Advances in Digital Technology and Data-Driven Business Practices

Navigating Data Science

Unleashing the Creative Potential of Artificial Intelligence

Edited by

Babita Singla
Kumar Shalender
Nripendra Singh

Navigating Data Science

ADVANCES IN DIGITAL TECHNOLOGY AND DATA-DRIVEN BUSINESS PRACTICES

Series Editor: Nripendra Singh, Pennsylvania Western University, USA

Digital technology in marketing is dynamic and continually evolving, providing marketers with innovative tools and strategies to connect with audiences in an increasingly digital-centric world. Adopting and adapting to these technologies is essential for staying competitive and effectively reaching target audiences. Businesses that leverage digital marketing effectively are better positioned to connect with their audience, drive business growth and stay competitive in the digital age. Beyond the technical and ethical, *Advances in Digital Technology and Data-Driven Business Practices* exhibits real-world applications of digital marketing and data-driven practices. Through compelling case studies, it demonstrates its efficacy in areas such as market research, competitor scrutiny and gleaning customer insights, traversing various channels, encompassing the likes of social media, e-commerce and email marketing.

Forthcoming Volumes

Navigating Data Science in the Age of AI: Exploring Possibilities of Generative Intelligence
Edited by: Babita Singla, Kumar Shalender and Nripendra Singh

Unveiling Bleisure Travelers: Exploring Novel Dimensions for Enriching Social Consumer Engagement Using Big Data Analytics
Edited by: Pooja Kansra, Tanveer Kajla and Nripendra Singh

Digital Transformation of the Business World: A Managerial Perspective
Edited by: Madhu Josala and Nripendra Singh

Digital Transformation and Artificial Intelligence for Operational Excellence in Healthcare
Edited by: *Anand Jaiswal, Vinaytosh Mishra and Nripendra Singh*

Data-Driven Decisions: Leveraging Insights for Winning Marketing Strategies
Edited by: *S.L. Gupta, Niket Mehta, Jitendra Singh Rathore, Piali Haldar and Nripendra Singh*

Destination Data: Charting the Course for Transformative Travel Experiences
Edited by: *Gautam Shandilya, Nripendra Singh, Praveen Srivastava and Niraj Mishra*

The Data-Driven World of Academic Publications: Citations, Indexing and Impact Factors
Edited by: *Tanuj Singh, Shakhil Ahmad and Nripendra Singh*

Mindful Unplugging: The Power of Digital Detox Retreats
Edited by: *Tanusree Chakraborty and Nripendra Singh*

Immersive Wellness: Journey Beyond the Senses
Edited by: *Tanusree Chakraborty and Nripendra Singh*

Generative Creations: Harnessing AI for Advertising, Design, and Marketing
Edited by: *Robert J. Thompson, Nripendra Singh and Heather Morgan*

This page intentionally left blank

Navigating Data Science: Unleashing the Creative Potential of Artificial Intelligence

EDITED BY

BABITA SINGLA

Chitkara Business School, Chitkara University, Punjab, India

KUMAR SHALENDER

Chitkara Business School, Chitkara University, Punjab, India

AND

NRIPENDRA SINGH

Pennsylvania Western University, USA

United Kingdom – North America – Japan – India – Malaysia – China

Emerald Publishing Limited
Emerald Publishing, Floor 5, Northspring, 21-23 Wellington Street, Leeds LS1 4DL

First edition 2025

British Library Cataloguing in Publication Data
A catalogue record for this book is available from the British Library

ISBN: 978-1-83608-299-6 (Print)
ISBN: 978-1-83608-298-9 (Online)
ISBN: 978-1-83608-300-9 (Epub)

Contents

About the Editors

Dr Babita Singla is a Professor at Chitkara Business School, Chitkara University, Punjab, India. She has a PhD in Management and is UGC-NET qualified. She has over 14 years of experience in teaching, research and administration. Her areas of expertise are marketing, e-commerce, omnichannel and retail. In her career, she has been involved in important academic and research assignments such as *Guest Editor of a reputed Journal*, *organising and conducting International and National Level Conferences, Faculty Development Programs*, and a guide for the research projects along her Teaching. Her overall research-oriented mindset, rich knowledge and dedication towards her responsibilities have awarded her with the most prestigious *Teaching Excellence Award* and *Outstanding Achievement Award*. She has more than 70 research publications in reputable international and national journals, including 42 indexed in *Scopus, Web of Science and SCI*, and has presented research papers at various national and international conferences. In the short span of her career in Academia and Administration, she has authored and edited several books on retail, supply chain, branding, customer relationship management and product management; covering the course content of various universities *nationwide with reputed publication houses including Taylor & Francis, Springer, Emerald and IGI Global among others*. She is a lifetime member of various organisations of national and international repute. She has successfully delivered guest sessions at international and national universities. Other notable achievements are the registered *Copyrights and Patents* in her name.

