Routledge Advances in Organizational Learning and Knowledge Management

ORGANISATIONAL LEARNING AND SUSTAINABILITY

ADVANCING KNOWLEDGE FOR A SUSTAINABLE FUTURE

Edited by
Mohammad Nabil Almunawar, Md Zahidul Islam
and Patricia Ordóñez de Pablos

ROUTLEDGE

Organisational Learning and Sustainability

Organisational Learning and Sustainability is a crucial resource that examines the development and significance of organisational learning. This edited volume features both theoretical and empirical chapters, along with case studies, offering a comprehensive analysis of how organisations can utilise learning to foster sustainable growth. By addressing the complexities and multifaceted aspects of sustainability challenges, the book introduces a new approach to managing organisational change and promoting collective learning. It presents a holistic perspective of organisational learning, from fundamental concepts to practical applications.

The volume explores the connection between organisational learning and sustainability, providing insights into how organisations can embed economic, environmental, social and governance principles into their practices. Readers will benefit from detailed research, practical case studies and actionable guidance that illustrate the role of learning in navigating competitive pressures and technological advancements. This research volume also aligns with the United Nations Agenda 2030 Sustainable Development Goals, offering a framework for organisations to engage with these global objectives.

Mohammad Nabil Almunawar is a full professor at the School of Business and Economics, Universiti of Brunei Darussalam (UBDSBE), Brunei Darussalam.

Md Zahidul Islam is an associate professor at the School of Business and Economics, Universiti Brunei Darussalam (UBD). His teaching and research interests focus on Strategic Management, Human Resource Management, and Knowledge Management.

Patricia Ordóñez de Pablos is a full professor in the Department of Business Administration in the Faculty of Business and Economics at the University of Oviedo (Spain). Her teaching and research interests focus on the areas of strategic management, knowledge management, intellectual capital and information technologies.

Routledge Advances in Organizational Learning and Knowledge Management
Edited by Patricia Ordóñez de Pablos

Key topics such as Organizational Learning (OL) Knowledge Management (KM), and Intellectual Capital (IC) are of increasing interest to both the academic community and organisations operating globally, in this post-crisis situation. They have a bearing on innovation and learning and can influence the achievement of competitive advantage for institutions, universities, organizations and regions. The existing literature on knowledge management and intellectual capital suggests that competitive advantage flows from the creation, ownership, protection, storage and use of certain knowledge-based organisational resources. Superior organisational performance depends on firms/universities/regions' ability to be good at innovation, learning, protecting, deploying, amplifying and measuring these strategic yet intangible resources.

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Organisational Learning and Sustainability

Advancing Knowledge for a Sustainable Future

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Routledge
Taylor & Francis Group
NEW YORK AND LONDON

First published 2026
by Routledge
605 Third Avenue, New York, NY 10158

and by Routledge
4 Park Square, Milton Park, Abingdon, Oxon, OX14 4RN

Routledge is an imprint of the Taylor & Francis Group, an informa business

ISBN: 978-1-032-94543-9 (hbk)
ISBN: 978-1-032-94834-8 (pbk)
ISBN: 978-1-003-58191-8 (ebk)

DOI: 10.4324/9781003581918

Typeset in Galliard
by Apex CoVantage, LLC

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About the Editors

Mohammad Nabil Almunawar is a full professor at the School of Business and Economics, Universiti of Brunei Darussalam (UBDSBE), Brunei Darussalam. He published over 250 papers in refereed journals, books and chapters. He currently serves as the editor-in-chief of the *International Journal of E-Business Research* (IJEBR), which is indexed in Scopus and Web of Science, as well as the *Journal of Business and Economic Analysis* (JBEA). He is also an experienced book editor, having worked with various publishers and published more than 20 edited books. His research interests include the application of IT in management, e-business/e-commerce, digital transformation, digital marketplaces/platforms, digital business ecosystems, health informatics, information security and cloud computing. At present, his research focuses on digital transformation, digital marketplace platforms and digital business ecosystems.

Md Zahidul Islam is an associate professor at the School of Business and Economics, Universiti Brunei Darussalam (UBD). His teaching and research interests focus on strategic management, human resource management and knowledge management. His research has appeared in journals such as *The Learning Organizations*, the *International Journal of Information Management*, *Management Decision*, the *International Journal of Public Administration* and *VINE: The Journal of Information and Knowledge Management Systems.*

Patricia Ordóñez de Pablos is a full professor in the Department of Business Administration in the Faculty of Business and Economics at the University of Oviedo (Spain). Her teaching and research interests focus on the areas of strategic management, knowledge management, intellectual capital and information technologies. She serves as Editor in Chief of Routledge book series Advances on Organizational Learning and Knowledge Management and Editor-in-Chief of IGI Global's *International Journal of Asian Business and Information Management* (IJABIM) and Editor-in-Chief of Inderscience's *International Journal of Learning and Intellectual Capital* (IJLIC).

Contributors

Muhammad Khusna Amal is Vice Rector in Academic and Institutional Affairs, Kiai Haji Achmad Siddiq State Islamic University (UIN KHAS), Jember, Indonesia. Previously, he was Dean of the Faculty of Ushuluddin, Adab, and Humanities, UIN KHAS. His fields of expertise are sociology of religion, politics of economy and Islamic political economics.

Darmanto is Associate Researcher at the Center for Public Policy Research, National Research and Innovation Agency. Darmanto is part of the Public Basic Service Research Group and has research competencies in the field of public policy and administration. Daru graduated from the Faculty of Economics, National Development University "Veteran" Yogyakarta, and continued his master's degree education in the Master of Public Administration study programme from Gajah Mada University.

Amri Dunan obtained his bachelor's degree in management from IBA University, Palembang, his postgraduate degree in public administration from Sriwijaya University, the south of Sumatra, and his doctoral degree in communication and media studies from the University of Malaya, Kuala Lumpur, Malaysia. He is a senior researcher at the Public Policy Research Centre, the National Research and Innovation Agency, Jakarta, Indonesia. He has a strong passion for researching new media communication, public policy and digital transformation. Currently, he is also a lecturer in the postgraduate programme in communication science, Gunadarma University, Depok, West Java.

Novi Savarianti Fahrani holds a bachelor's degree in law from the Islamic University of Indonesia and a master's degree from the University of Indonesia. As a researcher at the National Research and Innovation Agency in Jakarta, Indonesia, her focus is on human resource management, public policy and administrative law. Her current study is Strategy for Accelerating Digital Transformation of Local Government Public Services, Civil Service Talent Management Transformation Strategy and Merit System.

Fauzan is Vice Dean for Student Affairs, Alumni, and Cooperation at the Faculty of Islamic Economics and Business (FEBI), Kiai Haji Achmad Siddiq State Islamic University (UIN KHAS), Jember – Indonesia. Previously, he was Program Coordinator of Zakat Waqf Management Study, FEBI UIN KHAS. He has eight books with reputable national publishers. His research concerns are Islamic leadership, management of *zakat*, *infaq*, *sadaqa* and *waqf* (ZISWAF), *pesantren* (Islamic boarding school) and public governance.

Gati Gayatri is a senior researcher at Indonesia's National Research and Innovation Agency (BRIN). She focuses on communication policy, digital literacy and media studies. She has extensive experience leading national research programmes in communication and informatics (now the Ministry of Communication and Digital) and managing digital skill training programmes.

Chai Lee Goi is Associate Professor at the Faculty of Business, Curtin University, Malaysia. He holds a PhD in business and management with a specialisation in internet marketing from the Management and Science University, Malaysia, a Master of Information Technology Management and a Bachelor of Computer Science from the University of Wollongong, Australia. He also holds a Graduate Certificate of Tertiary Teaching from Curtin University, Australia. His research interests include consumer behaviour, internet marketing, social media, big data analytics, educational technology, machine learning and sustainable development. Goi is a professional technologist registered with the Malaysia Board of Technologists, a member of the Institute of Marketing Malaysia, a fellow (FHEA) of the Advance HE (formerly the Higher Education Academy) in the UK and a chartered marketer and a member of the Chartered Institute of Marketing, UK.

