intelligence system framework, the analysis of the function of the system's core components, and the current applied

status of business intelligence and multi-agent technology (Davenport, T.H). Even-Driven Architecture (EDA) based Right-Time Business Intelligence System Framework (EDA based RTBISF), which combines RT-BI and the business process based on the EDA and Agent, to resolve the environment uncertainty, business dynamics and to meet the needs of dynamic adjustment of business solution for the enterprise in the fierce competitive environment Using an Enterprise Marketing Campaign Automation (EMCA) system, firms may quickly compile data to determine the most efficient and accurate marketing campaign approach. By creating a mailing list specifically targeted to a certain set of customers based on their purchasing behaviours, it is possible to cut marketing expenses by just distributing the promotional products to the targeted customers (Diorio). A project to build business intelligence (BI) for homogeneous diagnostic groups (GDH), which are crucial for managing patient health and are quite specialised. The major objective of this project was to make data easily accessible to end users so they could have a decision support tool that improved the effectiveness of decision making.

Integrated approach 3, 33 % papers discuss about integrated between BI and Supply Chain Management. Business Intelligence, the basic technology of Business Intelligence, and the contents of Supply Chain Integration and focuses on the analysis of the application of Business Intelligence in Supply Chain Integration to provide basis for enterprises to implement Business Intelligence. Supply Chain Business Intelligence introduces driving forces for its adoption and describes the supply chain BI architecture. The global supply chain performance measurement system based on the process reference model is described (Davenport, T.H). The main cutting-edge technologies such as service-oriented architecture (SOA), business activity monitoring (BAM), web portals, data mining, and their role in BI systems are also discussed. Finally, key BI trends and technologies that will influence future systems are described. A comprehensive customer relationship management is made possible by CRM systems and business intelligence, which also improve customer profiling, make it easier for customers to detect value, track how well a company is doing at satisfying its customers, and create a holistic approach to customers. In order to learn more about the students and help the decision-making process, a conceptual and technological infrastructure was designed and integrated into a Student Relationship Management (SRM) system linked to Business Intelligence ideas and technology.

AI has influenced business processes:

Automation: AI technologies, such as machine learning and robotic process automation (RPA), have automated repetitive and mundane tasks. This allows employees to focus on higher-value activities, improving efficiency and productivity. AI-powered automation can streamline processes like data entry, customer support, and inventory management.

Decision-Making and Analytics

AI algorithms can analyze vast amounts of data and provide valuable insights for decision-making. By leveraging AI, businesses can make data-driven decisions faster and more accurately. AI-powered analytics tools can identify patterns, trends, and correlations in data that humans may not easily detect, enabling businesses to optimize processes, identify opportunities, and mitigate risks.

Personalization and Customer Experience

AI enables businesses to deliver personalized experiences to customers at scale. Through machine learning, AI systems can analyze customer data, preferences, and behavior to tailor

recommendations, offers, and interactions. AI-powered chatbots and virtual assistants can provide real-time assistance, enhancing customer support and engagement.

Predictive Maintenance and Optimization

AI can help businesses optimize their operations by predicting maintenance needs and optimizing resource allocation. By analyzing data from sensors and equipment, AI algorithms can identify patterns and indicators of potential failures or inefficiencies. This enables proactive maintenance, reducing downtime, and optimizing operational performance.

Supply Chain and Logistics

AI is transforming supply chain and logistics processes. AI-powered algorithms can optimize inventory management, demand forecasting, route planning, and transportation logistics. This improves efficiency, reduces costs, and enhances overall supply chain visibility and responsiveness.

Fraud Detection and Risk Management:

AI algorithms can analyze vast amounts of data to identify anomalies and detect fraudulent activities. In areas like financial services, AI-powered systems can flag suspicious transactions and patterns, helping businesses prevent fraud and mitigate risks.

Natural Language Processing and Communication

AI technologies like natural language processing (NLP) enable businesses to understand and interact with human language. Chatbots, virtual assistants, and voice recognition systems can understand and respond to customer queries, improving communication and customer service.

