

VUCA and Other Analytics in Business Resilience, Part A

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VUCA and Other Analytics in Business Resilience, Part A

EDITED BY

DEEPMALA SINGH

Symbiosis International University, India

KIRAN SOOD

*Chitkara Business School, Chitkara University, Punjab, India;
Research Fellow, Women Researchers Council (WRC), Azerbaijan
State University of Economics (UNEC)*

SANDEEP KAUTISH

*School of Computing, Model Institute of Engineering & Technology
(Autonomous), Jammu, J&K, India*

AND

SIMON GRIMA

University of Malta, Malta; University of Latvia, Latvia



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

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About the Editors

Deepmala Singh is an Assistant Professor at Symbiosis Centre for Management Studies, Nagpur, India and Symbiosis International (Deemed University), Pune, India. She completed her PhD from Banaras Hindu University, India, in 2016.

Kiran Sood is a Professor at Chitkara Business School, Chitkara University, Punjab, India; Research Fellow, Women Researchers Council (WRC), Azerbaijan State University of Economics (UNEC). She received her UG and PG degrees in Commerce from Punjab University, respectively, in 2002 and 2004. She earned her Master of Philosophy degree in 2008 and Doctor of Philosophy in Commerce with a concentration on Product Portfolio Performance of General Insurance Companies in 2017 from Panjabi University, Patiala, India. Before joining Chitkara University in July 2019, Kiran had served four organisations with a total experience of 18 years. She has published various articles in various journals and presented papers at various international conferences. She serves as an Editor of the refereed journal, particularly the *IJBST International Journal of BioSciences and Technology*, *International Journal of Research Culture Society*, and *The Journal of Corporate Governance, Insurance, and Risk Management (JCGIRM)*. Her research mainly focuses on regulations, marketing and finance in insurance, insurance management, economics and management of innovation in insurance. She has edited more than 10 books with various international publishers such as Emerald, CRC, Taylor & Francis, AAP, WILEY Scrivener, IET, Rivers Publishers, and IEEE.

Dr Sandeep Kautish is an Academician with 19 years of work experience in academia in various institutions of India and abroad. He is working as Dean-School of Computing, Model Institute of Engineering & Technology (Autonomous), Jammu, J&K, India. He has been setting up academic setups across India. He earned his Bachelor's, Master's, and Doctorate degrees in Computer Science on Intelligent Systems in Social Networks. His areas of research interest are healthcare analytics, business analytics, machine learning, data mining, and information systems. He has 50+ publications in his Scopus account with an H-Index of 12. Similarly, he has 1,000+ Google Scholar citations with an H-Index of 19 and an i-10 index of 32. His 36 publications are included in the Web of Science Core Collection with an H-Index of 10. He has publications in reputed journals like Springer, Elsevier, Taylor & Francis, Wiley, and IGI Global. He has also authored/edited more than 15 books with reputed publishers. He has been invited as a Keynote Speaker at VIT Vellore in 2019 for an International

Virtual Conference held at the VIT Vellore Campus. He filed one patent in the field of Solar Energy Equipment Using Artificial Intelligence in 2019. He has been instrumental in organising more than 10 conferences and 15+ FDPs/FTPs in India and abroad. He is an Editorial Member/Reviewer of various reputed SCI/SCIE journals.

Simon Grima is the Deputy Dean of the Faculty of Economics, Management and Accountancy, Associate Professor and the Head of the Department of Insurance and Risk Management at the University of Malta. Simon is also a Professor at the University of Latvia, Faculty of Business, Management and Economics and a Visiting Professor at UNICATT Milan.

About the Contributors

Prof. (Dr.) AMM Mustafa is a highly regarded academic specializing in Business Economics at the South Eastern University of Sri Lanka. Currently serving as the Head of the Department of Management and the chairperson of the Sri Lanka Forum of University Economists (SLFUE), Prof. Mustafa holds a PhD from the University of Jaffna. He contributes significantly to the academic community as the Chief Editor of the Journal of Management and Journal of Business Economics. Prof. Mustafa has a prolific research portfolio, with publications and books to their credit. They have actively engaged in research conferences worldwide and have played a crucial role in the university's developmental initiatives.