Achmad Setyo Hadi completed his doctoral studies at the Universitaet Bremen, Germany, with the dissertation topic on the influence of European integration on corporate culture. Currently he is a faculty member of the School of Business and Economics at Universitas Prasetiya Mulya – Jakarta, Indonesia. His research interests are in organisational sociology, organisational behaviour, human capital and serendipity. In his research, he has explored Pierre Bourdieu's theory of practice, serendipity, organisational ambidexterity and paradox theory. He is currently conducting research on centrifugal and centripetal paradoxes in innovation.

Rudy Handoko is a senior faculty member at Universitas Prasetiya Mulya, Indonesia, specialising in strategic branding, marketing management, communication and social entrepreneurship. His professional and academic focus centres on small and medium enterprises (SMEs) and entrepreneurship development. He has served in various leadership roles, including Director of Student Affairs and Vice Dean, and has consulted for business growth initiatives. Rudy has authored journal articles and

book chapters on topics such as social enterprise, community movement and digital transformation. He holds a doctorate in communication science from Universitas Indonesia and has completed advanced training in social entrepreneurship at INSEAD, France.

Miftachul Huda is a distinguished academic affiliated with the Faculty of Human Sciences at Universiti Pendidikan Sultan Idris (UPSI) in Tanjong Malim, Perak, Malaysia. He holds a Doctor of Philosophy and serves as a senior lecturer at UPSI. He has experience working on research in his field worldwide, including Islamic education, education science innovation, digital ethics and learning technology. Contributing several works, he is currently a member of the advisory editorial board in a number of indexed journals, for instance, *Jurnal Ilmiah Peuradeun*, *Nazhruna Jurnal*, *Ulumuna Journal*, *Islamic Guidance and Counselling Journal* and also the *Journal of Education and Learning*.

Fahmi Ibrahim (PhD) is Senior Assistant Professor of the School of Business, Universiti Teknologi Brunei, Brunei Darussalam. He gained his PhD from Glasgow Caledonian University, UK, and MBA and MSc in business IT systems from the University of Strathclyde, UK.

His research focuses on organisations operating in complex and transitional environments. This covers social innovation-entrepreneurship, tourism management, MIS-digital well-being and learning and teaching. His contributions add value towards digital literacy, inclusivity and well-being.

His academic experience in Brunei Darussalam and the UK includes module development, programme leadership and international collaboration. His teaching experiences cover strategic management, knowledge management, management information systems, operations management and research methodology.

He has consultancy experience in (i) ICT adoption of households, individuals and businesses in Brunei Darussalam and (ii) business transformation of SMEs in Brunei Darussalam. Further, he is a member of editorial board of four international journals and a full member of the International Association for Knowledge Management.

Karman Karman is a researcher passionate about exploring the intersection of communication, media and society. He brings his expertise to the Research Centre for Society and Culture at the National Research and Innovation Agency (BRIN). He earned his doctorate in communication science from the University of Indonesia.

Mahmudah is Associate Professor at the Faculty of Islamic Economics and Business (FEBI) & Postgraduate Program, Kiai Haji Achmad Siddiq State Islamic University (UIN KHAS), Jember, Indonesia. She is Vice Dean 2 – General Administration, Planning, and Finance of FEBI UIN KHAS. She is also a certified companion of Halal Certification for Micro, Small, and Medium Enterprises (MSMEs) at the Halal Inspection Institute (LPH) of UIN KHAS. Her research interests are Islamic economics, Halal for MSMEs, creative industry and women entrepreneurship.

Leonis Marchalina is Faculty Member at Universitas Prasetiya Mulya. Her research interests are human resources, leadership and change management. She has been actively involved in several projects, collaborating with public and private companies to help the government and SMEs in Indonesia. Recently, in 2024, she shared her insights on Employee Engagement: HR Innovations to Boost Productivity and Retention in the Inspiring Business Talk in the Postgraduate Department. She has received a professional certification in HR Leadership from Cornell University. In addition, she has also provided Training of Trainers (ToT) training to lecturers at Musamus University, Merauke, as well as SME entrepreneurs, Managerial and Leadership training to the Executive level at the Police in Manokwari. Furthermore, she also provides training to entrepreneurs and SME partners on how to do business.

Muafi Muafi is Professor of Management at the Faculty of Business and Economics, Islamic University of Indonesia (UII). His expertise includes strategic human resource management and strategic organisation. He has authored numerous academic publications related to service performance and circular economy implementation to support sustainable business practices. Dr. Muafi actively engages in research and academic collaborations while also mentoring students and professionals in the field of organisational strategy and sustainability.

Bambang Mudjiyanto obtained his bachelor's degree in communication science from Ibnu Choldun University and his postgraduate degree from the University of Indonesia. He is Research Professor at the Public Policy Research Centre, the National Research and Innovation Agency, Jakarta, Indonesia. He has published articles and books related to the new media of communication, intercultural communication, public communication and journalism. Currently, he is also a lecturer in the graduate programme in communication science at Universitas *Tujuh Belas Agustus*, Jakarta.

Khairunnisa Musari is Assistant Professor at the Faculty of Islamic Economics and Business (FEBI) & Postgraduate Program, Kiai Haji Achmad Siddiq State Islamic University (UIN KHAS), Jember, Indonesia. She is a member of the Indonesian Association of Islamic Economists (IAEI) and

the International Association for Islamic Economics (IAIE). Her research interests are in *sukuk*, *waqf*, *esham*, fiscal and monetary policies, circular economy, halal logistics, sustainable finance, climate change, and Islamic microfinance and nanofinance. She has several book chapters with reputable international publishers such as IGI Global, Emerald Publishing Limited, World Scientific Publishing, Routledge, Springer and Palgrave Macmillan. She has experience as Senior Specialist for Islamic Finance at the United Nations Development Programme (UNDP) Indonesia and was listed as one of the Top 300 Most Influential Women in Islamic Business & Finance 2019, 2020, 2021, WOMANi Significancica 2022 and WOMANi Academica 2023 and 2024 by Cambridge-IFA.

Ari Cahyo Nugroho earned a bachelor's degree in communication (journalism) from the Jakarta Institute of Social and Political Sciences (IISIP) in 2003 and a master's degree in communication with a focus on business media in 2022. He is an active scholar who has published papers in government policy, communications and media journals. Currently, he is a senior researcher at the National Research and Innovation Agency.

Daru Nupikso is an Associate Researcher at the Center for Public Policy Research, National Research and Innovation Agency. Darmanto is part of the Public Basic Service Research Group and has research competencies in the field of public policy and administration. Daru graduated from the Faculty of Economics, National Development University "Veteran" Yogyakarta and continued his master's degree education in the Master of Public Administration study program from Gajah Mada University.

Rashmi Paranjpye is a renowned finance faculty who is proficient in financial modelling. She has 18 **years of experience in teaching various modules in finance for management students**. Dr. Rashmi has published research papers in various international journals on topics related to green investments, digitalisation, financial inclusion and gold prices. She has designed and delivered courses in finance for non-finance students and professionals. She has been instrumental in non-academic activities for the growth of the institute. Dr. Rashmi has 15 years of corporate experience.

Yussi Ramawati is a lecturer at Atma Jaya Catholic University of Indonesia with a research focus on marketing management. Her academic interests include marketing strategies, consumer behaviour and digital marketing. She has contributed to various studies addressing market dynamics, brand management and customer engagement. Dr. Ramawati is committed to bridging theoretical knowledge with business practices and helps students develop analytical and strategic capabilities to respond to evolving market demands.

Thiserage Jeewanthi Rathnasekara Thisera is a PhD candidate in the Department of Management at Griffith University, Australia, and a lecturer attached to the Department of Human Resource Management, University of Kelaniya, Sri Lanka. She holds a Bachelor of Science in Human Resource Management, a Master of Business Administration in Human Resource Management and a Diploma in Counselling Psychology. Her academic interests focus on employee voice, human resource management and organisational behaviour. Jeewanthi is experienced in both teaching and research, with a strong commitment to advancing knowledge and practice in the field.

Yoga Religia is a lecturer and researcher at Universitas Pembangunan Nasional Veteran Yogyakarta, specialising in marketing management, marketing strategy and digital marketing. His research explores consumer behaviour, digital transformation and the adoption of technology in small and medium enterprises (SMEs). He has published studies on digital marketing strategies, e-commerce and AI-driven personalisation. Beyond research, he is active in teaching and mentoring students, equipping them with analytical and strategic skills. His work bridges academic theory with practical applications, supporting SMEs in leveraging technology for sustainable growth.