Employee Recruitment and HR Processes

AI can streamline and enhance HR processes, including candidate screening, resume analysis, and employee onboarding. AI-powered tools can analyze resumes, assess candidates' skills, and match them with job requirements. This helps businesses automate and expedite recruitment processes, saving time and effort.

It's important to note that while AI offers numerous benefits to business processes, organizations should also address ethical considerations, data privacy, and ensure human oversight to maintain transparency and accountability in AI-driven systems.

Potential Areas of Development

Enhanced automation: AI will continue to automate more complex tasks, including those that require cognitive abilities, problem-solving, and decision-making. This will further increase efficiency and free up human resources for more strategic and creative endeavors.

Advanced analytics: AI will become even more proficient at analyzing large and diverse datasets. It will provide more sophisticated insights and predictive capabilities, enabling businesses to make more accurate forecasts, identify emerging trends, and optimize their strategies.

Natural language understanding: AI's ability to understand and generate human language will improve. Conversational AI systems will become more sophisticated, enabling more natural and context-aware interactions with customers and employees. This will enhance customer service, support, and communication across various channels.

Explainable AI: There will be a growing emphasis on developing AI models and algorithms that are explainable and interpretable. This will help businesses understand how AI systems arrive at their decisions, increase transparency, and meet regulatory requirements.

Personalization at scale: AI will continue to advance personalization capabilities, enabling businesses to deliver highly tailored experiences to individual customers in real-time. This will foster stronger customer loyalty, engagement, and satisfaction.

Robotics and autonomous systems: AI will play a key role in the development of robotics and autonomous systems, enabling businesses to automate physical tasks in industries such as manufacturing, logistics, and healthcare. This will lead to increased efficiency, accuracy, and safety in various operational processes.

Edge computing and AI: The integration of AI with edge computing will enable real-time processing and analysis of data at the network edge, reducing latency and enhancing responsiveness. This will be particularly beneficial in applications such as Internet of Things (IoT), autonomous vehicles, and remote monitoring.

Enhanced cybersecurity: AI will be utilized to develop more sophisticated cybersecurity solutions. AI-powered systems will be capable of detecting and responding to emerging threats in real-time, strengthening defense mechanisms, and ensuring the security of business processes and data.

These advancements will continue to transform how businesses operate, innovate, and interact with customers. However, it's important to consider the ethical implications, privacy concerns, and the need for responsible AI deployment as technology progresses.

3.0 CONCLUSION AND RECOMMENDATIONS

Conclusion

In conclusion, the impact of artificial intelligence (AI) on business processes is significant and offers numerous benefits. AI technologies, such as machine learning and robotic process automation, have automated repetitive tasks, allowing employees to focus on more valuable activities and improving overall efficiency and productivity. AI-powered analytics tools enable businesses to make data-driven decisions faster and more accurately by analyzing large amounts of data and identifying patterns and trends that may not be easily detectable by humans.

AI also plays a crucial role in personalization and customer experience, as it can analyze customer data and behavior to deliver tailored recommendations and interactions. In addition, AI is transforming supply chain and logistics processes by optimizing inventory management, demand forecasting, and transportation logistics, leading to increased efficiency and cost reduction. It also contributes to fraud detection and risk management by analyzing data to identify anomalies and detect fraudulent activities. Furthermore, AI technologies like natural language processing enable businesses to understand and communicate with customers more effectively through chatbots, virtual assistants, and voice recognition systems. AI can also streamline HR processes, such as candidate screening and resume analysis, improving recruitment efficiency. While AI offers significant benefits, organizations should also address ethical considerations, data privacy, and ensure human oversight to maintain transparency and accountability. Future developments in AI are expected to include enhanced automation of complex tasks, advanced analytics for more accurate predictions and insights, improved natural language understanding for better customer

interactions, and the development of explainable AI models to increase transparency. Additionally, AI will continue to drive personalization at scale, facilitate the integration of AI with robotics and autonomous systems, and enhance cybersecurity measures. As these advancements continue, it is important to consider ethical implications, privacy concerns, and responsible deployment of AI to ensure its positive impact on business processes. In conclusion, AI is revolutionizing how businesses operate, make decisions, and engage with customers, leading to improved efficiency, customer experiences, and innovation. However, it is essential to approach AI implementation thoughtfully and ethically to fully harness its potential benefits.