Sadri Alija holds the position of Full Professor of Applied Mathematics and Mathematical Modeling at the South East European University in Tetovo, North Macedonia. Dr Alija also holds a Master of Science in Mathematics program Probability, Statistics, Applications at the Faculty of Natural Sciences, University of Tirana, Albania, a PhD from the Faculty of Business and Economics at SEEU in Economics and received a PhD in the field of Applied Mathematics in Economics. Dr Alija has more than 23 years of teaching experience at the undergraduate and graduate levels in various institutions.

Nelson D. is a Research Scholar and a Student from Christ University, Bangalore, pursuing a PhD in Commerce. Nelson's areas of interest fall under organising and managing events, taking up leadership roles to explore various opportunities, and having a passion for learning something new.

Adriana AnaMaria Davidescu is Full Professor in the Department of Statistics and Econometrics of the Bucharest Academy of Economic Studies and Senior Researcher at the National Institute for Scientific Research in Labour and Social Protection, with over 14 years of experience in socio-economic research and labour market analysis. Adriana has a PhD from the Bucharest University of Economic Studies and has been a Visiting Scholar at the University of Salerno (Italy). She has over 14 years of experience in the analysis of informal economy issues, coordinating or being a member of the research team of over 50 national and international projects.

Prof (Dr) Narayanage Jayantha Dewasiri is a Professor attached to the Department of Accountancy and Finance, Sabaragamuwa University of Sri Lanka. He currently serves as the Brand Ambassador at Emerald Publishing, UK, and the Vice President of the Sri Lanka Institute of Marketing. He is a pioneer in applying triangulation research approaches in the management discipline. He is currently serving as the Co-Editors-in-Chief of the *South Asian Journal of Marketing* published by Emerald Publishing, Managing Editor of the *Asian Journal of Finance*, and *South Asian Journal of Tourism and Hospitality* published by the Faculty of Management Studies, Sabaragamuwa University of Sri Lanka.

Assist. Prof Esra Sipahi Döngül graduated from the Istanbul Gelisim University Business Administration Doctorate Program. Her areas of management, social work, social media, and expertise are data analysis, business, and organisation. She has a strong background in research activities in corporate social responsibility and management organisation areas. She has published many articles in the field of corporate social responsibility and has also attended and presented at numerous international conferences. She is Associate Editor of *Heliyon* (SCIE-Scopus) indexed journal. She has good skills in data analysis, Artificial Intelligence applications, statistical analysis, and administrative applications. She is currently working at the Aksaray University, Turkey.

Cristina Maria Geambasu is a PhD student at the Doctoral School of Cybernetics and Statistics and has an experience of over 5 years on data manipulation and analysis, currently occupying the position of Senior Data Analyst at GfK Romania, aiming to bring innovative approaches and insightful visualisations to data collections and analysis. In the last year, she has focused on exploring the data science branch and machine learning techniques. The subject studied in the PhD is micro and macro approaches on the regional informal economy phenomenon and the main objective of the thesis is to explore the main determinants of informality and to estimate the dimension of the regional informal economy.

Prof Adriana Grigorescu is Full Member of the Academy of Romanian Scientists, Associate Senior Researcher at Romanian Academy National Institute for Economic Research ‘Costin C. Kirilăscu’ – Center for Renewable Energies and Energy Efficiency, PhD Supervisor in Management since 2010 and has a rich practical, academic, and research experience. She teaches at the National University of Political Studies and Public Administration (SNSPA) Management and Marketing at the Faculty of Public Administration. She is the President of the European Business Ethics Network Association – Romania (EBEN-Romania) – 2020 and of the Holistic Research Academic Association (HoRA) – 2016. <https://orcid.org/0000-0003-4212-6974>

Jiveta Chaudhary Grover is an MBTI® Certified Practitioner with extensive experience in student mentoring, career counselling, and personality development. She has an MBA in HR from GGS Indraprastha University. Additionally,

she has secured a Diploma in Training and Development from the Indian Society for Training and Development (Gold Medal). She has served the ITES and the NBFC service sectors and has been part of academia for more than 13 years. She has attended and organised multiple national and international workshops on Research Methodology, Case Study Development, Quality Education, etc. She has to her credit multiple publications in international journals. She has attended multiple conferences including GGSIPU and IIT Roorkee. Currently, she is serving as Assistant Professor (Sr Scale) at the School of Management and Liberal Studies, The NorthCap University. She is enrolled as a Doctoral candidate with The NorthCap University and is pursuing her research in the field of leadership.