Ahmad Budi Setiawan has a bachelor's degree in information technology from the Institute Technology of Indonesia and a master's degree in information technology from the University of Indonesia. He also holds an Information Security Management System Lead Auditor and an Associate Professional Engineer certificate. As a senior researcher at the National Research and Innovation Agency, Indonesia, he focuses on IT security, IT governance, ICT policy, big data and the digital economy.

Sudong Shang is Senior Lecturer in Organisational Behaviour and Human Resources in the Department of Management at Griffith Business School, Griffith University, Australia. His expertise is in work-family conflict, employees' well-being, leadership and immigrants' acculturation. He actively engages in research and publication in these areas and has publications in international journals, for example, *Human Resource Management,* the *Journal of Business Research,* and the *Journal of Cross-Cultural Psychology*. He currently serves as a section editor of *Stress and Health*.

Saptaningsih Sumarmi, a contributing author to *Organisational Learning and Sustainability: Advancing Knowledge for a Sustainable Future*, offers a unique perspective in her chapter titled "Organisational Learning in Society 5.0 Transformation." With an academic background in doctoral education in human resource management and a functional position as a senior lecturer at Universitas PGRI Yogyakarta, she brings a wealth of

knowledge to the field. Her expertise in human resource management, organisational learning and sustainability, as well as her focus on knowledge management and sustainable development, makes her contributions to the book particularly valuable. Her interest in advancing organisational learning to prepare HR for Society 5.0 is evident in her work. While further details about her institutional affiliations, research focus or publications are not publicly documented in the sources provided, her unique perspective is a key asset to the book.

Anny Triana is Policy Analyst at the Human Resources Development Agency, the Ministry of Communication and Digital. She plays a key role in the planning and implementing of digital literacy initiatives and the Digital Talent Scholarship programme. Her work advances digital skills development and fosters talent in Indonesia's growing digital economy.

Ubaidillah is Dean of Faculty of Islamic Economics and Business (FEBI), Kiai Haji Achmad Siddiq State Islamic University (UIN KHAS), Jember, Indonesia. His research interests are in Islamic thought, multiculturalism, economic sociology, Pasuruan history and *pesantren* (Islamic boarding school). He is also an assessor for the National Accreditation Agency for Higher Education (BAN-PT) and for the Accreditation Council for Education (LAMDIK). He has published his works in several national and international journals.

Adrian Wilkinson is Distinguished Professor at Griffith University. He was Founding Director of the Centre for Work, Organisation and Wellbeing at Griffith University (2006–2020). Prior to his 2006 appointment, Adrian worked at Loughborough University in the UK, where he was Professor of Human Resource Management from 1998, and he also served as Director of Research for the Business School. Adrian has worked at the Manchester School of Management, University of Manchester Institute of Science and Technology. He is a former academic fellow at the Centre for International Human Resource Management at the Judge Institute, University of Cambridge. He has been shortlisted by *HR Magazine* for the award of HR's Most Influential International Thinker and was listed in the Stanford University study in the top 2% of cited scientists globally. Adrian is Fellow of the British Academy of Management, Fellow of the Royal Society of Arts, Academician (Fellow) of the Academy of Social Sciences in the UK and Fellow of the Academy of Social Sciences in Australia.

Chin Han Wuen is an adjunct lecturer for the School of Business, Universiti Teknologi Brunei, Brunei Darussalam. He gained his PhD in management from the Universiti Teknologi Brunei, Brunei Darussalam. He also completed his master's in management from the Universiti Brunei Darussalam, Brunei Darussalam.

His current teaching experience revolves around the management field, which comprises human capital management, total quality management, managerial decision-making and information system and strategic management.

His main research areas focus on human resource management and organisational learning within the strategic management field. In recent years, he has expanded his research expertise and contribution by partaking in numerous research projects in business sustainability, ICT and human resource management. This has allowed him to publish articles in high-impact Scopus journals.

Witra Apdhi Yohanitas holds a bachelor's degree in computer systems from Bina Nusantara University and a master's degree from STIA LAN Jakarta. As a researcher at the National Research and Innovation Agency in Jakarta, Indonesia, he focuses on innovation, digital governance and human resources management. His current studies are improving the regional innovation index in digital government governance, modelling digital transformation and conceptualising human resources competency.

Hepni is Rector of Kiai Haji Achmad Siddiq State Islamic University (UIN KHAS), Jember, Indonesia. His fields of expertise are Islamic education management science, *pesantren* (Islamic boarding school) and qualitative research methodology. He is also Chairman of the Indonesian Waqf Board (BWI) for Jember Regency, Chairman of the Indonesian Mosque Council (DMI) for Jember Regency and Tasks Executor/Acting Chairman of the Education Board for Jember Regency.

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Preface

Introduction

Since Argyris and Schön's influential work in 1978, the significance of organisational learning has steadily gained recognition from both academics and practitioners. While defining organisational learning is inherently complex, it extends beyond the mere sum of individual learning. As Murray and Chapman (2003) explain, it not only involves a process of behavioural renewal – enabling a firm to pursue change and growth simultaneously – but also encompasses mechanisms that allow for testing and challenging the underlying assumptions that drive decision-making models.

Within the extensive literature on organisational learning, three key statements have been especially influential in elevating its relevance from a primarily academic topic to a central concern in boardroom discussions. First is the assertion that, for an organisation to thrive, it must learn at a pace that matches or exceeds the rate of change in its environment. In other words, an organisation's ability to adapt depends on its capacity to learn. Second, the shift from focusing solely on individual learning to promoting collective learning has become vital for organisational success, especially in light of increasing competitive pressures brought about by globalisation and rapid technological advancement. This perspective has introduced a fresh approach to managing organisations and has significantly contributed to the growing prominence of organisational learning in business discourse.

More recently, organisational learning has become deeply intertwined with the concept of sustainability. Achieving sustainability requires organisations not only to meet economic, environmental, social and governance (EESG) criteria but also to integrate these principles into their core practices and values. Addressing sustainability challenges effectively demands that organisations and stakeholders broaden their perspectives, transcend organisational boundaries and engage more deeply with diverse stakeholders. In this context, organisational learning offers a valuable lens through which to understand the complex, multidimensional nature of sustainability-related

change processes and to overcome associated challenges through collaborative action.

This book aspires to enrich the discourse on leveraging organisational learning, contributing to a more knowledgeable and sustainable future through a comprehensive examination. Featuring theoretical and empirical chapters, as well as case studies, it explores key aspects of organisational learning – from its foundational elements to the benefits it offers organisations. Moreover, the book examines the challenges and future prospects of organisational learning in advancing sustainable development, in line with the evolving perception of organisational responsibilities towards broader societal stakeholder engagement.

The book positions organisational learning as a compelling management paradigm for navigating an increasingly complex environment. In the context of the United Nations (UN) Agenda 2030 and the Sustainable Development Goals (SDGs), it highlights how organisational learning intersects with sustainability and offers insights into how organisations can meaningfully engage with the SDGs and work towards their realisation – ultimately aiming to better serve the communities they are part of.

With its blend of theoretical and empirical content, the 13 chapters in this volume provide a comprehensive overview of organisational learning and offer actionable guidance for both profit and non-profit organisations. The book serves as a valuable resource for academic scholars and students (both undergraduate and postgraduate) seeking to understand the latest developments in organisational learning theory and practice. Additionally, it provides practical insights for leaders, managers and change-makers striving to navigate complex business landscapes and foster sustainable growth and excellence within their organisations.

Contents of the Book

Chapter 1, titled "Fostering Organisational Learning: The Impact of Technology Integration From IT to Advanced Data Analytics" (by *Chai Lee Goi*), explores

> "the impact of technology integration, ranging from IT to advanced data analytics, on fostering organisational learning. Organisational learning is pivotal for growth, innovation and adaptability, and the integration of technology has revolutionised how organisations acquire, share and apply knowledge. IT systems enhance communication, collaboration and knowledge management, while advanced data analytics enables data-driven insights, predictive modelling, and informed decision-making. However, despite the potential benefits, organisations encounter significant challenges, such as cultural resistance and mindset barriers, as well as

technological infrastructure constraints. By examining theoretical underpinnings, including Argyris and Schön's (1974, 1978) organisational learning theories, this study links technology integration to enhanced efficiency, innovation, and sustainable practices in organisational learning. The findings underscore the transformative potential of technology in creating adaptive, knowledge-driven organisations. The book chapter also proposes a conceptual model for future research, highlighting pathways for effective technology integration to foster organisational learning."