Kumar Shalender (Post Doctorate, PhD) holds expertise in the fields of strategic marketing, leadership change, and technology management. He is an Associate Professor at Chitkara Business School, Chitkara University, Punjab, and has been involved in devising corporate strategy, business models and sustainability ecosystems. He has more than 80 publications to his credit, including 49 papers in highly reputed Scopus-indexed journals, international and national conferences, seminars and symposiums. Dr Kumar also holds authority on solving intricacies of design thinking, innovation culture, collaborative practices and team dynamics. He is associated with leading publications in the sustainability space and is having regular interactions with professionals on developing sustainable ecosystems across industries in the country.

Dr Nripendra Singh is a tenured Full Professor of Marketing in the Department of Business, Economics and Communication, College of Science, Technology and Business at the Pennsylvania Western University. He is a recipient of Fulbright

scholarship, a flagship programme of the United States Department of State, Bureau of Educational and Cultural Affairs. He completed Fulbright research at the Pennsylvania State University. As a visiting research scholar, Dr Singh visited renowned institutions such as University of California at Berkley, CA, and Technology University, NJ. He is a Post-Doc Fellow of the Global Institute of Flexible Systems and Technology and 'Campus-2-Capitol Fellow' of Bard College, NY. He earned two doctorate degrees and two MBA degrees. As a certified professional, he completed the Preparing Future Faculty programme at the Iowa State University. Dr Singh is an avid researcher and is on the editorial board and reviewers committee of several reputed journals. He has published and presented more than 100 research articles in reputed journals and conferences. He is the President and Director of 'International Association of Technology and Management', a nonprofit to promote research, and 'Clarion Consulting Center' to provide consulting services to businesses and help students get real-world projects. He mentors and advises young faculty members, research scholars and undergrad students globally.

About the Contributors

Shveta Bansal is working as an Assistant Professor in the Department of Computer Science and Engineering at Chitkara University, Punjab, India. She received her PhD in Computer Engineering from Thapar University, Patiala, India. Her research interests are cloud computing and IoT, and she has many related publications in esteemed SCI journals and national and international conferences.

Anant Bhatt is an alumnus of the Indian Institute of Technology, Kharagpur, and did research at the University of Maryland, USA. Colonel is an AI Researcher and possesses profound knowledge and experience in Army operational communications, cybersecurity, and satellite communication. He is an Electronic Warfare Expert. He has significant proficiency in satellite analysis and robotics. He is a qualified Psychologist. The colonel has strived hard to keep up his zeal for learning and completed Master's in Intellectual Property Law. Colonel Anant Bhatt is a proud recipient of the coveted Prime Minister Certificate of Merit and Award twice, a Certificate of Recognition from the Defense Minister award, Certification of Innovation from the Chief of Defense Staff, a Commendation Card from the Chief of Army Staff and Commendation Card from General Officer in Command Southern Command for his innovations. He is an active researcher in Artificial Intelligence and has earned a PhD in same field.

S. Catherine, PhD with 16 years of experience as an Associate Professor in Saveetha Engineering College, Chennai. Her research interests include consumer behaviour in digital commerce, mass customisation and fashion technology, and she has published 11 articles indexed in Scopus and 20 articles in other reputed journals.

Shilpa Gite received a PhD degree in deep learning for assistive driving in semi-autonomous vehicles from Symbiosis International (Deemed) University, Pune, India, in 2019. She is currently working as an Associate Professor with the Computer Science Department, Symbiosis Institute of Technology, Pune. She is also working as an Associate Faculty with the Symbiosis Centre of Applied AI (SCAAI). She has around 13 years of teaching experience. She is guiding PhD students in biomedical imaging, self-driving cars and natural language processing areas. She has published more than 60 research papers in international journals and 20 Scopus-indexed international conferences. Her research interests include deep learning, machine learning, medical imaging and computer vision. She was a

recipient of the Best Paper Award at the 11th IEMERA Conference held virtually at Imperial College, London, in October 2020.