Recommendations

1. **Invest in AI integration**: Businesses should focus on integrating AI technologies into their daily operations. This may involve assessing the current state of AI adoption within the organization, identifying areas where AI can add value, and implementing AI solutions accordingly.
2. **Foster AI knowledge and expertise:** As AI continues to advance, it is crucial for businesses to develop a comprehensive understanding of AI technologies and their potential applications. This can be achieved through training programs, hiring AI experts, or partnering with external AI specialists.
3. **Prioritize data management:** AI heavily relies on data, and businesses should prioritize effective data management strategies. This includes data collection, storage, quality assurance, and security measures to ensure the availability of high-quality data for AI algorithms.
4. **Embrace explainable AI:** With the increasing adoption of AI, there is a growing need for transparency and explainability. Businesses should prioritize the development of AI models and algorithms that can provide clear explanations for their decisions. This will enhance trust, regulatory compliance, and accountability.
5. **Focus on personalized customer experiences:** AI can enable businesses to deliver personalized experiences to customers at scale. By leveraging AI algorithms and customer data, businesses can tailor their products, services, and marketing efforts to individual preferences. This can lead to increased customer satisfaction and loyalty.
6. **Explore AI in supply chain management**: Businesses should consider the application of AI in optimizing supply chain and logistics processes. AI can help improve inventory management, demand forecasting, route planning, and overall supply chain efficiency. Exploring AI-driven solutions in these areas can result in cost savings and improved operational performance.
7. **Address ethical considerations:** As AI becomes more prevalent, businesses should actively address ethical considerations associated with AI technologies. This includes ensuring the responsible use of AI, protecting data privacy, and addressing potential biases or discriminatory outcomes that can arise from AI algorithms.
8. **Stay updated on advancements:** The field of AI is constantly evolving, and businesses should stay updated on the latest advancements and trends. This can be achieved through continuous learning, attending conferences and seminars, and actively engaging with AI communities and experts.

9. **Collaborate and share knowledge:** Businesses can benefit from collaboration and knowledge-sharing with other organizations and experts in the field of AI. This can involve participating in industry consortiums, joining AI-focused networks, or partnering with research institutions. By fostering collaboration, businesses can leverage collective intelligence and stay at the forefront of AI advancements.
10. **Conduct further research:** Given the rapidly evolving nature of AI, businesses should continue to conduct research and experimentation to explore the potential applications of AI in their specific industry or domain. This can involve pilot projects, proof-of-concepts, and partnerships with AI solution providers.

REFERENCES

Benbya, H.; Pachidi, S.; Jarvenpaa, S. Special Issue Editorial: Artificial Intelligence in Organizations: Implications for Information Systems Research. J. Assoc. Inf. Syst. 2021, 22, 281–303. [Google Scholar] [CrossRef]

Berente, N.; Gu, B.; Recker, J.; Santhanam, R. Managing artificial intelligence. MIS Q. 2021, 45, 1433–1450. [Google Scholar]

Bharadiya , J. P., Tzenios, N. T., & Reddy , M. (2023). Forecasting of Crop Yield using Remote Sensing Data, Agrarian Factors and Machine Learning Approaches. Journal of Engineering Research and Reports, 24(12), 29–44. https://doi.org/10.9734/jerr/2023/v24i12858

Bharadiya, J. (2023). Artificial Intelligence in Transportation Systems A Critical Review. American Journal of Computing and Engineering, 6(1), 34 - 45. https://doi.org/10.47672/ajce.1487

Bharadiya, J. . (2023). A Comprehensive Survey of Deep Learning Techniques Natural Language Processing. European Journal of Technology, 7(1), 58 - 66. https://doi.org/10.47672/ejt.1473