Chapter 2, titled "Organisational Learning in Indonesia's Digital Talent Development" (*by* Karman Karman, Gati Gayatri and Anny Triana), examines

"the Indonesian National Work Competency Standards (NWCS) and the Digital Talent Scholarship (DTS) programme from 2019 to 2023, specifically focusing on organisational learning processes. It investigates how the DTS programme, aligned with NWCS, promoted individual learning, facilitated knowledge sharing, and fostered programme-level learning to advance digital talent development. The study analysed the mechanisms through which the DTS programme supported skills development and knowledge dissemination, while also identifying the challenges and barriers to effective organisational learning encountered within the programme. The findings revealed critical enablers and obstacles to organisational learning within the DTS programme, including the influence of leadership support, the effectiveness of knowledge management practices, and difficulties adapting to the industry's rapidly changing needs. The discussion highlighted the necessity of incorporating organisational learning principles into designing and implementing digital talent development initiatives to improve their effectiveness and long-term sustainability. These findings provided valuable insights for enhancing Indonesia's digital workforce and ensuring its competitiveness in the global digital economy. The DTS programme can evolve into a catalyst for sustainable innovation, effectively equipping Indonesia's workforce with the cutting-edge skills necessary to thrive, compete, and lead in the global digital economy, fostering long-term economic growth and resilience."

Chapter 3, titled "Resource Management for Organisational Learning: Salesperson Learning and Serendipitous Individual Profession" (by Achmad Setyo Hadi), explains that

"vocational high schools, particularly in emerging economies like Indonesia, play a critical role in bridging the gap between education and industry. These schools not only provide technical knowledge but also aim to teach

soft skills, cultural adaptability, and entrepreneurial mindsets among students. This dual focus makes it a fertile ground to observe the interplay between habitus, capital and field in shaping learning outcomes, as conceptualised by Bourdieu. Most vocational high schools use formal curricula that are based on normal situations, while real business situations are very dynamic, volatile and challenging. It requires not only updating curricula but also equipping students with prepared minds to respond to environmental change. Based on the theory of practice, school and curriculum are regarded as structures, while students are viewed as agents. The concept of serendipity is used to describe the benefit of unexpected moments. This chapter aims to provide insights on how salesperson learning at vocational high schools produces serendipitous professions through the lens of Bourdieu's theory of practice. It contributes to a broader understanding of how Bourdieu's theoretical constructs and the concept of serendipity can be operationalised to foster organisational learning in diverse contexts."

Chapter 4, titled "Voice for Learning and Learning to Voice" (by Thiserage Jeewanthi Rathnasekara Thisera, Adrian Wilkinson and Sudong Shang), states that

"organisational learning is a key factor in enabling organisations to adapt and innovate in pursuing their goals and objectives. Employee voice plays an important role in facilitating organisational learning, but it has received scant attention in the learning literature. This is puzzling, as while the practices and literature are distinct, they share common ground. Hence, this chapter elaborates on the relationship between employee voice and organisational learning using the organisational learning processes of organisational search, knowledge creation, knowledge retention and knowledge transfer. In doing so, this chapter identifies the different ways that employee voice connects with each of these organisational learning processes. In conclusion, we propose that future researchers in both disciplines should further explore the interconnections between the employee voice and organisational learning."

Chapter 5, titled "Enhancing Rural Organisational Learning through Communication Management Interventions for Local Business Development" (by Rudy Handoko), explores

"the role of communication management interventions in strengthening organisational learning in rural communities. Grounded in double-loop learning and social learning theory, the chapter illustrates how strategic, participatory communication encourages reflection on underlying

> norms, fosters behavioural change and supports collaborative knowledge construction. Conducted in a rural Indonesian context, the interventions enhanced group cohesion, decision-making and adaptive capacity. Findings highlight that well-structured communication processes not only facilitate effective information exchange but also promote critical thinking and innovation. The chapter offers insights into how rural organisations can evolve into adaptive learning systems through sustained support and inclusive communication practices. The study uses a qualitative research approach, including interviews and participatory observation, to examine communication management and the impact of interventions in rural organisations."

Chapter 6, titled "Big Data Governance in the Implementation of the Organisational Learning and Sustainability for the Digital Talent Development System" (by Ahmad Budi Setiawan, Ari Cahyo Nugroho, Novi Savarianti Fahrani, Witra Apdhi Yohanitas, Amri Dunan, Darmanto, Daru Nupikso and Bambang Mudjiyanto), explores

> "the application of big data governance in organisational learning for digital talent development systems through training programmes. In the digital era, an organisation's ability to manage and utilise big data is a determining factor in developing employees' digital skills. By utilising big data, organisations can implement an adaptive, data-driven and personalised learning approach according to individual and organisational needs. This chapter focuses on the concept of big data governance in the context of organisational learning and how this approach can help organisations identify skills gaps, optimise training and improve the sustainability of digital talent development. This chapter provides insights for stakeholders in designing effective and sustainable training strategies."

Chapter 7, titled "The Transformational Learning on Hybrid Workplaces among SMEs in Indonesia" (by Leonis Marchalina), states that

> "hybrid workplaces have become ideal for many working people today. Contemporary workplaces have helped employees optimise their work-life balance, designing a more meaningful workday. Consequently, organisational learning can be achieved through the enjoyment and fulfilment of their balanced life between work and social life. Organisational learning is essential for any organisation to survive and grow. In addition, employee development through learning is also useful as an asset, whereby their knowledge, skills and experience contribute to the company's productivity. Informal training is suitable for organisational learning in a hybrid workplace. This chapter conducted a qualitative approach

by interviewing six entrepreneurs of SMEs. The results show that transformational organisational learning can be implemented effectively when SMEs are focused on employee-centric and employee wellness. The study revealed the importance of factors such as creating organic fun and supportive hybrid ecosystems, commitment to learning in a hybrid workplace, giving attention to employees' wellness and training of acquired skills."

Chapter 8, titled "Investigating SME Sustainability through the Transformation to Green Digital Technologies: A Systematic Literature Review" (by *Yoga Religia,* Yussi Ramawati and Muafi Muafi), explores

"the adoption of green digital technologies as a strategy to improve the sustainability of small and medium enterprises (SMEs), addressing a gap in literature that mostly focuses on large enterprises. Using a systematic literature review of studies published between 2023 and 2024, the research integrates the Technology-Organisation-Environment (TOE) framework and the Resource-Based View (RBV) framework to analyse external pressures, technological readiness and internal resources essential for adopting green technologies. The findings indicate that green digital technologies enhance sustainability across economic, environmental and social dimensions. Economically, these technologies boost operational efficiency, competitiveness and profitability. Environmentally, they help reduce carbon emissions, minimise waste and lower energy use. Socially, they foster environmentally friendly jobs, improve community welfare and strengthen stakeholder relationships. The study also highlights the complementary roles of the TOE and RBV frameworks in overcoming challenges in adopting green technologies and proposes an integrated model for incorporating sustainability dimensions. This research offers theoretical contributions by extending innovation adoption models for SMEs and provides practical insights for policymakers and practitioners. Ultimately, this study underscores the strategic role of green digital technologies in fostering sustainable development, enabling SMEs to succeed in an increasingly competitive and environmentally aware global economy."

Chapter 9, titled "Does Competitive Strategy Matter as Mediator for the Relationship between Organisational Learning and Performance of Service-Based MSMEs?" (by Chin Han Wuen and Fahmi Ibrahim), studies

"that organisational learning and competitive strategy within micro, small and medium enterprises (MSMEs) have become one of the significant strategic management topics. This chapter aims to investigate the

mediating effect of competitive strategy on the influence of organisational learning towards MSME performance. Based on a questionnaire survey of 275 valid responses, this chapter incorporated the SMART PLS software to examine the measurement model and structural model. This is followed by the Preacher and Hayes mediation test. The statistical results revealed (i) organisational learning to have a significant positive impact on MSME performance and (ii) competitive strategy to be a significant mediator (partial) for the relationship between organisational learning and MSME performance. Drawing from these findings and statistical analysis, this chapter provides practical recommendations for MSME owners/managers to facilitate a favourable learning process which aligns with the strategic requirements, as well as expanding the interdependence mechanism between organisational factors, within the Contingency Theory context."

