DIGITAL TRANSFORMATION FOR BUSINESS SUSTAINABILITY AND GROWTH IN EMERGING MARKETS

PAWAN KUMAR
SUMESH DADWAL
RAJESH VERMA
SUNIL KUMAR

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EDITED BY

PAWAN KUMAR
Lovely Professional University, India

SUMESH DADWAL
London South Bank University, UK

RAJESH VERMA
Lovely Professional University, India

AND

SUNIL KUMAR
Shoolini University, India

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

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About the Editors

Dr Pawan Kumar is currently a Professor and Research Coordinator at Mittal School of Business (ACBSP/NIRF/NBA Accredited), Lovely Professional University (NAAC A++), Phagwara, Punjab (India). Apart from corporate experience, having core academic career spanning over 18 years, he has served in various institutions of Punjabi University, Patiala, at the capacity of an HOD and an Assistant Director. He is an active trainer and a subject matter expert in the field of Research Methodology and Data Analysis. He has attended 30+ relevant training and 4 UGC/AICTE FDP's as well as attained 35+ Certified MOOC courses for the latest learnings. He has been invited as a resource person in the FDP/Workshops on Research Methodology and Data Analysis using SPSS, Smart PLS, R and Nvivo. He has authored four edited books from IGI Global on the theme Business5.0: Opportunities and Challenges in Emerging Markets and Drivers of SME Sustainability and Growth in Emerging Markets, Demystifying the Dark Side of AI, Convergence of HR Technologies and Industry5.0. Presently, he is handling edited books of Emerald and Taylor Francis. He has published 40+ articles in reputed Scopus/ABDC Journals of Emerald, Sage, IGI Global and Inderscience. Under his supervision, 10 PhD students have been awarded doctorates till now and 2 MPhil research student. He has successfully completed special issues at the capacity of Guest Editor from Scopus Journals of Inderscience. He has been an Editorial Board member of Scopus Indexed Journals Namely the *International Journal of Technology Transfer and Commercialization*, the *International Journal of Public Sector Performance Management* and the *International Journal of Entrepreneurship and Small Business*. He is certified for 'Life Skills and Motivating Individuals'. His areas of specialisation are Marketing Research, Research Methodology, Business and Research Analytics using R, SPSS, Smart PLS and Digital Marketing. He has successfully organised more than 10 international conferences at the capacity of a Joint Organising Secretary, a Convener and an Organising Secretary at various institutions.

Dr Sumesh Dadwal has 23 years of experience in teaching, academic research, eLearning and educational quality management, associated with various UK universities. Currently, he is working as a Senior Lecturer in Strategy at London South Bank University, UK. Previously, Dr Dadwal has worked at a number of British Universities such as the Northumbria University, University of Glyndwr, UWL, Birkbeck College, University of London, University of Plymouth, University of Falmouth, Ulster University, the University of Roehampton and Bucks

New University, UK. He has previously worked as a Project Engineer in construction projects and a Quality Annalist in the Supply chain. He has also been associated with QAA UK, the higher education quality assurance agency of the United Kingdom. Sumesh specialises in international strategies, technological strategy and business models, innovation and technology in marketing, digital marketing, entrepreneurship and business in emerging markets, He is an Active Researcher undertaking analysis in the service sector, promotional strategies in emerging markets, Augmented reality marketing and consumer behaviour, utilising various qualitative and quantitative techniques. He has authored various research papers, recently edited two books, authored many book chapters in other edited books and has led research activities at various levels. His recent publications include many book chapters and journal articles and has edited several research books.

Dr Rajesh Verma is the Senior Dean and Professor of Strategy at Mittal School of Business, LPU, Punjab. His research and teaching interests entail areas like Business Models, Market Orientation and Political Marketing. He is a recipient of a Junior Research Fellowship from the University Grant Commission of India and other research grants from bodies like the UK–India Education and Research Initiative (UKIERI); the European Commission; and the Department of Science and Technology (DST), Government of India. He is a Wiley Certified Design Thinking Practitioner and has conducted several training programmes on design thinking, selling skills, changing business models, brand building and customer orientation, etc. for corporates like India Oil, Radington, etc.

Dr Sunil Kumar, currently an Associate Professor at Faculty of Management Sciences, Shoolini University, possesses extensive academic and research experience. With a background in Business Administration, Sunil's research endeavours span multiple domains, including human resource management, e-training and the application of artificial intelligence in business. His prolific contributions are evidenced by numerous research papers, book chapters, copyrights and patents. Dr Kumar has a knack for teaching with expertise in subjects like HR Analytics, Talent Management, Industrial Psychology and more. He has also successfully guided PhD students and actively contributes to various academic administrative roles. Dr Kumar's vast research landscape includes topics like AI-based chatbots in recruitment, e-training impact and more. His papers have been published in esteemed journals like the *Journal of Workplace Learning*, *International Journal of Educational Management* and *International Journal of Law and Management*. Moreover, he has authored books and edited volumes touching upon themes related to the contemporary business environment. Dr Sunil has been a dynamic participant in numerous workshops, ranging from data analysis to stress management.

About the Contributors

Dr Shyam Sunder Agrawal, Assistant Professor, Mittal School of Business, Lovely Professional University, Phagwara, Punjab, India. He has been associated with the education industry since 2015. He has presented papers at various reputed IIM conferences and published several research papers in UGC CARE, SCOPUS, and ABDC journals. He has done his PhD in Management from Devi Ahilya Vishwavidyalaya, Indore. His fields of interest are behavioral finance, sustainable finance, capital market, banking, and insurance. He has published and granted 2 patents from Govt of India. He got the International Case Study Award in 2022.