Athambawa Jahfer is a Professor attached to the Department of Accountancy and Finance, Faculty of Management and Commerce, South Eastern University of Sri Lanka, Sri Lanka. He has been teaching financial management, investment valuation, and accounting since 1997. His research interest includes financial market development, capital market, investor behaviour, capital market efficiency, and monetary economics. He is a Graduate of B.Com (Hons) from the University of Colombo, Sri Lanka. He holds an MSc in Management from the University of Sri Jayewardenepura, Sri Lanka and he received his PhD in Business Administration from Yokohama National University, Japan in 2006. He was a Visiting Research Fellow in the same university (June 2012–May 2013). He has published articles in reputed national as well as international journals and presented papers at national and international conferences.

Dr Sanjeev Kadam is currently working as an Assistant Professor at Symbiosis Institute of Business Management Pune, India. He did his PhD in Management from Symbiosis International (Deemed University), Pune, India. To his credit, he has 20 years of industry experience and has been in academia for the last 12 years. His research interests are multidisciplinary in nature especially focusing on operations. Dr Kadam is an Associate Member of The Institution of Engineers (India).

Dr Rameesha Kalra started her career as an Assistant Manager at ICICI Bank where she spent 2.5 years and has now been associated with teaching for more than 15 years. She holds a Master's degree in Business administration (MBA Finance and HR) from FMS, Ajmer University and was a topper in the MBA program. She is also UGC (NET) qualified. She completed her PhD from Banasthali Vidyapith (Rajasthan) on 'Performance Evaluation of Banking Industry Using Balanced Scorecard Approach'. She has to her credit several research papers in journals of repute and has participated in various conferences at the national as well as international level.

Chikezie Kennedy Kalu is currently a PhD Student at the School of Management, in the Department of Management Science and Engineering, Jiangsu University, China. His field of research is technology and innovation management. He is

from Nigeria and has a B.Eng. in Electronics Engineering from the University of Nigeria, Nsukka, Enugu State, Nigeria (UNN) and a Masters (with Distinction) in Communication Engineering from the University of Manchester, UK. He has done research works cutting across management, wireless communication, agriculture, and health. He has also had professional work experiences cutting across the fields of: Telecom, Retail, Education, Oil and Gas, ICT and Logistics.

Dr Shad Ahmad Khan is Assistant Professor in Oman University, Oman. He has published more than 30 research papers. He is also Guest Editor in *Indersciences* (IJPEE) journal and many more journals. His research area is financial management and marketing.

Ashish Kumar works in the Department of Humanities and Social Sciences, Motilal Nehru National Institute of Technology Allahabad. His research area includes Gig Economy and Entrepreneurship. He has published over 20 research papers in Scopus-indexed and ABDC-listed journals.

Alex Praveen Raj M. is a Research Scholar and a Student from Christ University, Bangalore, pursuing a PhD in Commerce. Alex's areas of interest lie in event management and showcasing leadership skills in various academic activities. The ultimate goal is to impart and inculcate research knowledge to a broad group of budding students.

Dr Anand Shankar Raja M., hails from an educational background, and he is also a board member of his family-run Higher Educational Institution 'NRKN Higher Secondary School', which is situated in Kunnathur, Tamil Nadu. He has earned his Doctorate degree from SRM University, Chennai, Tamil Nadu, in Human Resource Management. His area of specialisation is 'Market Research' where he explores mystery shopping professionals, and he also conducts ample mystery shopping activities for different brands across the globe. He has published a few articles which are indexed with Emerald, Taylor and Francis, and Springer.

Ionel Magdalena is a PhD student in Management at the National University of Political Studies and Public Administration, Bucharest, Romania.

Eduard Mihai Manta is a PhD student at the Doctoral School of Cybernetics and Statistics and has over seven years of experience in model risk management, holding various positions in data teams. In the past years, he focused on machine learning and data science. The subject studied in the PhD is the COVID-19 pandemic – an accelerator of the implementation of sustainable development concepts, resilience, green and inclusive of the global economy. He has experience working with one of the principal NGOs in the field of education, working on reports that underlie decision-making within the organisation.