Chapter 10, titled "Organizational Learning in Society 5.0 Transformation" (by Saptaningsih Sumarmi), argues

"that the Society 5.0 era, a transformative period that integrates advanced technologies, such as artificial intelligence (AI), the Internet of Things (IoT) and big data, to improve social welfare and solve complex social challenges, is heavily reliant on organisational learning. This concept combines physical and digital spaces to create a more inclusive and sustainable society. This chapter explores how organisational learning acts as a catalyst in the transformation towards Society 5.0. It supports innovation, adaptability, resilience and inclusiveness, all vital to addressing rapid technological change and societal challenges. By improving data, technology and human literacy, organisations can leverage technology to create innovative solutions. In addition, continuous learning prepares human resources to face technological disruption and maintain operational continuity. The chapter also discusses challenges in implementing Society 5.0, such as resistance to change, resource constraints and opportunities that arise through global collaboration and technological advancements. Learning strategies that focus on collaboration and the use of technology are effective approaches to achieving organisational sustainability in this era."

Chapter 11, titled "Sustaining Organisations Work Performance in Industry 5.0: New Perspectives From Recent Literature" (by Miftachul Huda and Mohammad Nabil Almunawar) studies

"that industry 5.0 has evolved from industry 4.0 to highlight the integration of human creativity and skills with technological advancements

like artificial intelligence (AI) and the Internet of Things (IoT). In this instance, the ongoing access and implementation of such progress must be considered to maintain the organisation's work efficiency. Nonetheless, there has been a deficiency of academic focus on thoroughly examining this specific improvement in maintaining organisational work performance within Industry 5.0. This chapter seeks to explore the broad aspects of enhancing work performance sustainability within the organisational setting, particularly in light of the progress of Industry 5.0. A thorough examination of the recent relevant literature indicates that the strategic effort to enhance the sustainability of organisational performance must incorporate the comprehensive aspects of the fundamental principles of Industry 5.0, emphasising environmental, economic and social sustainability. This chapter offers valuable insights for prioritising human well-being by improving workers' roles through collaboration with machines instead of merely replacing them. Additionally, Industry 5.0 may be seen as a paradigm shift that combines human abilities with advanced technologies, emphasising sustainability. From this perspective, sustainable organisations necessitate a proportionate and extensive integration of the human-centric approach to facilitate the strategic application of the circular economy by emphasising ethical AI, energy efficiency and social responsibility."

Chapter 12, titled "Transformation of Local Wisdom Based on Environment, Social and Governance (ESG) in Islamic Boarding Schools (Pesantren) Towards Sustainable Society: Evidence in Indonesia" (by Hepni, Muhammad Khusna Amal, Ubaidillah, Mohammad Nabil Almunawar, Mahmudah, Fauzan and Khairunnisa Musari), addresses that

"sustainability has become a key issue as countries around the world face the challenges of climate change. In a broader sense, sustainability integrates economic, social and environmental dimensions, where the integration of environmental, social and governance (ESG) becomes a set of standards for measuring sustainability. As a framework used to evaluate an organisation's sustainability and ethical impact, ESG paradigm currently is adopted also by educational institutions, including the oldest Islamic educational institution in Indonesia, which is called the Islamic boarding school (pesantren). Pesantren embodies local wisdom rooted in ESG principles. With their extensive reach, pesantren in Indonesia are evolving into learning organisations that promote ESG by preserving their traditions while embracing changes. By combining literature review, observations, nethnography and interviews with the caretakers of pesantren, this chapter explores three key areas: (1) an overview of pesantren in Indonesia, (2) the ESG transformation occurring within pesantren in Indonesia

and (3) the requirements for pesantren to build their institutions toward a sustainable society. The chapter discusses the challenges pesantren face in fostering a sustainable society. The findings of this study are intended to inspire other traditional institutions in Indonesia and globally to accelerate their ESG transformation towards a more sustainable future."

Finally, the last chapter of the book, Chapter 13, titled "The Organisational Learning and Sustainable Development: The Neo-paradigm" (by Rashmi Paranjpye), affirms that

"organisations have traditionally focused on economic expansion and profitability, ignoring the long-term effects on the environment and society. But a paradigm shift is taking place in response to escalating global issues, including resource depletion, social inequality and climate change. This change, referred to as the "neo-paradigm," necessitates an integrated strategy that blends sustainable development objectives with organisational learning, providing a framework for organisations to handle the complexity of contemporary issues. The neo-paradigm offers a fundamental reworking of conventional management techniques, viewing organisational learning as a dynamic and adaptable mechanism, which allows companies to continuously change, rather than as a static, transactional process. Integrating social responsibility, ethical governance and environmental stewardship into organisational learning frameworks is one of the main principles of the neo-paradigm. This involves cultivating a corporate social responsibility culture, which synchronises corporate activities with more societal objectives, including cutting carbon emissions, promoting social justice and increasing transparency. Organisations can adopt a more balanced perspective that aims to provide long-term value for stakeholders. This chapter provides a model for integrating sustainability into organisational learning. By embracing organisational learning as a tool for sustainability, businesses can create long-term value and contribute to the achievement of sustainable global development goals."

Mohammad Nabil Almunawar, Md Zahidul Islam, and
Patricia Ordóñez de Pablos

Acknowledgements

This book is composed of hard work and dedication of the authors, who are academics, researchers or practitioners in Asia. The editors would like to sincerely thank all the authors for their contributions to this valuable book.

The editors would also like to extend heartfelt appreciation to all reviewers who had participated in the reviewing process. Their time and expertise in evaluating the suitability of submitted chapters for publication in this book have significantly contributed to the completion of this edited book.

Moreover, we are also profoundly thankful to our leaders and colleagues at the School of Business and Economics (UBDSBE), Universiti Brunei Darussalam, Brunei Darussalam, for their continuous support.

Finally, we also like to express our sincere gratitude to the editorial team from Routledge, CRC Press, Taylor & Francis Group for their wise feedback, advice and support in publishing this book.

1 Fostering Organisational Learning

The Impact of Technology Integration From IT to Advanced Data Analytics

Chai Lee Goi

Introduction

Organisational learning is a fundamental driver of growth, adaptability, competitiveness, and innovation in today's fast-paced and dynamic business environment. Technology plays a pivotal role in enhancing the learning processes across individual, team, and organisational levels, promoting continuous development and adaptation. As businesses face rapid technological advancements, they are compelled to integrate various tools, from basic Information Technology (IT) to more complex technologies like Artificial Intelligence (AI) and Data Analytics, to sustain their competitive edge (Mahmoud et al., 2020). These technologies not only support the acquisition of knowledge but also enable organisations to process and interpret vast amounts of data more effectively, resulting in improved decision-making and overall performance (Ajibade et al., 2019).

Technology integration into organisational learning frameworks increases an organisation's ability to process data, spot emerging opportunities, and solve complex challenges. However, despite its potential, the adoption of learning analytics (LA) often faces several barriers. These include insufficient technical resources, low levels of trust in the technology, and lack of readiness within the organisation (Mahmoud et al., 2020). Research by Ajibade et al. (2019) highlighted that IT plays a critical role in enabling real-time knowledge sharing, a key element of effective business intelligence and decision-making processes. The inability to adapt to technological advancements can reduce competitiveness.

Moreover, the advent of AI and big data analytics has transformed organisational learning. AI and big data analytics facilitate predictive decision-making, enhancing operational efficiency and strategic alignment. Menzies et al. (2024) emphasised that AI not only supports innovation but also enhances market forecasting and the development of global strategies, although it necessitates significant organisational adjustments to achieve successful integration. Similarly, Almaqtari (2024) underscored the role of IT

DOI: 10.4324/9781003581918-1

governance in facilitating AI adoption within the accounting and auditing sectors, improving financial reporting practices, and addressing challenges such as data sovereignty and compliance. Kerr et al. (2023) further reinforced this notion by exploring the impact of marketing technologies, like programmatic advertising, in aligning organisational activities to improve performance. These advancements are crucial for fostering a more dynamic and responsive organisation.