Dr Abdul Ali is a Lecturer in Operations and Supply Chain Management at the University of Greenwich. He was a full-time faculty member at the University of Northumbria-London Campus (QA). Abdul has completed his PhD from the University of Bedfordshire where he also worked as a Visiting Lecturer and a researcher. He was also a visiting Lecturer and a Dissertation Supervisor with QA at the University of Ulster London Campus, London Metropolitan University and Roehampton University London. Abdul is a Fellow of the UK Higher Education Academy (Advance HE). He is a member of various professional bodies and serves as a reviewer of many prestigious journals. His research interests are in the areas of Operations, Logistics and Supply Chain Management.

Richa Bhatia is an Associate Professor of Management with more than 12 years of experience in delivering engaging lectures and presentations on management principles and practices. Specialises in conducting research, producing scholarly articles and mentoring students on academic and career matters with 25+ publications. Implements innovative teaching strategies and assessment methods to enhance student learning. Supervised two PhD Scholars.

Festus Edobor has over 20 years of industry experience. He holds a PhD from Cardiff Metropolitan University, UK. The Director and Senior Partner at Experts Consulting Ltd, UK, he is also the Director of Executive Development Programme at the Academy of Innovation and Management, UK, a Doctoral fellow at the Centre for Innovation and Enterprise, UK, and a Member of Chartered Management Institute, UK. Member, Chartered Institute of Personnel and Development, UK. Member of the conference advisory Board for the *International Journal of Knowledge, Innovation and Enterprise*. Fellow of the Higher Education Authority.

Farooq Habib is a Senior Lecturer and the Deputy Director of the MSc in Procurement and Supply Chain Management. Farooq currently lectures on three modules including: Principles of Strategic Procurement, Negotiation and Contract Management and Future for Digital Procurement. Farooq holds or has held Visiting Faculty positions at business schools in Birkbeck College, University of London, University of Buckingham and University of Bedfordshire in the United Kingdom and Breda University of Applied Sciences in the Netherlands. Prior to these roles, he held senior management positions for more than 15 years in export-oriented organisations operating globally within the textiles, food and beverage sectors. Dr Farooq Habib has a PhD in Supply Chain Management (Cranfield University), FHEA (Cranfield University) and an MSc in Research (Cranfield University). Farooq holds an MSc in Logistics and Supply Chain Management (Lancaster University). He has an MBA (Gold Medal) (LUMS) and graduated with honours as a Mechanical Engineer (UET).

Kanwal Jahan completed an MSc in Global Logistics Operations in Supply Chain Management from Northumbria University. She currently works as a Buyer at Alpine Racing Limited – Formula One Team (Renault Group); previously, she worked with Toyota Pakistan as an Assistant Manager of Purchase. Kanwal is a supply chain enthusiast with a special interest in further growing in the field of procurement.

Dr P. James Daniel Paul is a Professor in Mittal School of Business. Since the completion of his PHD in 1996, he has been associated with various organisations like World Bank, United Nations Industrial Development Organization (India, Italy and France), World Vision International (Manila) EY, PWC, DP World (Dubai), British Deputy High Commission, NIPFP (Ministry of Finance, Government of India) Confederation of Indian Industries (CII), Skymark (UK), Murugappa Group VIT University and Karunya University. His specialisation is Income Determination of Individuals, Firms and Economies. He has been actively promoting investments and private sector development in different countries. He has 30-year experience in Industry and Academia. He has many Q1 Publications to his credit. He has been active in the Indian stance on WTO and VAT. His interventions span across 1000s of companies in many countries. He organises programmes on no-code machine learning to make it attractive to the users.

Dr Hitesh Jhanji is currently working as an Associate Professor in Mittal School of Business (MHRD NIRF India Rank 32; ACBSP USA, NAAC A++, NBA Accredited), Lovely Professional University, Phagwara, Punjab (India). In an academic career spanning over 14 years, he worked at Kapsons Industries Limited as an export marketing manager. He completed his PhD from Punjab Technical University in the area of Green Marketing. He has published five papers in UGC, two case studies, one book chapter and three papers in Scopus-indexed journal. He has presented case studies and research papers in national and international conferences.

Dr Mahesh Chandra Joshi is working as a Professor and a Programme Coordinator at Centre for Distance and Online Education, Manipal University Jaipur. He has an experience of about 24 years. He did his first master's as a Master of International Business from M.L.S. University and was a Gold Medallist. He completed his second master's from Symbiosis Centre of Distance Learning, Pune, in Personnel Management. He has supervised three PhD and three MPhil scholars. His Research Areas are International Business, Entrepreneurship, case Writing and Management Education. He has attended over 40 international, national, state-level conferences, seminars and workshops and presented papers. He is a member of professional bodies and worked as a Reviewer for reputed journals of Inderscience, Springer, etc. He has credit of 45 publications including Research Papers, Case\Studies and Chapters in books and journals of repute including ABDC, Scopus and Web of Science.

Amit Kakkar, an Associate Professor working in Mittal School of Business, Lovely Professional University, has an industry experience of 11 years and more than 5 years of teaching experience. He has completed his PhD degree from Lovely Professional University in the field of consumption enhancement of VOD services. In a span of 8 years, he has presented his papers at more than 12 international conferences. His areas of interest are strategic management and consumer behaviour. One of his papers was awarded as the best paper in NICOM, 2018.

Dr Pooja Kansra is presently working as a Professor and Head of Economics at Mittal School of Business, Lovely Professional University, Phagwara, Punjab (India). She has a teaching experience of 15 years and a research experience of 11 years. Her areas of research include health economics, labour economics, gender economics, insurance and informal sector and digitalisation. She is an avid researcher and presented papers in various national and international conferences. She is the recipient of several best paper awards from reputed institutions such as MAIMS, IBS, NIT Srinagar, Delhi University and Lovely Professional University. She has to her credit various research papers published in Scopus-indexed journals including *Journal of Consumer Behaviour* (Wiley, ABDC A category), *Economic and Political Weekly* (EPW) and *Journal of Health Management* (Sage Publications), *Global Business Review* (Sage Publications), *International Journal of Diabetes in Developing Countries* (Springer Publications), *Health and Population: Perspectives and Issues* (MOHFW), etc.