Akansha Mer is an Assistant Professor in the Department of Commerce and Management, Banasthali Vidyapith, Rajasthan, India. She has earned her

Doctorate on Work Engagement in NPOs from Banasthali Vidyapith. She has 2.5 years of corporate experience and about a decade of academic work experience. Her research interests include work engagement, adoption of technology by consumers, mindfulness, workplace spirituality, working patterns of non-profit organisations and Artificial Intelligence in HRM and marketing. She has published research papers with Emerald, Springer, Taylor and Francis (Routledge), Sage, Wiley, and Inderscience.

Fisnik Morina is an Assistant Professor in the fields of Banking, Finance, Economics, and Econometrics at the Faculty of Business at the University 'Haxhi Zeka' in Peja, Kosovo. Currently, Fisnik Morina is Vice Dean for Teaching, Student Affairs, and Scientific Research at the Faculty of Business. In 2023, Fisnik Morina will continue his post-doctoral research in the field of Banking and Finance at the Institute of Economics, University of Graz in Austria. In 2022, Fisnik Morina successfully completed his post-doctoral studies in the fields of financial institutions and risk management at the University of Malta. He completed his doctoral studies in 2019 at the South East European University, Faculty of Business and Economics in the Republic of North Macedonia, and qualified as Doctor of Economic Sciences-Economics. Fisnik Morina has international experience in the field of scientific research, has several scientific papers published in international scientific journals, and has participated in many international scientific conferences in many countries of the European Union. Fisnik Morina is internationally certified by the Center for Economic Research and Graduate Education – Economics Institute (CERGE-EI) in the Czech Republic for contemporary teaching methods in Higher Education and is a Senior Trainer at the Center of Excellence at the University 'Haxhi Zeka' in Peja.

Dr Anitha Nallasivam is currently associated with Jain CMS Business School as a Professor. She has published more than 45 research articles in reputed journals such as Scopus and WOS. She completed more than 10 research projects funded by the funding agencies AICTE, ICSSR, and DST. She mentored a few startups and founder and creator of a campus company. Her research areas of interest are consumer behaviour and sentiment analysis. She has presented more than 50 papers in conferences international and national as well as published two books. She is a Certified Trainer for behavioural training.

Dr Mohamed Ismail Mohamed Riyath is an Accomplished Academic and Lecturer in the Department of Accountancy and Finance at the Faculty of Management and Commerce, South Eastern University of Sri Lanka. He graduated with a BBA Specialisation in Finance, achieving First Class Honours, and went on to earn an MSc in Management from the University of Sri Jayewardenepura. Driven by his passion for research, he obtained his PhD in Finance from Sabaragamuwa University of Sri Lanka. With a focus on accountancy, finance, and multidisciplinary studies, he has published numerous research articles in respected academic journals and has presented his findings at prestigious international conferences. His dedication to professional development is evident through his membership in

The Institute of Certified Management Accountants of Sri Lanka and various other professional societies. Beyond his academic accomplishments, he has demonstrated strong leadership abilities, having served as Head of Department and holding key roles in research and innovation, as well as internal quality assurance.

Dr Mahalakshmi S. is currently working as an Assistant Professor in the Faculty of Management Studies, Jain Deemed to be University. She has completed her Engineering in Computer Science from VTU and her MBA in Marketing and Systems from Bangalore Central University. She has worked in the area of Project Management in CGI Information Systems and Management Consultants for 3.5 years. Later awarded with PhD for the topic 'Internet of Things (IoT) in Power Distribution Management'. She has over 25+ papers published in reputed Scopus-indexed journals. She has to her credit, for publishing, a book chapter for Springer on the Internet of Things (IoT). She has conducted and chaired various conferences. She is also a Content Developer for an online MBA course for Manipal University and well-developed courses for MBA in Jain University online programs. She is also a certified behavioural trainer.