Additionally, business analytics (BA) plays a critical role in enhancing organisational performance by enabling better alignment between technological, organisational, and environmental factors. Horani et al. (2023) found that BA is a significant contributor to improving organisational performance, particularly when the technology integration aligns with broader organisational goals and external environmental conditions. Therefore, organisations that strategically align their technological capabilities with organisational learning processes are better positioned to leverage technological advancements for competitive advantage.

Through these technological advancements, organisations not only improve internal capabilities but also contribute to broader societal goals. For instance, Subramanian and Suresh (2022) highlighted how the integration of organisational learning and green human resource management practices can drive a circular economy, enhancing sustainability efforts across industries. Similarly, Bianchi et al. (2022) discussed how lifecycle management in organisations, guided by organisational learning, can contribute to environmental sustainability. These examples underscore the importance of integrating technology with organisational learning to foster both internal growth and external responsibility. Consequently, as organisations continue to evolve in response to technological advancements, they must adopt frameworks that facilitate both continuous learning and innovation to stay competitive and sustainable in an ever-changing landscape (Subramanian & Suresh, 2022; Bianchi et al., 2022).

By leveraging technology, organisations can transform their learning processes, enhance operational efficiency, and foster sustainable growth. As highlighted by several studies, including those by Sarfraz et al. (2023), Mai et al. (2022), and Gamón-Sanz et al. (2024), the successful integration of organisational learning with technology-driven practices leads to improved organisational effectiveness, innovation, and overall performance. Overall, fostering organisational learning through technology integration is crucial for organisations aiming to thrive in the competitive and rapidly changing business environment. Thus, the main objective of this chapter is to explore the impact of technology integration, ranging from IT to advanced data analytics, on fostering organisational learning.

This chapter is structured into several sections: (1) methodology, (2) organisational learning theories, (3) technology integration in organisational learning,

(4) impact of technology integration on organisational learning, (5) challenges and barriers, (6) conclusion, (7) implications, and (8) future research.

Methodology

To complete this chapter, a systematic literature review was applied to examine the impact of technology integration, from foundational information technology (IT) to advanced data analytics, on fostering organisational learning. The systematic review aims to synthesise existing research, identify key themes and trends, and highlight critical gaps in the literature.

A structured series of steps was systematically applied to ensure a comprehensive and rigorous review of the literature, as discussed below:

- Step 1: Articles retrieval
- Academic and non-academic articles, including journal articles, conference papers, newspapers, reports, and online materials, were reviewed in boh online and hardcopy formats. Specifically, for online academic articles, we accessed databases, including Google Scholar, Scopus, and Web of Science, as these databases reflect high-quality and peer-reviewed journals and conference papers. To identify relevant literature, we have entered four major keywords: "*Organisational Learning*," "*Technology Integration*," "*Information Technology*," and "*Data Analytics*."

  (TITLE-ABS-KEY (organisational AND learning) AND TITLE-ABS-KEY (technology AND integration) AND TITLE-ABS-KEY (information AND technology) AND TITLE-ABS-KEY (data AND analytics))

- Step 2: Screening and selection
  In the screening and selection process, the priority of the selected articles was those published in 2014 and above. However, articles related to the fundamental theories of organisational learning published as early as the 1970s were also selected. This preserves the relevance of the early and latest studies on theory.
- Step 3: Data extraction and thematic analysis
  In the selected articles, study objectives, methodologies, findings, and contributions were analysed, and thematic analysis was conducted to identify patterns, emerging trends, and critical gaps.
- Step 4: Synthesis and discussion
  The findings from the articles were synthesised to provide a structured discussion on how technology integration, from basic IT systems to advanced data analytics, enhances organisational learning. Insights from both theoretical and empirical studies were incorporated to ensure a balanced perspective.

Organisational Learning Theories

One of the earliest contributions to organisational learning theory came from Argyris and Schön (1974, 1978), with the development of single-loop and double-loop learning theories. These theories have become central to understanding how organisations identify and address their challenges. Single-loop learning occurs when errors are detected and corrected within the boundaries of existing norms, policies, and objectives. This learning focuses on improving efficiency and achieving set goals without questioning the underlying theories. It is comparable to a thermostat that adjusts temperature deviations to maintain a pre-set value without reconsidering whether the set point itself is optimal. In contrast, double-loop learning represents a more profound level of organisational adaptation. This approach not only identifies and corrects errors but also questions and re-evaluates the fundamental assumptions, values, and objectives that led to those errors. The reflective and transformative process enables organisations to rethink their strategies and behaviours, making fundamental changes to improve their adaptability and long-term effectiveness. Using the thermostat analogy, double-loop learning not only adjusts the temperature but also assesses whether the set point remains appropriate based on evolving circumstances.

Argyris and Schön (1977, 1996) then extended these single-loop and double-loop learning theories, emphasising the importance of fostering a culture of reflection and adaptability within organisations. In these extended theories, they highlighted the effective learning environments that encourage critical thinking, questioning of norms, and openness to change, which are essential for sustainable improvement. These expanded theories introduced the idea of triple-loop learning, which builds upon single-loop and double-loop learning. Triple-loop learning goes beyond questioning norms and objectives to examine the processes of learning itself. This meta-cognitive layer involves understanding how an organisation generates, shares, and applies knowledge and refining these processes to enhance organisational capacity for continuous improvement.

Overall, Argyris and Schön's (1974, 1978) single-loop and double-loop learning theories provide a structured approach to understanding how organisations can evolve from merely reacting to problems to fundamentally rethinking and enhancing their systems, ensuring resilience and growth in a complex and dynamic environment. Even, Argyris and Schön's (1974, 1978) organisational learning theories have profoundly influenced several key theories, including Action Learning, Experiential Learning Theory, Learning Organisations, and Reflective Practice.

Action Learning

Revans' (1982) Action Learning aligns with the double-loop learning theories. It focuses on addressing real-world problems while fostering reflection and learning at both individual and group levels. The process extends beyond solving problems (single-loop learning) to include examining and improving the problem-solving approach itself, embodying the essence of double-loop learning. Through collaboration and reflective inquiry, participants challenge their assumptions and mental models, enabling both problem resolution and enhanced critical thinking skills. This practical approach reflects Argyris and Schön's (1974, 1978) emphasis on revising underlying assumptions to achieve transformative learning.

Experiential Learning Theory

Kolb's (1984) Experiential Learning Theory is connected to Argyris and Schön's (1974, 1978) theories, as it emphasises on learning through experience and reflection. Kolb's learning cycle, comprising concrete experience, reflective observation, abstract conceptualisation, and active experimentation, parallels the process of single-loop and double-loop learning. While single-loop learning addresses errors based on experience, double-loop learning involves re-evaluating the theories or beliefs driving those actions. Overall, Kolb's model highlights the value of reflection and critical analysis in fostering profound changes in behaviour and understanding, reinforcing the significance of revisiting assumptions for meaningful organisational growth.

Learning Organisations

Senge's (1990) Theory of Learning Organisations, articulated in the Fifth Discipline, builds directly on Argyris and Schön's (1974, 1978) theories. Senge's five disciplines, systems thinking, personal mastery, mental models, shared vision, and team learning, reflect the essence of double-loop learning, focusing on mental and team learning. In a learning organisation, individuals and teams are encouraged to critically examine and challenge their assumptions and beliefs, fostering transformative organisational change. This mirrors double-loop learning, where the emphasis is on questioning and revising fundamental norms and values to drive deeper adaptation and improvement.

Reflective Practice

Schön's (1983) Theory of Reflective Practice extends Argyris and Schön's (1974, 1978) theories, focusing in the realm of professional learning. Reflective practice emphasises continuous learning through critical reflection, both

during action (reflection-in-action) and after action (reflection-on-action). This dual process aligns with double-loop learning, as it encourages practitioners to evaluate not just their actions but also the assumptions and frameworks underlying their decisions. By engaging in reflective practice, individuals develop the capacity for deeper learning, enabling them to refine their practices and adapt to complex challenges more effectively.

Overall, these four theories underscore the critical role of reflection, critical thinking, and the willingness to challenge assumptions in fostering learning and adaptability within organisations. Also, these theories provide the comprehensive understanding and enhancing of organisational learning processes.