Dr Christian Kaunert is a Professor of International Security at Dublin City University, Ireland. He is also a Professor of Policing and Security, as well as the Director of the International Centre for Policing and Security at the University of South Wales. In addition, he is the Jean Monnet Chair, the Director of the Jean Monnet Centre of Excellence and Director of the Jean Monnet Network on EU Counterterrorism.

Murtaza Farooq Khan is an aspiring barrister, with a particular interest in Company, Revenue and IT law. He holds an LLB Single Honours from SOAS University of London and is presently reading the Bar Professional Training

Course at the University of Law. In pursuit of his career at the Bar, Murtaza holds two major scholarships, from the Middle Temple and the University of Law. He is also involved in blockchain technology – having produced a White Paper, a self-balancing index and a variety of research reports for organisations involved in the private sector.

Pooja Khanna is working as an Associate Professor in the Department of Marketing at Mittal School of Business, Lovely Professional University, Punjab, India. She has 20 years of experience in industry and academia. Her research interests encompass marketing, with a particular emphasis on consumer behaviour, sustainability and business practices and market research. She has publications in peer-reviewed journals and has presented her work at numerous national and international conferences. She has also chaired sessions at national and international conferences. She has written various research papers and book chapters published in SCOPUS-indexed books and journals namely – *Indian Journal of Marketing* indexed in Elsevier's Scopus, *International Journal of Intelligent Systems and Applications in Engineering*, *Demystifying the Dark Side of AI in Business* – IGI Global Publishers, *Digital Transformation for Business Sustainability and Growth in Emerging Markets* – Emerald. In addition, Pooja also has hands-on industry in Operations management and Six Sigma.

Dr N. Kishore Babu is working as a Professor in the Department of Commerce and Management Studies, Andhra University, Visakhapatnam. At present, he is also the Dean, Academic Affairs of Andhra University. He has 29 years of teaching experience in MBA and MCom courses of Andhra University. He received the Best Teacher Award from the Government of Andhra Pradesh on 5th September 2023. He has 33 years of Research Experience in the Faculty of Commerce and Management Studies, Andhra University. He has presented various papers in National and International seminars. He has published more than 50 research papers in various National and International reputed journals. He is also an Editorial Board Member of various referred journals. Under his guidance, 33 PhD Scholars and 5 MPhil Scholars were awarded so far. He has more than 15 years administrative experience as an Assistant Director for MBA Distance Mode Programme, a Warden for AU Arts and Commerce Hostels, a Co-ordinator for PG and Professional Examinations, a Co-ordinator for Certificate Course on Goods and Services Tax, Chief Warden for A.U Research Scholars' Hostels, a Deputy Co-ordinator for U.G.C-S.A.P-C.A.S Programme-II, Internal Auditor for IQAC, Andhra University and Treasurer for ISTD (Indian Society for Training and Development), Visakhapatnam Chapter. At present, he is a National Council Member of ISTD. He is a Life Member of various social and professional bodies. He was one of the Members of State Level Committee on Credit Based Choice System (CBCS) in Undergraduate Colleges in Andhra Pradesh and Review the Syllabus, appointed by the Andhra Pradesh State Council of Higher Education (APSCHE). He was also a Convener of AP ICET-2022.

Anup Kumar is a dedicated scholar currently pursuing his Doctor of Business Administration (DBA) degree at SSBM, where his research focuses on Technology

Adoption Models. With a passion for innovation and a profound interest in the intersection of technology and healthcare, Anup has made significant contributions to the field. He has successfully patented several groundbreaking technologies with applications in the healthcare domain, highlighting his commitment to improving the quality of healthcare through technological advancements. In addition to his pursuit of a DBA, Anup holds a Master's in Data Science, which has equipped him with a strong foundation in data-driven decision-making. With over 13 years of hands-on experience in working with cutting-edge technologies such as augmented reality (AR), virtual reality (VR) and Artificial Intelligence (AI), he brings a wealth of practical knowledge to his academic endeavours. Anup Kumar's journey is marked by a humble dedication to the pursuit of knowledge and the advancement of technology for the betterment of society. His work exemplifies a commitment to excellence, innovation and a deep-seated desire to create a positive impact in the realm of technology and healthcare.

Teki Yaswanth Kumar, an exceptional author and dedicated research scholar with 4 years of enriching teaching and research experience. Having completed his MBA, M Com and MSc in Psychology within the esteemed walls of Andhra University, Yaswanth Kumar's thirst for knowledge knows no bounds. His academic excellence extends further as he qualified UGC NET JRF in Commerce and UGC NET in Management, highlighting his expertise in diverse domains; he has published several articles. With an illustrious background, Yaswanth Kumar presents the enlightening masterpiece 'Sustainable Digital Transformation in Online Advertising (Analysing User Notions on Ad Campaigns of Select E-Commerce Platforms)', combining captivating writing with a knack for simplifying complex concepts. This transformative book promises readers a profound journey of complete wisdom and personal growth in digital era. Beyond academia, Yaswanth Kumar finds solace in nature and cherishes exploring diverse cultures. These personal touches enrich the depth of his narratives, making his work a compelling and inspiring read for all.

Dr Dhrupad Mathur is an Associate Professor of technology management and serves as a Director of faculty recruitment and training at the SP Jain School of Global Management in Dubai. He received his Doctorate in Management from Jai Narain Vyas University in India, with a thesis on 'The Challenges of e-Business'. At Mohanlal Sukhadia University, he completed his Master of Business Administration programme. He has extensive expertise instructing classes in Internet governance, e-business and ICTD. He has research papers and articles published in reputable journals and periodicals. Along with several other certifications, he holds certificates from Sun Microsystems (USA) as a Sun Certified Programmer for Java 2 Platform and IBM (USA) as an IBM Certified Solutions Developer.