Ajay Sidana has more than 22 years of comprehensive experience in the corporate and academic sectors. He is a dynamic and laborious personality, a shining star in his career so far and left good benchmarks to be achieved. He has worked with Mumbai-based corporate, associated with NSE listed company, namely Appcotax Securities Ltd. (A wholly owned company of Asian Paints). He served as Branch Head in Bajaj Capital Ltd. New Delhi and Punjab Locations, where he has handled the NRI/ HNI portfolios and their financial planning. He has been associated with wealth management, investment management and banking sector for more than 12 years. Having passion for teaching, training, and imparting quality education, he has been into academic sector too. He has also been associated with the leading educational group, affiliated with Kurukshetra University – Haryana, namely 'Shree Siddhivinayak Educational Trust's Group of Institutions', Distt. Yamuna Nagar, Haryana. He has participated in more than 100 seminars, workshops, national and international conferences, NMC, FDP and MDP and had hands-on experience in conducting national/international conferences and seminars. He is closely associated as a life time member with professional bodies Indian Commerce Association (ICA), All India Management Association (AIMA), and Association of Indian Management Scholars (AIMS International). He is a widely travelled person, and his extrovert personality and temperament give and him a winning edge.

Neeru Sidana has more than 12 years of comprehensive teaching experience in academic sector. She is a dynamic and laborious personality, a shining star in her career so far and has left good benchmarks to be achieved. She is currently associated with the Amity School of Economics (ASE), Amity University – Noida. She has worked with the leading educational group affiliated with Kurukshetra University. She has also served as Associate Professor – Economics Domain in

Lovely Professional University, Jalandhar-Punjab. Having passion for teaching and training, she has participated in more than 50 seminars, workshops, conferences, FDP and MDPs and presented research papers also in reputed national and international conferences. She is a widely travelled person, and her extrovert personality and temperament give her a winning edge.

Dr Shilpa Sindhu is an Associate Professor of Marketing and Entrepreneurship at Department of Management (MBA), Maharaja Surajmal Institute, Janakpuri, New Delhi. She has around 16 years of experience: 5 years in marketing and research of agri-products at NAFED; and more than 11 years in academia. Her area of specialization is Marketing with interests in Consumer Behavior, E-commerce, Retail Marketing, Services Marketing and Entrepreneurship. She has authored/co-authored 33+ research papers in reputed international and national journals which include Scopus, ABDC indexed and SSCI. She has attended and presented papers in more than 15 conferences and seminars at reputed institutions like IIT, MDI, IMC, AIMA, JNU, IPU, in the areas of marketing, entrepreneurship, e-tailing, rural marketing, and economics. She has authored five published book chapters and a Book with an International Publisher. She has supervised one doctoral research (awarded) and is guiding three research scholars in the area of Marketing/Advertising/Leadership. She is a Lifetime member of All India Management Association (AIMA), Indian Society of Agricultural Development & Policy, PAU, Ludhiana and Haryana Economic Association. She has been the key resource person for various sessions in National and International seminars and conferences. She holds PhD in Business Administration from Chaudhary Devi Lal University, Sirsa, MBA from VAMNICOM, Pune, BA (H) English from Panjab University, Chandigarh and is ASRB (ICAR)-NET qualified.

Mohamed Abdul Majeed Mohamed Siraju is a Senior Assistant Registrar attached to the Capital Works and Planning Division of the Eastern University, Sri Lanka. He has obtained a BBA Specialisation in Information System with 2nd class Honours from the South Eastern University of Sri Lanka. He holds a Post Graduate Diploma in Conflict Resolution and Peace Preparedness from the University of Bradford, UK and a Master of Business Administration from the University of Peradeniya, Sri Lanka. He is also a Member of the Institute of Management of Sri Lanka. He has published research articles in academic journals and international conferences in management information system, accountancy and finance, and multidisciplinary studies.

Rohit Sood is Assistant Professor at Department of Finance, Lovely Professional University, Phagwara, Punjab (India). He has an extensive academic and professional experience of more than 12 years. He has presented 5 papers at national and international conferences and 10 papers have been published in reputed international referred journals with high impact factors and indexing on Google Scholar, Scopus, BEIESP, Open J Gate, DOAJ, get CITED, dig, Higher Education Forum, Cite Factor, Index Copernicus, Search Sight, Scirus, UK Index, New

Jour, and Research Gate. Apart from this, he has attended various conferences, workshops, and seminars in different colleges. He has attended 10+ relevant training and courses for continuous learning. HE has attended more than 10 Faculty Development Programs. He is a life member of the Society of FSP and Global Risk Community.