Anvesha Jain is pursuing her Bachelor's in Computer Science and Design from IIIT Delhi. She is actively involved in visual and graphic design and has an avid interest in applications of data analytics and artificial intelligence.

Ruchi Jain is a Professor and Coordinator of a PhD programme in Amity School of Business, Amity University Uttar Pradesh, with more than 20 years of research and academic experience. She has been associated with noteworthy research publications, organising conferences and faculty development programmes.

Leena Jenefa, PhD, is an Associate Professor in School of Management in Hindustan Institute of Technology and Science, Chennai, India. She is an Expert in MBA-IEV, a BoS member IEV, Institute Innovation Cell, a member in Research and Development and Career Guidance Cell and a member of Monitoring Committee. Her research interests include consumer delight, artificial intelligence and consumer behaviour in digital commerce.

M. Kalaivani is currently working as an Associate Professor in Faculty of Management, SRM Institute of Science and Technology, Vadapalani, Chennai. She has 20 years of experience in this academic field. She is specialised in marketing and was awarded her PhD in the same specialisation from Bharathiyar University, Coimbatore. Currently, she is guiding four research scholars. She has also published papers in various reputed journals indexed in Scopus, WoS, ABDC, UGC, etc.

Simarjit Kaur is working as an Assistant Professor in the Department of Computer Science and Engineering, Chitkara University Institute of Engineering and Technology, Chitkara University, Punjab, India. She received her PhD in the research area of Energy Prediction and Optimisation from Thapar Institute of Engineering and Technology, Patiala. She has published various research papers in SCI-indexed journals and conferences.

Ketan Kotecha is an Administrator and a Teacher of Deep Learning. His research interests include artificial intelligence, computer algorithms, machine learning and deep learning. He has expertise and experience in cutting-edge research and projects in AI and deep learning for the last 25 years. He has published his work in several peer-reviewed journals on various topics ranging from cutting-edge AI, education policies, teaching–learning practices and AI for all. He is an Associate Editor of *IEEE Access* journal.

T. Mangaiyarkarasi has 15 years of experience in academics and industry. Her research areas include finance and analytics. She has numerous publications and case studies in credit risk, cryptocurrencies and fintech and holds several technical certifications in analytics. She is currently serving as an Assistant Professor at SRM Institute of Science and Technology, Chennai.

Neha Mishra has earned a doctoral degree in Business Management and currently serves as an Assistant Professor at Chitkara Business School within Chitkara

University, situated in India. In her role, she likely contributes to the academic community through teaching, research and possibly administrative duties, within the realm of business education.

Shruti Patil is an enthusiastic academician and an avid researcher in the flied of AI technology. She is a gold medalist in computer science. She has been an industry professional in the past, currently associated with Symbiosis Institute of Technology as a Head of the department, AI&ML department, and also as a Research Associate with SCAAI. She has expertise in applying innovative technology solutions to real-world problems. Her research areas include applied artificial intelligence, natural language processing, acoustic AI, adversarial machine learning, data privacy, digital twin applications, GANS and multimodal data analysis. She is currently working in the application domains of healthcare, sentiment analysis, emotion detection and machine simulation via which she is also guiding several UG, PG and PhD students as a domain expert. She has published 100+ research articles in reputed international conferences and Scopus/Web of Science indexed journals and books.

K. Shanthi is an exceptional scholar with over two decades of experience in both academia and industry. Her groundbreaking qualitative research focuses on understanding and empowering marginalised communities. With a strong background in management and industrial psychology, Shanthi expertly employs thematic analysis and grounded theory methodologies to gain deeper insights into the lives of those at the bottom of the socio-economic pyramid. Through her tireless work, Shanthi seeks to challenge stereotypes, fight for social justice and make a real difference in the lives of underserved populations. She is committed to bridging the gap between academia and activism and is unwavering in her dedication to this cause.

Aashima Sharma holds a Master's degree in Computer Applications from Thapar Institute of Engineering and Technology, as well as a doctoral degree with specialisation in blockchain and IoMT in healthcare from Thapar Institute of Engineering and Technology. She is working as an Assistant Professor in the Department of Computer Science and Engineering at Chitkara University Institute of Engineering and Technology. Her areas of interest include blockchain technology, IoMT and network security and has many related publications in esteemed SCI journals and national and international conferences.