Suraj Kumar Mukti is working as an Associate Professor in the Department of Mechanical Engineering, National Institute of Technology Raipur, India. He has completed his PhD in Management at NIT Raipur. His fields of interest are Industrial Engineering and Management, Enterprise Resource Planning, Management Information System, Knowledge Management and e-waste Management. He

has published more than 50 papers in reputed journals and attended and presented research papers in abroad. He got published four patents recently from the Government of India. He has authored four books. He is the recipient of prestigious awards like Mahatma Jyotiba Phule Fellowship Award and Shikshak Ratna Samman, etc. He is an Editorial Board Member of many internationally reputed journals.

Buddhi Rajini Munasinghe has completed her Master's degree in Global Logistics, Operations, and Supply Chain Management from Northumbria University. Buddhi brings a wealth of expertise in Supply Chain Management, with nearly a decade of experience in the Telecommunications and Manufacturing industries. Motivated by a strong desire to make a positive impact in the society, Buddhi recently transitioned into Law Enforcement sector in the United Kingdom. Buddhi is passionate about exploring evolving technologies and utilising their potential to enhance problem-solving, foster innovation and drive continuous improvement. In October 2024, Buddhi was recommended for recognition by her Senior Leadership for her contribution in training and mentoring her team and other cross-functional teams during a complex, organisation-wide system integration. Previously, in 2023, Buddhi was recognised for her initiative in automating a long-standing Risk Management process that had been manual for over a decade. Buddhi aspires to pursue her further studies in Digitalised Information Supply Chains, which present unique complexities in comparison to traditional Supply Chains that manage physical goods. She hopes to apply her diverse skills and experience to promote sustainable growth and operational excellence in the organisations she serves.

Avinash Rana holds a PhD in Entrepreneurship and Marketing Management from Central University of Himachal Pradesh. He has more than 11 years of experience in industry, teaching and research and is UGC-NET qualified. At present, he is working as an Associate Professor (Business Analytics) in CMS Business School, Jain (Deemed to be University), Bengaluru. Dr Rana's areas of expertise are machine learning, NLP, technology adoption, consumer behaviour and research methods. He has conducted workshops on Social Media Analytics, Marketing Analytics and Research Writing. Dr Rana has published numerous articles in both national and international journals. Additionally, he serves as a reviewer for several journals.

Manpreet Kaur Riyat, a Doctoral Candidate at Mittal School of Business, Lovely Professional University, Phagwara, Punjab, India, specialises in marketing with master's in business administration in International Business and Marketing. Her research focuses on the impact of gamification marketing activities on marketing outcomes in education technology, aiming to bridge the gap between traditional marketing approaches and the digital landscape. With a keen interest in gamification, the metaverse, consumer behaviour, education technology and technology adoption, she is committed to advancing knowledge in these cutting-edge fields and exploring their implications for marketing strategies.

Dr Amina Sambo-Magaji holds a PhD in Artificial Intelligence from the Robert Gordon University, RGU, UK. She is an experienced tech expert cum academic

with diverse skills in software development, data science, technology policy, innovation strategy and project management. She is the Director, Literacy and Skills, National Information Technology Agency (NITDA).

Dr Bhupinder Singh is working as a Professor at Sharda University, India, also an Honorary Professor in University of South Wales, UK, and Santo Tomas University Tunja, Colombia. His areas of publications as Smart Healthcare, Medicines, fuzzy logics, Artificial Intelligence, robotics, machine learning, deep learning, federated learning, IoT, PV Glasses, metaverse and many more. He has 3 books, 139 paper publications, 163 paper presentations in international/national conferences and seminars, participated in more than 40 workshops/FDP's/QIP's, 25 courses from international universities of repute, organised more than 59 events with international and national academicians and industry people, an Editor-in-Chief and a Co-editor in journals, developed new courses.

Zhewen Tang is a Lecturer in Marketing and Programme Leader for the MA Luxury Brand Project Management at Northumbria University, London Campus. Her research interests focus on consumer behaviour within various consumption frameworks, including family dynamics across generations, food-related experiences, the adoption of Artificial Intelligence (AI) and the integration of Information Systems and Information Communication Technologies (ICTs). Her research commitment is to comprehensively understand the nuances that shape consumer preferences and decision-making processes in an ever-evolving market landscape, intending to provide a new understanding of consumer well-being and sustainable consumption for different stakeholders with theoretical insights and business practice.

Dr Sumant Kumar Tewari is a distinguished scholar with a BTech in Computer Science and Engineering, an MBA and a PhD from IIITA Allahabad. He has also qualified UGC-NET, underscoring his academic excellence. Dr Tewari has contributed extensively to the field of Information Technology and business management through numerous research papers published in reputed journals. His work is characterised by a blend of technical acumen and managerial insights, reflecting his diverse educational background. Dr Tewari continues to impact the academic community with his innovative research and dedication to advancing knowledge in his areas of expertise.

Rimzim Tyagi is a research scholar with Mittal School of Business. Her research delves into impact of gamification on consumer behaviour. She is an avid researcher and has publications in Scopus-indexed books and journals, namely *Asian Journal of Business Ethics, Springer*. She aims to advance understanding in this field and inspire further research in her career.

Sen Yang is a former university lecturer and a self-made serial entrepreneur. He runs businesses including a software development start-up focusing on introducing disruptive AI technologies into higher education as well as consultancy businesses to connect higher educations and other stakeholders between the United Kingdom and China. Inspired by his own entrepreneurial journey, Mr

Yang is working towards his doctoral degree at the Business School, Bangor University. His research topic is to investigate the interplay between entrepreneurship, organisational strategy and entrepreneurial learning. He holds a first degree in Economics and Trade and a master's degree in management.