Technology Integration in Organisational Learning

Technology integration plays a very important role in enhancing organisational learning by transforming how knowledge is shared, acquired, and applied. Effective integration is seen as an enabler for educational and developmental objectives rather than an end in itself (Hermanto & Srimulyani, 2021). Organisations must align their systems with performance improvement goals and learning outcomes for technology to be successfully integrated. By automating repetitive tasks and offering better access to learning tools, organisations can create environments conducive to continuous learning and adaptability. Moreover, technology fosters organisational learning by breaking down barriers between people, systems, and departments, promoting a culture of collaborative knowledge sharing (The eLearning Blog, n.d.; Olmstead, 2021; Sharelook, 2023).

In the context of organisational learning, two important aspects of technology integration are Information Technology (IT) and advanced data analytics. IT systems provide the foundational infrastructure necessary for the seamless flow of information, while data analytics enhances decision-making by transforming raw data into actionable insights (Wijnhoven, 2022). Both elements contribute significantly to organisational learning by facilitating the creation of more efficient, data-driven environments. However, the successful adoption of these technologies demands a thoughtful approach considering both technical and organisational factors (Lam et al., 2021). This section further explores how IT and data analytics contribute to fostering organisational learning, particularly by supporting workforce development, knowledge sharing, and operational effectiveness (Sarker, 2021).

Information Technology (IT) Integration

Integrating IT systems is pivotal in creating an infrastructure that supports organisational learning. Technologies such as Learning Management Systems (LMS), cloud-based storage, and collaboration platforms enable knowledge

sharing, engagement, and skill development within organisations (Wijnhoven, 2022). These technologies bridge traditional learning methods with contemporary digital solutions that enable organisations to improve accessibility, connectivity, and collaboration in their learning environments. Chan (2023) commented that successful IT integration into organisational learning requires careful planning to ensure that these technologies meet the pedagogical goals and the users' needs. One example is how virtual learning environments (VLEs) can create interactive and personalised learning experiences, but their success depends on organisational support and user adoption.

Another important aspect is overcoming challenges related to resistance to change, training, and cultural shifts, which is essential for successful IT integration. The management in an organisation needs to ensure that employees remain IT savvy and continuously explore new technologies (Shahbaz et al., 2019). IT-enabled learning environments also necessitate a cultural shift, encouraging experimentation and participatory learning. In order for innovations to be driven, a supportive culture that values technology adoption as a scholarly activity must be established (Azeem et al., 2021). Even the most advanced technologies may fail to yield meaningful benefits without this cultural alignment. Therefore, IT integration should be a continuous process that evolves organisational learning goals to ensure ongoing relevance and effectiveness (Sarker, 2021).

Advanced Data Analytics Integration

Advanced data analytics transforms how organisations approach learning by providing data-driven insights that enhance decision-making and workforce development (Isensee et al., 2020). Unlike traditional business intelligence tools that focus on historical data, advanced analytics utilises predictive and prescriptive models to uncover trends and patterns, allowing organisations to measure performance, diagnose learning gaps, and optimise developmental strategies (Sharma et al., 2022). As data analytics platforms provide real-time feedback, organisations can track employee performance and adapt learning strategies (Jabbar et al., 2020).

However, there are some challenges in integrating advanced analytics into organisational learning. First, to ensure employees possess the necessary competencies to interpret and act on the insights provided by these platforms (Madhumita et al., 2024). Thus, organisations must invest in training for employees. Secondly, ethical considerations, especially data privacy and security, must be addressed to ensure analytics are used responsibly (Menzies et al., 2024). Integrating advanced analytics can drive learning by identifying areas for improvement and reinforcing development, which requires the creation of a data-driven culture where insights are actively utilised to inform decisions and strategies (Isensee et al., 2020).

Impact of Technology Integration on Organisational Learning

Integrating technology into organisational structures profoundly influences their ability to foster organisational learning. Technology facilitates communication and collaboration within teams and across organisational hierarchies, promoting more dynamic and productive interactions (Lam et al., 2021). Creating interconnected networks within an organisation enhances knowledge sharing, skill development, and collaborative problem-solving. By leveraging advanced IT systems, organisations can streamline knowledge management practices, ensuring better access to information and supporting faster and efficient learning processes (Sarker, 2021). As a result, technology has emerged as an essential driver for organisational learning, cultivating environments in which employees can easily access and engage with integrated learning opportunities (Usmani et al., 2023). Also, technology's impact extends beyond knowledge sharing, positively influencing operational and transactional efficiencies across business functions such as marketing, finance, procurement, production, and customer service (Sarker, 2021).

The digital age has accelerated the advanced data analytics adoption, profoundly transforming how organisations approach learning and decision-making. The sophisticated tools significantly shift from basic IT systems to platforms that provide actionable insights through real-time data and predictive modelling (Baskerville et al., 2020). Advanced data analytics empowers organisations to monitor performance and make informed predictions about future trends, fostering proactive decision-making. Integrating these tools into organisational learning allows for more tailored workforce development strategies and continuous improvement (Su et al., 2024). Organisations that invest in real-time feedback mechanisms and learning management systems can effectively assess learning outcomes, enhance employee development, and facilitate continuous improvement (Sarker, 2021). This shift towards data-driven learning systems is pivotal in improving organisational efficiency and innovation.

Enhanced Decision-Making Through Technology Integration

Effective decision-making is essential to organisational success, and technology integration plays a key role in this process. Access to real-time data allows organisations to make informed, timely decisions, enhancing organisational learning and adaptability. Advanced tools such as self-service business intelligence dashboards, predictive analytics, and role-based reporting provide organisations with the necessary tools to leverage internal data sources and external industry insights for decision-making (Jabbar et al., 2020). These technologies enable organisations to transition from relying on historical data to predictive models that offer insights into future trends, facilitating proactive decision-making and sustaining competitive advantage (Sarker, 2021).

Industries like retail and insurance have successfully integrated advanced data analytics to improve decision-making. For instance, Madhumita et al.'s (2024) study proved that a retail chain with over 1,000 stores uses real-time data tools to track employee performance, sales trends, and inventory levels, allowing managers to make quick data-driven decisions. Another study by Usmani et al. (2023) on the insurance industry. The insurance industry has shifted from intuition-based decision-making by incorporating data-driven insights to guide operations. This integration of data analytics facilitates organisational learning by empowering employees at all levels to access relevant information, contributing to decision-making processes, and creating a culture of knowledge-driven learning.

Improved Knowledge Sharing and Collaboration

Technology significantly enhances knowledge sharing within organisations, which is crucial for fostering a culture of collaboration and continuous learning. Adopting collaborative technologies such as wikis, messaging platforms, and expertise-finder systems encourages employees to communicate and share knowledge more effectively (Azeem et al., 2021). These tools break down organisational silos, enhance transparency, and facilitate the exchange of expertise across departments, ultimately supporting collective learning (Malhotra et al., 2021). Furthermore, real-time collaboration technologies, such as webinars and e-panels, enable sharing of best practices across large groups, reinforcing organisational learning on a broader scale (Pereira & Mohiya, 2021).

The success of technology integration in knowledge sharing relies on aligning the technological infrastructure and organisational culture. Creating an environment that encourages collaboration, backed by leadership support, ensures employees are willing to share knowledge. Organisations must overcome barriers such as resistance to change and power dynamics to create a culture that values and rewards knowledge sharing (Pereira & Mohiya, 2021). By adopting technologies that streamline knowledge sharing and collaboration, organisations can foster a dynamic learning environment that empowers employees to innovate, improve performance, and drive organisational success (Baskerville et al., 2020).

Challenges and Barriers

Integrating technology into organisational learning is an important strategy for fostering continuous development and adapting to a rapidly changing business environment. However, despite the potential benefits, organisations encounter significant challenges. These barriers include cultural resistance and technological infrastructure constraints.

Cultural Resistance and Mindset Barriers

One of the barriers to technology integration is cultural resistance. When an organisation transitions from traditional IT systems to advanced data analytics, employees' psychological and emotional responses to change can obstruct the effective use of new technologies. Research by Shahbaznezhad et al. (2021) indicated that employees often resist adopting new systems and prefer to continue using the existing technology they are already familiar with. This resistance is caused by fear and discomfort with the unfamiliar, job displacement, and loss of power. Also, this resistance is caused by the mindset. In a fixed mindset, employees may believe their abilities and skills are static, preventing them from taking advantage of new technologies. On the other side, a growth mindset fosters creativity and adaptability, enabling employees to view technological changes as opportunities for personal and organisational growth (Troisi et al., 2022). Change management strategies that focus on building a growth mindset, providing training, and offering continuous support can help to overcome psychological barriers and encourage employees to embrace new technologies.