Jaswinder Pal Singh is a researcher at Department of Library and Information Science, Punjabi University, Patiala, India, and is currently working as a University Librarian at Chitkara University, Punjab, India. He possesses a comprehensive 18-year tenure within the library field, accumulating extensive expertise and proficiency in various aspects of library management, including cataloguing, information retrieval, collection development and patron services. Throughout this substantial duration, he has demonstrated a deep commitment to fostering an enriching environment for patrons, leveraging his wealth of experience to enhance library operations and meet the diverse needs of users. His areas of research

include media and information literacy, knowledge sharing, information retrieval, knowledge management in libraries and collections development.

Shrishti Singh is a research scholar, working in the field of marketing from Amity College of Commerce and Finance, Amity University Uttar Pradesh. Her areas of interest include augmented reality, artificial intelligence, social media marketing and consumer behaviour.

Rubani Singla is a dedicated professional with a strong research, teaching and academic administration background. With over 4 years of experience, Rubani has held positions as an Assistant Professor at CGC Jhanjeri Mohali and GZS Campus College of Engineering and Technology Bathinda. With a solid educational foundation in Information Technology and Computer Science, including an MTech degree, Rubani has contributed to the field through research papers on topics like skew detection in text documents and the socio-economic impacts of e-commerce. In addition to academic achievements, Rubani has gained significant industrial training in various technologies and is proficient in website designing and multiple programming languages.

N.V. Suresh is the Vice Principal and a Professor at ASET College of Science and Technology, Chennai, Tamil Nadu. He has published 30 research papers, presented 15 conference papers, authored two textbooks and developed over 10 e-content modules. Dr Suresh has supervised six funded projects and numerous student projects. He is an editor and reviewer for international journals and has held various academic leadership positions. He has received several awards, including the Best Faculty Award from Lions International in 2023, and has participated in international faculty exchange programmes.

Suganya V. is an Assistant Professor (selection grade) in Faculty of Management at SRM Institute of Science and Technology, Chennai, India, handling subjects varying from human resources and marketing management. She's known for her extensive contributions to academia and has a depth in knowledge when it comes to research and its methodologies. With a focus on research, she has presented numerous papers at both international and national conferences, showcasing her expertise in her field. As an educator, she brings a wealth of knowledge and experience to her role, inspiring students and colleagues alike. Her dedication to scholarly pursuits has earned her recognition as a leading figure in her field, with her work making valuable contributions to the academic community.

Preface

The combined use of data science (DS) and artificial intelligence (AI) is increasing by the day. Businesses across the industry vertical are using these technologies to explore new opportunities in addition to strengthening their current market positions. *Navigating Data Science: Unleashing the Creative Potential of Artificial Intelligence* takes a comprehensive look into the combined capability of DS and AI with specific reference to real-world business scenarios. From analysing the use of New Age innovations in marketing to science and technology and the healthcare sector, the authors have contributed to enhance the body of knowledge in the field of DS and AI. The ethical considerations of using AI tools in education, academic research and gig workers are also discussed. The impact of technology in moulding the overall well-being of employees within the specific framework of their work life has been discussed by the authors. Among the key highlights of the title is the comprehensive and holistic approach that the authors have taken while contributing chapters. The global perspective enhances the usability and relevance of the book for a wider set of audiences. Especially in relation to the science and technology domain, the use of the DS and AI will encourage stakeholders to come together and contribute to harness the potential of these technologies on a larger scale. The ethical concerns related to the use of AI are also analysed. This is critical for the field of propagating AI as the use of the technology has been surrounded by myriad issues with policymakers across the globe debating very passionately about setting a framework for the use of AI. The discussion and implications offered by this book can prove instrumental in finally developing an AI framework that will lead to the right use of the technology within the set boundaries. The implications of using big data to generate information from AI are also part of the contents covered by the book. The chapter on using the DS and AI in the healthcare sector also features some crucial implication for the policymakers. As the role of technology is very crucial in offering quality and affordable healthcare services, the chapter will help industry stakeholders deliberate on the use of technology for benefitting patients. It is essential to note that taking things forward in the technology domain, especially in relation to the DS and AI, stakeholders need to come together and collaborate in a constructive manner. This approach will help to reduce the burden of the

resources to develop new use case of these technologies that, in turn, will lead to widespread adoption of these innovations at a mass level. Summarily, this book is a valuable addition to the knowledge body and will help academics, professionals and policymakers.