Preface

The accelerating pace of digital transformation and the concurrent imperative for sustainability have converged to create a pivotal moment in history. This book, *Digital Transformation for Business Sustainability and Growth in Emerging Markets*, explores the dynamic interplay between technological advancement and sustainable development, offering insights from a diverse range of sectors and geographical contexts.

Our journey begins with Chapter 1, where Bhupinder Singh and Christian Kaunert explore the integration of photovoltaic cells in smart cities, addressing the critical Sustainable Development Goal 11 (Sustainable Cities and Communities). This chapter sets the stage by demonstrating how technology can drive urban sustainability.

Chapter 2, authored by Manpreet Kaur Riyat, Amit Kakkar, Avinash Rana and Dhrupad Mathur, delves into the challenges and opportunities in bridging the digital divide in emerging markets. The authors highlight how sustainable EdTech can transform education, fostering inclusivity and equity.

In Chapter 3, Kanwal Jahan and Farooq Habib investigate the impact of Industry 4.0 on procurement processes across various sectors. Their cross-sectoral perspective provides a comprehensive understanding of how digital technologies can enhance efficiency and sustainability in procurement.

Anup Kumar, in Chapter 4, explores the role of quantum computing in advancing sustainability. This chapter provides a forward-looking view on how emerging computational technologies can solve complex environmental challenges.

Chapter 5, by Zhewen Tang and Sen Yang, presents a case study on the adoption of generative AI by SMEs in emerging markets. This chapter underscores the importance of technology socialisation in driving innovation and sustainable development.

Buddhi Rajini Munasinghe, Abdul Ali, Farooq Habib and Murtaza Khan in Chapter 6 discuss the adoption of Industry 4.0 technologies in the UK manufacturing supply chains. Their insights reveal the transformative potential of these technologies in achieving sustainable industrial practices.

Sumant Kumar Tewari, in Chapter 7, navigates the challenges of data-driven marketing in emerging markets. This chapter illustrates how sustainable development can be promoted through effective and ethical use of data.

Chapter 8, by Festus Edobor and Amina Sambo-Magaji, examines the role of Small & Medium Enterprises (SMEs) in sustainable economic development. Their analysis highlights the critical contributions of SMEs to economic resilience and sustainability.

In Chapter 9, Rimzim Tyagi and Pooja Khanna offer a comprehensive review of digital transformation for sustainable development, focusing on blockchain and gamification. Their discussion sheds light on how these technologies can be leveraged to achieve sustainability goals.

Teki Yaswanth Kumar and N. Kishore Babu, in Chapter 10, analyse the digital marketing landscape of online advertising, providing insights into user perceptions of ad campaigns on e-commerce platforms. This chapter emphasises the need for sustainable practices in digital marketing.

Chapter 11, by Pooja Kansara, Pawan Kumar and P. James Daniel Paul, reviews the literature on sustainable digitalisation, with a focus on Indian initiatives. This chapter provides a valuable overview of how digitalisation efforts are being tailored to sustainability in India.

Shyam Sunder Agrawal and Suraj Kumar Mukti in Chapter 12 discuss the role of sustainable finance in contributing to the growth of the Indian economy. Their insights underscore the importance of financial strategies that align with sustainability objectives.

Finally, Chapter 13, by Mahesh Chandra Joshi, Richa Bhatia and Hitesh Jhanji, explores the use of chatbots for digital transformation in emerging markets. This chapter highlights how digital tools can foster investor awareness and resolve grievances, contributing to sustainable development in developing economies.

As editors, we are privileged to present this collection of chapters that collectively underscore the essential role of digital transformation in driving sustainability. Each contribution provides a unique perspective, weaving a rich tapestry of knowledge that we hope will inspire further research and practical applications in this critical field.

We extend our heartfelt gratitude to the authors for their insightful contributions and to the readers for their engagement with these pressing topics. Together, we can harness the power of technology to build a more sustainable and equitable future.

Editors

Pawan Kumar, Sumesh Dadwal, Rajesh Verma, and Sunil Kumar

Acknowledgment

Digital transformation, sustainability and growth in emerging markets are inextricably linked. The digitisation of various sectors plays a crucial role in resource conservation and meeting the demands of these markets, significantly impacting the aggregate supply of goods and services. Growth patterns in emerging markets have been profoundly influenced by digital transformations. The imperative of the triple bottom line – people, planet and profit – drives nations, industries and individuals to adopt digital technologies for sustainability and growth.

Compiling the diverse expertise required for 'Digital Transformation for Business Sustainability and Growth in Emerging Markets' has been a journey enriched by the generosity, talent and dedication of many individuals.

First and foremost, we extend our heartfelt gratitude to the contributing authors, whose insightful chapters have provided depth and breadth to this edited volume. Your expertise and willingness to share your knowledge have been invaluable.

We are indebted to the editorial team members, whose meticulous efforts ensured the coherence and quality of this publication. Your guidance and expertise have been instrumental in shaping this book. We also extend our sincere appreciation to the reviewers, whose constructive feedback helped refine and strengthen the content. Additionally, we acknowledge the researchers whose excellent work has inspired and informed our contributors.

We express our gratitude to the dedicated team at Emerald Publishing for their support and professionalism throughout the publication process. Your commitment to excellence has been evident every step of the way.

Lastly, to our readers, we thank you for your interest in exploring the complex interplay between digitisation, sustainability and growth in emerging markets. Your engagement and curiosity are the driving forces behind our endeavour.

The most crucial challenge of this century is balancing conservation with advancement. Concurrently, the digital landscape is continuously evolving. Markets that demonstrate agility and resilience in response to change are swiftly progressing toward a sustainable future. This book explores various digital transformations and their impacts across emerging markets.