Albulena Syla completed his Master's degree in 2023 at the University 'Haxhi Zeka' in Peja, Faculty of Business, Department of Banking and Finance. Albulena has experience in the field of scientific research and has participated in scientific conferences. Currently, Albulena is a Financial Officer at the trading company 'Nora Market' in Klina. In recent years, Albulena has attended a significant number of trainings in the fields of finance, business management, investment and accounting.

Dr Ravindra Tripathi is an Associate Professor in the Department of Humanities and Social Sciences, Motilal Nehru National Institute of Technology Allahabad. To his credit, he has more than 40 research papers in Scopus-indexed and ABDC-listed journals. His research area includes accountancy, microfinance, financial management, taxation and economics.

Dr Kiran Vazirani started her career as an Assistant Professor at Pioneer Institute of Management and has now been associated with Christ (Deemed to be University) with a total of eight years of teaching experience. She holds a Master's degree in Business Administration (MBA in Marketing and Finance). She completed her PhD from Janardhan Rai Nagar Rajasthan Vidyapeeth (Rajasthan). She has been actively participating in various conferences, faculty development programs, and workshops at the national and international levels. She also has to her credit several research papers published in reputed journals.

Dr Ashutosh Verma is currently working as Associate Professor at Khalsa College of Engineering & Technology, Amritsar. Dr Verma completed his MBA and Doctorate from Himachal Pradesh University, Shimla. He carries an extensive experience of more than 17 years (academic and corporate) and has been associated with companies of repute such as Torrent Pharmaceuticals Ltd, Fullerton India Credit Company and Nectar Lifesciences Ltd. prior to his academic debut. He is an active learner and has attended and participated in several seminars, conferences and workshops. Dr Verma has several journal articles and book chapters to his credit along with a recently published patent. Dr Verma has authored a book titled *Engaging HR strategies: Building a dynamic workforce for success in the modern Era*.

Dr Dippi Verma is a Doctorate in Finance with a rich experience of 18 years. She is a member of a panel of paper setters for many universities and autonomous institutions of Bangalore. She has authored a book on business ethics. She is a Reviewer for various journals, chaired many conferences, seminars, business

games, and panel discussions in various colleges and institutions. Apart from this, she facilitated training and development programs for students and faculty. She organised many workshops, seminars and events in the institutions. Also, published many research articles in various journals, presented papers and participated in conferences.

Amarpreet Singh Virdi is an Assistant Professor at the Department of Management Studies, Kumaun University Bhimtal Campus, Nainital (Uttarakhand). He has a corporate experience of working with a software company dealing with share market software based on Oracle database and forms. His research interests include the self-service technologies in banking, green product/marketing, adoption of technology by consumers, working patterns of NGOs, design thinking, Fintech, Artificial Intelligence in marketing and HR. He has published papers and book chapters with leading publishers like Sage, Inderscience, and Wiley and Scrivener.

Uma Shankar Yadav is working as a Senior Research Fellow in Humanities and Social Science at Motilal Nehru National Institute of Technology Allahabad, Prayagraj, India. He has published more than 50 research papers in reputed global journals and in the Ministry of MSME. He is currently Deputy Editor in Chief in *Bank and Policy Journal*, Science Education and Innovation in Modern Prospects, Associate Editor in 12 international journals, and editorial board member in 15 international journals at the global level. He is a Reviewer in many reputed SCOPUS indexed, ABDC B LISTED, journals like AER, JAST, SEDME, RMI, FIIB, and Vision (all are SAGE Publication Scopus Journals). He is serving as a pioneer in the handicraft industry in the district of Prayagraj India. He has three book chapters with Taylor Francis Group and Palgrave Macmillan. He has also published one book on the *Proposal of Global Handicraft Index* (Lambert Academic Publishing Maldoa).