Editors
Dr Babita Singla
Dr Kumar Shalender
Dr Nripendra Singh

Chapter 1

Data Science and Artificial Intelligence: Exploring Collaborative Potential for Healthcare Sector

Kumar Shalender[a], *Babita Singla*[a] *and Nripendra Singh*[b]

[a]Chitkara Business School, Chitkara University, Punjab, India
[b]Pennsylvania Western University, USA

Abstract

Exploring the game-changing potential of the data science and artificial intelligence (AI) in the healthcare sector, this chapter specifically looks into the use cases to develop practical guidelines for the industry to implement the technology at a higher level. By analysing the use cases of data science and AI in the healthcare industry, the chapter identifies key areas where the combined use of these technologies is bringing superior benefits to the stakeholders. These cases then become a base for the development of practical guidelines that can be adopted by the healthcare industry to adopt, integrate and intensify the use of technology in relevant areas of business performance. The chapter concludes with the fact that adoption of the holistic approach is required for the long-term adoption of the data science and AI in the healthcare sector. The study also emphasises close collaboration between industry and policymakers so that the process of technology is adoption can be sustained for a longer period of time.

Keywords: Artificial intelligence (AI); collaboration; data science; healthcare sector; policymakers; stakeholders

1. Introduction

The transformative potential of data science and artificial intelligence (AI) has just begun to find mention across the academic world and corporate sectors. Technology is enabling businesses to make sweeping changes in their products

Navigating Data Science, 1–11

doi:10.1108/978-1-83608-298-920251001

and services and helping them to deliver superior value to the target market. From the automobile industry to the FMCG sector and the consumer durable industry to exports, the use of data science and AI is opening new avenues of growth and opportunities for the industry players. Against this specific background, this chapter explores the transformative potential of data science and AI for the healthcare industry. The healthcare sector is very important not only in terms of its contribution to the economy but also in ensuring that the masses continue to receive quality healthcare services at affordable prices. There is no doubt about the role of technology in guaranteeing that quality healthcare services can be offered to people without charging very high prices. Data science and AI has a great potential that can be realised by the healthcare sector, and by integrating the technology in its functional department as well as operational mechanisms, the sector can utilise the technology to achieve new heights of growth and profitability. Another important facet of data science and AI is its crucial role in catalysing innovation for the industry. Technology can be used to come up with different kinds of products and services that can help the entire healthcare sector to come up with new methods and mechanisms for delivering superior healthcare services to patients. Such is the large scope of applications related to generative intelligence in the healthcare sector that businesses across the verticals are now investing in data science and AI to come up with products specifically related to healthcare management (Aggarwal et al., 2020). The chapter is organised into the following sections: the use cases related to data science and AI in the healthcare sector have been discussed that is followed by the development of the conceptual framework that can help the industry holders to use the technology in healthcare practices. The Development of the Framework is then followed by the Conclusion and Discussion while the authors also detail the important implications related to the use of data science and AI in the healthcare industry. The study has important implications for all the stakeholders in the healthcare ecosystem, and by focusing on the specific benefits related to the value chain of the industry, this chapter will set the tone for future research (Bisam, 2024). Researchers and academicians are likely to benefit greatly from the study and can utilise the chapter in order to come up with innovative practices for making sure that they deliver superior patient care services to the masses. The research will also contribute to the cause of making superior healthcare services available to the masses and by implementing and integrating data science and AI in the day-to-day working of the healthcare industry; the significant benefits can be reaped by the concerned stakeholders.

2. Data Science and AI in Healthcare: Use Cases

2.1 Screening Patients

Data Science and AI is increasingly finding used in screening of the patients in hospitals. The technology is proving very successful and instrumental in reducing the load of the practitioners so that they can strategically invest their time in taking care of the patients. With the help of generative AI, the various images