Thank you all for your invaluable contributions.

Warm Regards
Editors
Pawan Kumar, Sumesh Dadwal, Rajesh Verma, and Sunil Kumar

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Chapter 1

Turbo Boost Digital Transformation Integration Business Sustainability and Innovation: Photovoltaic Cells for Smart Cities Gratifying SDG11 (Sustainable Cities and Communities)

Bhupinder Singh[a] *and Christian Kaunert*[b]

[a]Sharda University, India
[b]Dublin City University, Ireland

Abstract

The evolving landscape of digital transformation, businesses are increasingly recognising the intrinsic link between technological innovation, sustainability and the critical role of photovoltaic (PV) cells in smart cities. This nexus represents a compelling proposition, not only for addressing the imperatives of business sustainability but also for achieving United Nations Sustainable Development Goal 11 – the aspiration for sustainable and resilient urban communities. The use of PV cells within smart city infrastructure serves as an exemplar of how digital transformation can be harnessed to drive sustainability and innovation concurrently. With harvesting solar energy through PV cells, smart cities can reduce their carbon footprint, enhance energy efficiency and offer cleaner, more sustainable living environments for their inhabitants. This chapter investigates how the integration of PV cells in smart city infrastructure not only aligns with SDG11 but also serves as a potent catalyst for turbocharging digital transformation endeavours, fostering business sustainability and fuelling innovation.

Keywords: Business sustainability; digital transformation; innovation; photovoltaic cells; SDG11 (sustainable cities and communities)

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Introduction

The rapid growth of urbanisation and the pressing need for sustainable development have made the concept of smart cities a focal point in contemporary urban planning. The realisation of Sustainable Development Goal 11 (Sustainable Cities and Communities) depends critically on the incorporation of digital technologies, the promotion of business sustainability and the drive for innovation. With a specific focus on the use of photovoltaic (PV) cells in smart cities, this chapter explores the synergistic interaction between these three pillars. In addition to being a reliable source of clean energy, PV technology also helps cities reduce their environmental impact. Understanding how the Internet of Things (IoT) and Artificial Intelligence (AI), two key components of digital transformation, can improve solar system efficiency in smart cities is crucial. Long-term, environmentally conscious urban ecosystems are developed as a result of the adoption of sustainable business practices in these urban contexts, including circular economies, green supply chains and socially responsible corporate activities. The adoption of PV innovation, such as improvements in solar cell effectiveness and energy storage techniques, is crucial for accelerating the switch to renewable energy sources. This study aims to shed light on the transformative potential of PV cells in smart cities, boosting sustainability and ultimately aiding in the achievement of SDG11 by looking at these interconnected aspects.

PV cells, which convert sunlight into electricity, have garnered substantial attention for their potential to provide a clean and renewable energy source. Their integration into smart city infrastructure can significantly reduce the carbon footprint of urban areas. The inexhaustible power of the sun, when effectively harnessed, can drive sustainable urban development. However, this integration involves more than just placing solar panels on rooftops; it requires a comprehensive approach that combines digital transformation, sustainable business practices and innovative technologies (Almihat et al., 2022).

Digital Transformation (DT) for Sustainable Development in Emerging Markets

The digital transformation of cities, fuelled by the IoT, big data analytics, AI and blockchain, enables urban areas to operate more efficiently and sustainably. Smart city technologies provide real-time data insights, optimising energy consumption, improving traffic management and enhancing resource allocation. These advancements empower cities to make data-informed decisions that align with SDG11's objectives. In the pursuit of sustainable urban development, businesses play a pivotal role. The integration of sustainability into corporate strategies, known as corporate social responsibility (CSR), supports not only environmental goals but also social and economic ones. Sustainable business practices extend to every aspect of an organisation, from green supply chains to circular economy initiatives. When businesses actively engage in sustainability, they contribute to the larger goals of a sustainable city (Singh et al., 2024).

Alos, innovation in PV technology is essential for driving the transition to renewable energy sources. Breakthroughs in energy storage solutions, emerging materials and design concepts are essential for enhancing the efficiency and cost-effectiveness of PV cells. These innovations, coupled with the smart integration of digital technologies and sustainability in business operations, hold the promise of reshaping our urban landscapes into sustainable smart cities. This chapter aims to explore, dissect and illuminate the intricate web of interactions between digital transformation, business sustainability and innovation, with a keen focus on PV cells, in the context of fulfiling the objectives of SDG11. By comprehensively examining these interrelated facets, it hopes to provide insights and inspiration for creating cities that are not only smart but also sustainable, contributing to the overarching mission of building resilient and inclusive communities in an urbanised world Mondejar et al. (2021).

Significance of Digital Transformation and Sustainability

Digital transformation has become a crucial force driving advancement and change across numerous sectors in an era where digital technologies permeate every part of our lives. Its power to completely alter how people work, interact and conduct business is what gives it its relevance. Organisations may streamline their processes, boost productivity and achieve new levels of efficiency by integrating digital tools. In the context of smart cities and sustainable development, where digital transformation enables cities to become more responsive, efficient and ecologically conscious, this is especially pertinent.

Smart cities leverage cutting-edge technology like the IoT, data analytics and AI to transform themselves digitally. These technologies make it possible to gather and analyse enormous volumes of data from sensors and other devices incorporated into the urban environment. In turn, these data offer useful insights that enable cities to optimise energy use, promote trash reduction, better traffic management and generally improve the quality of life for their citizens. It is impossible to overestimate the importance of digital transformation in this environment; it is the catalyst for the development of sustainable and efficient smart cities Awan (2021).