Bharadiya, J. . (2023). Convolutional Neural Networks for Image Classification. International Journal of Innovative Science and Research Technology, 8(5), 673 - 677. https://doi.org/10.5281/zenodo.7952031

Bharadiya, J. . (2023). Machine Learning in Cybersecurity: Techniques and Challenges. European Journal of Technology, 7(2), 1 - 14. https://doi.org/10.47672/ejt.1486

Davenport, T.H.; Prusak, L. Working Knowledge: How Organizations Manage What They Know; Harvard Business Press: Boston, MA, USA, 1998. [Google Scholar]

Diorio, S. “Realizing the Growth Potential of AI”: Forbes. Available online: https://www.forbes.com/sites/forbesinsights/2020/05/08/realizing-the-growth-potential-of-ai/?sh=567d044433f3 (accessed on 8 May 2020).

dos Santos Garcia, C.; Meincheim, A.; Junior, E.R.F.; Dallagassa, M.R.; Sato, D.M.V.; Carvalho, D.R.; Santos, E.A.P.; Scalabrin, E.E. Process mining techniques and applications–A systematic mapping study. Expert Syst. Appl. 2019, 133, 260–295. [Google Scholar] [CrossRef]

Maita, A.R.C.; Martins, L.C.; Lopez Paz, C.R.; Rafferty, L.; Hung, P.C.; Peres, S.M.; Fantinato, M. A systematic mapping study of process mining. Enterp. Inf. Syst. 2018, 12, 505–549. [Google Scholar] [CrossRef]

Majhi, S.G.; Mukherjee, A.; Anand, A. Business Value of Cognitive Analytics Technology: A Dynamic Capabilities Perspective. VINE J. Inf. Knowl. Manag. Syst. 2021, 1–19. [Google Scholar] [CrossRef]

March, S.T.; Smith, G.F. Design and natural science research on information technology. Decis. Support Syst. 15, 251–266. [Google Scholar] [CrossRef]

Nallamothu, P. T., & Bharadiya, J. P. (2023). Artificial Intelligence in Orthopedics: A Concise Review. Asian Journal of Orthopaedic Research, 6(1), 17–27. Retrieved from https://journalajorr.com/index.php/AJORR/article/view/164

Offermann, P.; Blom, S.; Schönherr, M.; Bub, U. Artifact types in information systems design science–A literature review. In Proceedings of the International Conference on Design Science Research in Information Systems, St. Gallen, Switzerland, 4–5 June 2010; Springer: Berlin/Heidelberg, Germany, 2010; pp. 77–92. [Google Scholar]

Taymouri, F.; La Rosa, M.; Dumas, M.; Maggi, F.M. Business process variant analysis: Survey and classification. Knowl.-Based Syst. 2021, 211, 106557. [Google Scholar] [CrossRef]

van de Wetering, R. Achieving Digital-Driven Patient Agility in the Era of Big Data. In Responsible AI and Analytics for an Ethical and Inclusive Digitized Society; Dennehy, D., Griva, A., Pouloudi, N., Dwivedi, Y.K., Pappas, I., Mäntymäki, M., Eds.; Lecture Notes in Computer Science; Springer International Publishing: Cham, Switzerland, 2021; Volume 12896, pp. 82–93. ISBN 978-3-030-85446-1. [Google Scholar]

Van Der Aalst, W.; Van Hee, K.M.; van Hee, K. Workflow Management: Models, Methods, and Systems; MIT Press: Cambridge, MA, USA, 2004. [Google Scholar]

Wetering, R.V.D. The impact of artificial intelligence ambidexterity and strategic flexibility on operational ambidexterity. In Proceedings of the PACIS 2022 Proceedings, Taipei, Sydney, 5–9 July 2022; p. 153. Available online: https://aisel.aisnet.org/pacis2022/153 (accessed on 1 January 2023).

Yu, E.S.; Mylopoulos, J.; Lespérance, Y. Al models for business process reengineering. IEEE Expert 1996, 11, 16–23. [Google Scholar] [CrossRef][Green Version]