related to the medical records of the patients can be analysed quickly, and accordingly, the data can be forwarded to the doctors for further analysis and treatment procedures (Bughin et al., 2017). The fast completion of the preliminary process is of critical importance as it can help the doctors and practices to deliver the patient care services without any kind of unnecessary delay. It is also important to understand that the inclusion of the technology has also made the process more cost-efficient which means the vision of delivering affordable healthcare services to all can be realised quickly and efficiently. Another significant benefit of using technology in screening patients is the fast processing as unlike human beings that technology do not require any kind of a break or rest period. This means patients can be continuously screened by the technology, and accordingly, analysis is offered to the doctors for taking the remedial actions. There are many machines to which the integration of data science and AI can be done, and satisfactory results on the Diagnostic front can be achieved. The potential of making errors also happens to be quite low in the case of data science and AI, and by ensuring that the right kind of data is fed into the machine, the optimum results can be obtained from the technology (Dhiman et al., 2018). More and more hospitals are now investing in data science and AI to come up with the right kind of a diagnostic techniques and mechanisms, and it is just a matter of time before we start witnessing that technology becomes a means of operations related to patient diagnostics and treatment procedures. By simultaneously increasing the efficiency and effectiveness of diagnostic procedures, the use of data science and AI can also play a crucial role in furthering the concept of affordable healthcare in the world. Especially when it comes to the developing and under-developed economies, the role of technology in providing good healthcare services is very crucial. These countries require a proper investment in the healthcare infrastructure, and by using the technology, the cost efficiency related to the healthcare management practices, healthcare services and allied issues can also be tackled effectively. The role of policymakers becomes also very important in encouraging the use of technology in the healthcare industry. By promoting new investment in the sector and encouraging technology developers, entrepreneurs and allied players in the ecosystem, renewed progress can be achieved in the healthcare industry (Dorn, 2024).

2.2 Vaccine Discovery

The large number of iterations are required before formerly a vaccine is introduced in the market. These trials are very costly and by making use of the generative AI, pharmaceutical companies and researchers can save a lot of money and resources. The technology uses offered them the opportunity to conduct these iterations in a cost-effective and efficient manner. The insightful information offered by the data science and AI can also help in trials and by correlating the results of different kinds of vaccine trials the technology can help further bring down the cost factor. The industry has already started using data science and AI in the vaccine discovery process, and while using the technology in different kinds

of procedures, the overall time and cost related to drug discovery will definitely going to be shorter than before (Floreano & Wood, 2015). The machine learning aspect of data science and AI is very helpful in the vaccine discovery phase, and training the machines on identifying the ideal candidates for the trials of the vaccines and then correlating the results of how the trials have brought a positive change is very important and significant for the vaccine discovery process. The technology also very useful in managing the impact of the new vaccines, the data and analysing its impacts, the data science and AI can be widely used for preserving the data management related to the important vaccine discovery for the future too. The process related to cleaning the data and generation of the various queries related to the possible impact of the new vaccines on health can also be preserved with the help of generative AI. Especially when it comes to the decoding process related to various biomedical processes, the usability of the data science and AI is very crucial. In fact, the utility of data science and AI in discovering new drugs and vaccines is holistic and encompassing. From identifying the molecules related to the targeted diseases to finding the right candidate for administration of the vaccine under the trial and tracking the results with the purpose of preserving the information for the years to come, all things can be done very efficiently with the help of the generative AI. The primary benefit related to the use of technology in drug and vaccine Discovery is a reduction in the cost as many research reports have predicted that the then use of data science and AI can bring down the cost to one-tenth of the total amount required as an investment to come up with a new vaccine (Fox, 2024).

2.3 Automating Administrative Processes

In comparison to the other sectors, the automation enabled by the data science and AI in healthcare is very critical for improving the overall delivery experience to the patients. Speed of processing the requirements to refer the patient to the doctor can become very critical and even decide the fate of the entire treatment procedure. It also makes sense as the focus of the healthcare management services must be on delivering superior patient care rather than focusing on completing files, managing bills and other associated aspects related to the healthcare sector. By achieving better efficiency in the administrative processes, data science and AI can play a crucial role in enhancing the overall diagnostic and treatment procedures for patients (Ghosh, 2024). The automated process can also be related to gathering the data and information of patients, and by combining it with the analysis of their present conditions, a complete record related to particular patient can be made for reference purposes. The sharing of the report among the participating stakeholders in the healthcare ecosystem will then lead to the creation of a dynamic and vibrant healthcare sector. The need or to meet processes and treatment procedures is also being felt to divert the critical human resources on other important parameters of the healthcare system (Hurley & Adebayo, 2017). The utilisation of the manpower in the hospital must be done in a judicious manner, and by automating healthcare features and systems with minimum

human intervention, the enhancement in the efficiency of the system can be achieved in a significant manner. The automation of data collection, analyses and processing is another significant benefit of generative AI. Of specially, the ability of the technology to extrapolate the data for to predicting future business scenarios is quite commendable. The current crunch of manpower that the World Health Care ecosystem is experiencing today is very acute. According to the leading authority in the field of healthcare ecosystem, it is estimated that around 30 million people are required to fill management positions in hospitals, dispensaries and infirmaries in order to provide satisfactory healthcare services to the targeted people. This number is bound to increase in the coming times with the population expected to rise and reach the level of 9 billion by the end of 2050. In order to offer quality and affordable healthcare services to such a number of people across the globe, technology adoption is a prerequisite and primary criterion to focus upon by all players in the healthcare ecosystem (Kopalle et al., 2020). The use of data science and AI can also be done to issue different kinds of statements required by both regulatory bodies and customers along with filling out records of the patients in relation to their medical conditions. These are things in addition to the enormous utility of data science and AI in digitising the records that can be used for a whole lot of purposes by both industry players and regulatory organisations.