The importance of corporate sustainability is increased in the context of smart cities and sustainable development. Businesses play a crucial role in urban development because they offer the commodities and services that influence city dwellers' quality of life. Businesses may help achieve the larger objectives of building cities that are ecologically responsible, inclusive of all people and economically viable by adopting sustainability. Business sustainability is not just a fad; it is a transformative force that supports the goals of a more just and sustainable world.

It is impossible to overstate the importance of digital transformation and corporate sustainability in the context of smart cities and sustainable development. Digital transformation enables the creation of intelligent urban environments that are efficient, data-driven and environmentally conscious. Business sustainability, on

the other hand, is the key to ensuring that businesses operate responsibly, create value for society and thrive in an increasingly conscientious marketplace. Together, these forces are driving the transition to smart cities that are not only technologically advanced but also sustainable and capable of fulfiling the goals of SDG 11 – Sustainable Cities and Communities.

Role of PV Cells in Smart Cities

PV cells, commonly known as solar panels, have assumed a central role in the vision of smart cities, marking a pivotal step towards sustainable urban development. These semiconductor devices, designed to harness sunlight and convert it into electricity, are seen as a linchpin in addressing the environmental challenges and energy demands that arise with rapid urbanisation (Franchina et al., 2021). The significance of PV cells in smart cities is multifaceted and goes beyond mere energy generation. The prime role of PV cells in smart cities is the provision of clean and renewable energy.

PV cells are essential for guaranteeing energy security and resilience in smart cities. Smart communities can lessen their susceptibility to power outages and supply disruptions by producing electricity locally. PV cells can continue to deliver a dependable source of electricity during catastrophes like natural disasters or grid outages, maintaining vital infrastructure, emergency services and the well-being of locals. In order to create resilient, living ecosystems, smart cities must prioritise this component of energy security. In order for smart cities to be energy independent, PV cells are essential. Cities can lessen their reliance on centralised energy systems and the ensuing transmission losses by producing their own electricity on-site.

The visibility of solar installations in public spaces serves as a constant reminder of the city's commitment to reducing its ecological footprint, thereby encouraging individuals and organisations to adopt eco-friendly practices. PV cells hold a multifaceted and indispensable role in the development of smart cities. Their capacity to generate clean and renewable energy, enhance energy security, promote energy independence and contribute to the overall quality of urban life is paramount (Shehab et al., 2021). By integrating PV cells into the fabric of smart cities, it moves closer to creating urban environments that are not only intelligent but also sustainable and resilient, thereby aligning with the principles of SDG11 – Sustainable Cities and Communities.

Objectives of the Chapter

The primary objective of this study is to explore the intersection of digital transformation, business sustainability and innovation in the context of PV cells for smart cities, with a specific focus on achieving SDG11 (Sustainable Cities and Communities). This overarching aim is supported by the following specific research objectives to:

- investigate the role of digital transformation technologies, including IoT and AI, in optimising the integration and performance of PV cells in smart cities;
- analyse the methods and tactics used by companies in smart cities to advance sustainability, such as CSR programmes, sustainable supply chain management and circular economy techniques.
- examine current advances in solar technology, including energy storage options and novel materials, to determine how they will affect the switch to renewable energy sources – identify the challenges, barriers and opportunities associated with the integration of PV cells in smart cities and propose recommendations for fostering sustainable urban development.

With the overarching goal of supporting SDG11, these research objectives aim to collectively provide insights into the complex interactions between digital transformation, business sustainability and innovation in the context of PV cells within smart cities.

Digital Transformation and Business Sustainability: Interconnection

Modern organisational strategy includes two crucial and connected facets: the digital transformation and corporate sustainability. As companies try to adjust to a world that is changing quickly and demands both technical agility and environmental responsibility, these two factors are becoming more and more entwined. Organisations have a unique chance to not only flourish in the digital era but also contribute to broader environmental and societal well-being thanks to the convergence of digital transformation and business sustainability (Tura & Ojanen, 2022). The full integration of digital technologies and data-driven processes across a business is what is meant by 'digital transformation'. It includes the use of big data analytics, cloud computing, AI, the IoT and other digital tools to improve operations, enhance customer experiences and spur innovation. The importance of digital transformation is made clear by its ability to increase productivity, cut expenses and offer insightful information that helps with decision-making. Organisations may respond to market changes, stay competitive and satisfy customer requests more rapidly by simplifying processes, automating operations and allocating resources optimally. Business sustainability focuses on incorporating ethical business practices into the central plan of a firm. Reducing greenhouse gas emissions, following circular economy principles, implementing green supply chain management and encouraging CSR are all examples of sustainability practices. These procedures not only lessen the negative effects of corporate operations on the environment, but they also satisfy the rising demand for morally and environmentally responsible behaviour from clients, investors and authorities Singh (2023a, 2023b).

Technology is only one factor in the interaction between digital transformation and company sustainability. It encompasses leadership, organisational culture and stakeholder involvement. Businesses that place a high priority on sustainability are more likely to promote a culture of social responsibility and environmental awareness, which is in line with the ethical requirements of the digital age. Additionally, they are in a better position to interact with stakeholders who are calling for businesses to operate ethically and sustainably. For modern firms, the relationship between digital transformation and business sustainability provides a potent paradigm. It is a synergy that enables businesses to flourish in a digital environment that is continually evolving while simultaneously making a positive impact on a more sustainable and responsible world (Ji et al., 2021).

Multifaceted Landscape of Digital Transformation: Impact on Business Sustainability

A new era of business sustainability has arrived as a result of the complex digital transformation landscape, surpassing conventional methods of corporate strategy. There are significant consequences for the environmental, social and economic aspects of sustainability as a result of this revolution, which is defined by the integration of digital technologies into every aspect of business operations. A wide range of technologies, including the IoT, AI, big data analytics, cloud computing and blockchain, are included in the concept of digital transformation. With the help of these technologies, businesses can gather, examine and use massive volumes of data to improve decision-making, streamline processes and develop new goods and services. Companies can minimise waste, optimise supply chains and make more informed decisions about product design and life cycles Andrés (2016).