The role of leadership is very important in addressing cultural resistance among employees. The management must foster an environment where learning from failures is encouraged and where employees feel safe to experiment with the adoption of new technologies. Transparent communication about the benefits of new systems, clear demonstrations, and ongoing training initiatives are essential for shifting attitudes from scepticism to acceptance (Leithwood et al., 2021). By promoting a culture of continuous learning and providing rewards for adopting new technologies, an organisation can create an inclusive environment that supports technological integration.

Technological Infrastructure Constraints

As advanced technologies are integrated into organisations, substantial challenges arise in terms of technological infrastructure. This is because the transition from basic IT solutions to sophisticated data analytics systems demands substantial investments in hardware, software, and network infrastructure. Organisations also may be hampered by outdated equipment, which limits the ability to leverage modern technologies (Choi et al., 2020). Even many organisations are still using outdated technologies that are not designed to work with modern, data-driven tools, creating friction when trying to integrate advanced data analytics into existing workflows (Tyler & Viana, 2021).

Moreover, organisations must also contend with issues related to data quality, regulatory compliance, and ethical concerns. As advanced data analytics tools rely heavily on large datasets, the accuracy and reliability of the

data used are paramount. However, many organisations struggle with ensuring data integrity, which can undermine the effectiveness of analytics systems (Abdualwhab et al., 2024). Furthermore, the integration of AI and other advanced technologies raises ethical questions regarding data privacy, bias in algorithms, and the responsible use of technology (Lora & Foran, 2024).

Addressing these technological constraints requires a comprehensive strategy that not only upgrades hardware and software but also develops an organisational culture that values technological innovation. This includes nurturing talent, and employees at all levels are equipped to operate and innovate with advanced systems. The integration of technologies should be seen as an ongoing process that requires constant adaptation and improvement (Rahouti et al., 2021; Agirre et al., 2021).

Conclusion

Technology integration is critical for advancing organisational learning, enhancing decision-making, and fostering innovation. By investing in infrastructure and cultivating a supportive organisational culture, organisations can create adaptive environments that promote continuous learning, collaboration, and resilience in a rapidly changing business landscape. IT systems provide the foundation for organisational learning by enabling seamless communication, collaboration, and knowledge sharing. Advanced data analytics further revolutionises organisational learning by providing real-time insights that inform proactive decision-making and innovation.

Despite its advantages, technology integration poses challenges, including cultural resistance, inadequate infrastructure, and ethical concerns. The management must actively manage these barriers, such as providing necessary training and ensuring alignment with long-term goals, including sustainability, to fully realise the potential of technology in organisational learning.

Implications

Theoretical Implication

The findings of this study offer significant theoretical contributions to the field of organisational learning, particularly in relation to the integration of advanced technologies like IT systems and data analytics. By building on established organisational learning theories such as Argyris and Schön's (1974, 1978) single-loop and double-loop learning, this study underscores how technology can influence deeper levels of organisational learning, challenging assumptions and enhancing adaptability. Furthermore, the study expands on the concept of triple-loop learning by exploring how

technologies like AI and big data analytics can not only facilitate learning but also transform the processes through which organisations learn, evaluate, and improve their strategies.

Managerial Implication

This study emphasises the critical role of technology integration in fostering organisational learning, offering practical insights for managers to enhance their organisations' adaptability and competitiveness. Managers need to rethink and prioritise to align technology investments, such as IT systems and advanced data analytics, with organisational learning objectives. IT systems, like Learning Management Systems and collaborative platforms, can facilitate knowledge sharing and engagement, while data analytics enables data-driven decision-making and workforce development. However, successful technology integration requires addressing barriers such as cultural resistance and mindset barriers, and technological infrastructure constraints. Managers must foster a culture that encourages experimentation, continuous learning, and participatory use of technology. Providing employee training to interpret data insights and ensuring the ethical use of analytics is equally critical.

Practical Implication

Technology integration, including IT systems and advanced data analytics, has significant practical implications for organisational learning. It enables faster knowledge acquisition, decision-making, and performance optimisation by automating processes, improving data access, and fostering collaboration across teams. AI and analytics empower organisations to make predictive decisions, anticipate challenges, and drive continuous improvement in learning frameworks. By leveraging these technologies, organisations can enhance workforce development, ensure adaptability, and improve operational efficiency. However, successful technology integration requires overcoming barriers such as technical resources, employee readiness, and data privacy concerns.

Future Research

Based on an analysis of the literature, we have proposed a comprehensive model, as referred to in Figure 1.1, for future research. This model can guide future research by examining how IT integration, advanced data analytics integration, leadership support, organisational culture, and employee competence and training influence organisational learning outcomes in a technology-driven environment. Through empirical investigation, this

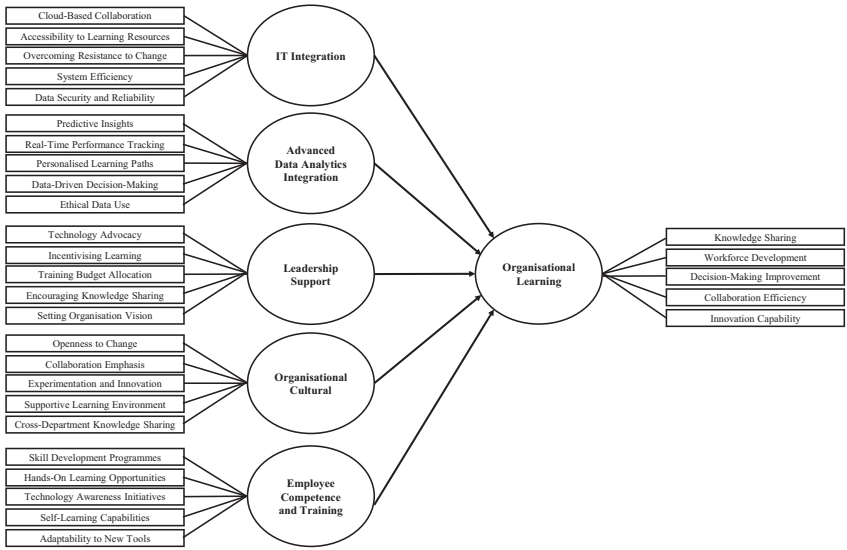

Figure 1.1 Proposed Model

model will provide insights into how businesses can better integrate technology into their learning processes to drive competitiveness, innovation, and sustainability. The brief discussion of each factor is given below:

- Organisational learning: Organisational learning is the central outcome of interest in this study. Organisational learning involves the development of knowledge, skills, and strategies that enhance the adaptability and competitiveness of an organisation (Sarker, 2021; Usmani et al., 2023).
- IT integration: The success of IT integration systems, for example, cloud-based tools, and Learning Management Systems enables seamless communication, collaboration, and knowledge sharing, thus fostering organisational learning (Wijnhoven, 2022). Proper IT infrastructure is essential to support the efficiency of organisational learning processes (Mahmoud et al., 2020).
- Advanced data analytics integration: Advanced data analytics adoption, for example, predictive models and real-time analytics, provides organisations with insights that enhance decision-making and workforce development. Analytics empower learning by identifying gaps and guiding learning strategies (Isensee et al., 2020; Su et al., 2024).
- Leadership support: Leadership plays a critical role in promoting technology adoption within an organisation. It is important for management

to foster a culture that values technological innovation and its benefits to organisational learning (Azeem et al., 2021; Pereira & Mohiya, 2021).
- Organisational culture: A very supportive organisational culture encourages new technology adoption and promotes knowledge sharing. Cultures that emphasise collaboration and continuous improvement are essential for maximising the benefits of technology integration (Sarker, 2021; Malhotra et al., 2021).
- Employee competence and training: A successful implementation of technology integration requires employees to be equipped with the necessary skills and knowledge. At the same time, training programmes are essential to ensure that employees can interpret data insights and apply them to improve learning processes (Madhumita et al., 2024).

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