2.4 Remote Operations

The use of data science and AI is increasingly finding favour among stakeholders, thanks to its capability to offer remote assistance to patients. This utility is specifically significant for elderly people who find it difficult to commute to the hospitals for their appointments with healthcare professionals. Also, people who are suffering from acute diseases which leave them almost in still positions can also utilise the technology to get remote assistance from the doctors and physicians. With the help of data science and AI and IoT, the dream of receiving quality healthcare services is fast becoming a reality (Olsen, 2024). This aspect of getting assistance remotely is also proving beneficial for countries in developing and underdeveloped economies. The small towns and villages in these countries do not have quality healthcare services, and by using advanced technology such as telemedicine applications, the patients get a chance to have treatment from the best doctors in the world. This also saves time for the practitioners by allowing them to offer treatment services to a large number of people without actually needing to visit them in person. By combining the generative aspect of AI with natural language processing (NLP) models, desirable progress can be achieved in delivering quality healthcare services to target patients. The primary advantage of these telemedicine applications is their round the clock availability, which is a big plus for patients (Pal & Shalender, 2021). The best thing about remote assistance is that not only physicians or doctors offer medical services but people associated with the medical fraternity are also able to offer these services to patients. Nurses, junior doctors and attendants can use the telemedicine services to offer assistance

to patients worldwide. The concept of virtual nurses is fast gaining prominence across the world is also natural extension of the generative AI. The critical role of the data scientists in making the processes more efficient and effective is also recognised across the globe. The data science has proved instrumental in bringing the AI revolution in the healthcare sector, and by offering the collection, analysis and evaluation of the relevant data, the healthcare sector is becoming increasingly effective in treating patients cost-effectively and affordably. The significance here lies in integrating data science with data science and AI as the combination is the one that has the transformative capability to change the very face of the global healthcare sector (Pelley, 2024). The cost associated with travelling and bringing the patients in person for the treatment process can also be significantly decreased with the help of data science and AI technologies. Another important point to note is that all these revolutions are catalysed by the availability of high-speed internet, and by ensuring that the connectivity remains available across the globe, policymakers can ensure that the healthcare sector will continue to benefit from the combined capabilities of data science and AI.

3. Development of Holistic Framework

3.1 Develop Vision

In order to take the organisation through the adoption process of data science and AI, the healthcare ecosystem must have a collective vision of the direction they want to head into (refer Fig. 1.1). This vision is one of the primary requirements for making the technology adoption a successful process. It is also important to integrate the technology adoption with long-term profitability of the company so that each and every person recognises the importance of becoming a coriander in the constantly changing business environment. Organisations usually ignoring of specific technology visions but given the importance of new-age innovations in offering the sustainability and a competitive edge to organisations, this development is a must (Shalender & Yadav, 2018, 2019). The delegation of the top management in this development must have input from the business and functional level people; these are the persons who will be directly responsible for the implementation of the data science and AI strategy in the company. It would be more useful if the entire ecosystem of healthcare could develop a collective vision towards adoption of the technology, and by sharing the cost in terms of the resources required to do this digital transformation, the organisations in the healthcare sector can save a lot of money in the process. It is therefore necessary that healthcare companies must be attention to development of the technology vision and align that with the overall goals, objectives and values of the organisation.