Such resource efficiency aligns with the principles of a circular economy, where products and materials are reused and recycled, reducing the environmental impact of production and consumption. The digitisation of business processes enables remote work and flexible schedules, reducing the need for extensive commuting and business travel. This has the potential to significantly cut down on carbon emissions and decrease the environmental strain associated with transportation. The global COVID-19 pandemic underscored the viability of remote work, prompting many organisations to rethink their work models with sustainability and environmental responsibility in mind.

Digital transformation also offers opportunities for more sustainable product and service development. Through data analytics and consumer insights, businesses can identify market demands for eco-friendly products, leading to the creation of sustainable offerings that cater to the growing consumer interest in green and ethical choices (Abu-Rayash, 2021). Additionally, blockchain technology can provide transparency and traceability throughout the supply chain, enhancing sustainability by verifying the authenticity of eco-friendly claims and certifications Singh (2024a, 2024b).

From social front, digital transformation has an impact on business sustainability by enhancing social responsibility and stakeholder engagement. Due to the increased openness brought about by digital technologies, businesses are better equipped to inform stakeholders about their sustainability efforts. It promotes companies to uphold their sustainability pledges and enables investors and customers to make informed judgements. Due to customers' faster access to information and increased power to hold companies accountable for their activities, the interconnected world of digital media also makes enterprises accountable for their environmental and social practices (Singh et al., 2024).

Evolving Strategies and Technologies Adopted by Businesses to Embrace Sustainability

Businesses all across the world are becoming more aware of how crucial sustainability is to their operations and strategy. Companies have changed how they do things and embraced new technology to make sustainability a central part of their business models in response to environmental concerns, changing consumer tastes and a greater consciousness of social responsibility. Corporate sustainability strategies have undergone significant changes, moving from a focus on merely complying with rules to one that emphasises proactive engagement with environmental and social issues (Thornbush & Golubchikov, 2019). Businesses are now actively looking for methods to lessen their impact on the environment and positively contribute to society rather than just following the law. They are establishing challenging sustainability objectives that cover topics like lowering carbon emissions, minimising waste and safeguarding natural resources. This movement is driven not only by compassion but also by the realisation that sustainability initiatives may boost productivity, cut expenses and draw in environmentally conscientious customers and investors. The introduction of data-driven solutions has changed the sustainability landscape technologically. Nowadays, businesses use big data and machine learning, as well as advanced data analytics, to get insights into their supply chains and operations. With the help of this data-driven methodology, businesses can pinpoint inefficient processes, use less resources and minimise their environmental impact. For instance, sensors and IoT technology can track real-time waste generation, water consumption and energy usage. This enables more precise resource management.

With its capacity to offer supply chains transparency and traceability, blockchain technology has emerged as a potent tool for ensuring that sustainability principles are upheld throughout the whole manufacturing and distribution process. Utilising blockchain technology allows businesses to validate the validity of environmental claims and certifications, assuring customers and investors of their dedication to sustainability. Businesses are increasingly embracing sustainable innovation along with operational optimisation (Kim & Yang, 2023a, 2023b). This entails the creation of eco-friendly goods and services that appeal to a rising consumer base interested in making eco-friendly decisions. Sustainable innovation is a strategic goal that promotes consumer loyalty and competitiveness, not just a

compliance issue. For instance, the automotive industry has seen a surge in electric and hybrid vehicles as a response to growing concerns about emissions and environmental degradation. Moreover, organisations are exploring sustainable packaging solutions, renewable energy sources and the use of recycled materials in product design.

The rise of social media and digital communication has significantly influenced how businesses engage with stakeholders regarding sustainability. Companies are using digital platforms to transparently communicate their sustainability initiatives, report progress and gather feedback from customers and investors. This level of engagement is not only good for branding but also for building trust with a socially conscious audience. So, evolving strategies and technologies adopted by businesses to embrace sustainability are multifaceted and dynamic. They encompass a shift towards proactive environmental and social responsibility, data-driven sustainability initiatives, sustainable supply chain management, innovation in sustainable products and services and transparent stakeholder engagement. The adoption of these strategies and technologies is not only reshaping corporate sustainability but also contributing to a more sustainable and responsible business landscape that addresses the pressing global challenges of our time.

Smart Cities and SDG11

The aspects of smart cities are pivotal in the global effort to realise Sustainable Development Goal 11 (SDG11), which aims to make cities and human settlements inclusive, safe, resilient and sustainable. The explosive growth of urbanisation across the world has brought both opportunities and challenges. As of 2018, over half of the global population resides in urban areas, a figure projected to reach 68% by 2050. Additionally, smart cities are often pioneers in eco-friendly transportation initiatives, such as electric vehicle (EV) charging networks and intelligent traffic management systems, which contribute to improving air quality and reducing the environmental impact of urban mobility. Beyond environmental considerations, smart cities also prioritise the social dimension of sustainable urban development. The inclusive nature of smart cities means that they work to ensure access to essential services, affordable housing and safe public spaces (Sharma & Singh, 2022). Technological innovation in healthcare, education and public safety systems enhances the quality of life for residents, aligning with SDG11's aims of making cities more inclusive and safe.

With fostering innovation and entrepreneurship, they create job opportunities and promote economic growth, addressing the objective of sustainable economic development within SDG11 in smart cities exhibit economic resilience and vibrancy. Initiatives such as the development of start-up incubators, investment in research and development and the provision of high-quality digital infrastructure cultivate an environment conducive to economic sustainability. It is also noteworthy that smart cities are frequently characterised by efficient and transparent governance. Digital transformation enables better citizen engagement, improved