3.2 Start Small

The very first recommendation is to adopt these technologies in an incremental manner, and rather than changing the entire system and replacing it with the

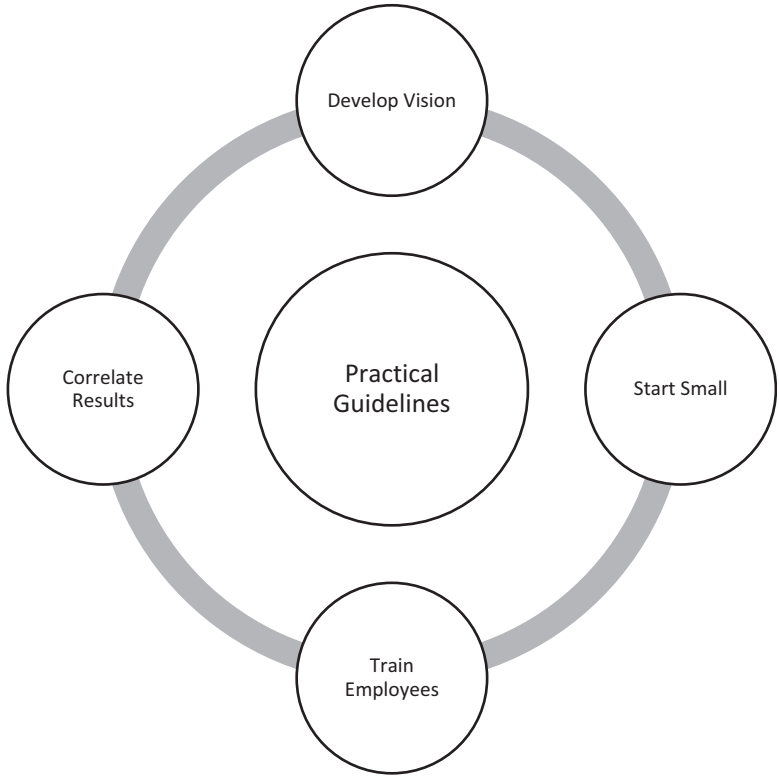

Fig. 1.1. Practical Guidelines. *Source:* Authors' conceptualisation.

technology part, it is better to start using data science and AI in an implemental manner (Shalender & Sharma, 2022). This will not only save the cost associated with the adoption of the technology but will also help the organisations to tackle resistance that might arise due to adoption of the technology in a big way. Especially when it comes to the legacy systems which are operational for a long period of time in healthcare organisations, replacing all those systems with data-driven decision-making might not augur well to the adoption process. Top management must take into confidence each and every employee about the adoption prospects of data science so that the resistance related to this adoption process can be minimised.

This approach will help in gaining the confidence of the shareholders who might also not like the process of a comprehensive change in a single instance (Shalender, 2018). As resources required for the transformation and adoption of the technology has to be approved by the shareholders of the organisation, the positive attitude of the shareholders is a prerequisite for determining the success of the process. It is also helpful if the top management conveys their idea about adopting data science and the return form and circulating that memorandum to

all the employees so that they can have a clear idea about the digital strategy of the organisation (Shalender et al., 2024). This clarity will help in making sure that adoption of the data science and AI will be accomplished in a satisfactory manner.

3.3 Train Employees

This is one of the most neglected issues and has to be addressed on a priority basis as far as the adoption of data science and AI in the healthcare sector is concerned. By investing in the training and development of employees, organisations can make them ready to use the technology efficiently (Singla & Shalender, 2024). This is also a credible method to reduce the opposition to the technology adoption as informed and trained employees are more likely to adopt the technology without any kind of inhibition than others. Of course investing in the training and development is a function of resources and once again edition if the healthcare sector decides to train employees on the new age innovations, it will cost them money. The approval for training and development of employees on the technology from usually comes from the top management of the organisation with corporate-level people in turn asking shareholders for the same in order to get the approval. The entire process can become more streamlined and smoother if the technology adoption in the company is associated with the long-term profitability of the organisation (Singla et al., 2024). It is the responsibility of technology team to demonstrate the benefits associated with the technology adoption, and by offering tangible benefits that can be showcased in front of top management and shareholders, the way forward to adopt and implement the technology can be smoothened. Investing in the training and development of the employees has always been a good idea as it inculcates a sense of belongingness and familiarity among employees. This will also help to reduce role stress and work disengagement, leading to better performance on critical parameters such as growth, market share, customer retention, etc.

3.4 Correlate Results

One of the significant steps that companies often field to implement is to correlate the results of technology adoption with the market parameters. As an organisation, you must demonstrate that because of the implementation of the technology adoption, crucial parameters related to the performance have been infected positively. Correlating the data science and use of AI with enhanced patient satisfaction, delivery of superior value to patients and offering affordable healthcare services is a part of the process that you must complete to enhance the implementation of the technology in your organisation. By demonstrating superior results to the top management, healthcare companies can ensure that they get hold of more resources in order to take the use of technology in their companies to a higher level. Communicating the results with the positive framework is not only related to the technology adoption in the healthcare company at the present stage