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Foreword

The global economic trends seen in recent decades, especially in investment and trade, have tightened linkages between different countries and regions around the world. Since the early 1970s, internationalisation of enterprises has been considered as one of the main areas of study in international business. Internationalisation means an increasing involvement of firms in the international market, be it in just a specific segment of corporate operations or the entire operational activity. Internationalisation takes place when, for instance, enterprises establish diverse cross-border relationships with their counterparts in other countries, starting usually with relatively simple forms, such as exports and then progressing to much more advanced ones that include, i.e. FDIs. Whichever form is selected, any business that embarks on the path of internationalisation gets exposed to many more uncertainties than those at the domestic market. Hence business resilience becomes really important.



Over the past few years, companies have faced unprecedented uncertainties and turbulences in the global economy. Ambiguous and sometimes even contradictory conclusions drawn in the studies on business resilience, are, in my opinion, the fundamental reason why in-depth studies on the effects of global turbulences and their impact on international business should be conducted. Obviously, there is a shortage of conceptual and empirical studies in this field that would address, in particular, the pandemic and its effects, such as global value chain disruptions, new patterns for investment attractiveness, industrial revolution 4.0, environmental and climate changes, and, last but not least, the impact of wars and political conflicts on business activity at international level.

This book attempts to fill this gap by presenting, discussing, and analysing different aspects of a trendy managerial acronym: VUCA, which in short reflects on the *volatility*, *uncertainty*, *complexity*, and *ambiguity*. The book covers the most important aspects of the VUCA and highlights valuable insights on business resilience. In this book, readers will find both the conceptual chapters and empirical analysis. The book discusses interesting and original studies and is highly recommended to all those interested in business and diverse

aspects of its resilience, a subject so pertinent in our contemporary times filled with uncertainties. Personally, I am grateful for having an opportunity to read this book published by the prestigious publishing house. Congratulations to the Authors and Editors!

Dr hab. Tomasz Dorożyński, prof. UŁ
Head of Faculty's Centre for Training and Apprenticeship
Department of International Trade
Institute of Economics
Faculty of Economics and Sociology
University of Lodz (Poland)

Preface

During the COVID-19 pandemic, companies and governments faced a need to simultaneously address multiple competing priorities. One of the most difficult challenges is how to keep an economy running while shutting it down to protect inhabitants from illness. As some areas recover from the worst of the crisis, it's tempting to believe that the attention will shift back to a single issue. Leaders rapidly embraced advanced analytics and artificial intelligence (AI) prior to the COVID-19 pandemic's control over the world and with good reason. The annual economic worth of these talents is anticipated to range between \$9.5 trillion and \$15.4 trillion.

Increases in the amounts and types of uncertainty can have significant implications for the long-term viability of a company's advantages, the way companies learn and adapt, ways to manage innovation and knowledge, and the attractiveness of various strategies and organisational models. In today's world, company executives need strategic flexibility in volatility, uncertainty, complexity, and ambiguity (VUCA) to maintain a competitive advantage. VUCA is a business acronym that has only recently entered the business lexicon. VUCA are adjectives that have been used in various ways to characterise a situation that defies confident diagnosis and perplexes executives. Same as VUCA Business, analytics is also considered to be a big boon for businesses since it helps them achieve a competitive edge by providing timely insights, optimising business processes, and generating growth and innovation opportunities. Many strategic questions arise as firms begin their business analytics programmes. The need for expanded knowledge and use of new concepts and frameworks to deal with unpredictable and rapidly changing situations is addressed in this book, which covers VUCA and analytics. Business analytics is considered to be a big boon for businesses since it helps them achieve a competitive edge by providing timely insights, optimising business processes, and generating growth and innovation opportunities. Many strategic questions arise as firms begin their business analytics programmes. This comprehensive edited book is the first of its kind, designed to serve as a textbook for long-duration business VUCA analytics programs. This book brings together works by specialists from different disciplines and continents to reflect on the nexus between VUCA and analytics.

We discuss descriptive/diagnostic, predictive, and prescriptive analytics tools, as well as how they might be used to investigate 'black swan' occurrences like the COVID-19-related worldwide catastrophe and the ramifications for managers and policymakers.

The book spells out, first of all, what our VUCA world and analytics entail, and how it affects businesses, organisations, and societies as a whole. Secondly, the book develops new perspectives on the use of Analytics in the VUCA World of business. In this book, we'll explore what VUCA and analytics mean in more detail, and we'll look at how by combining the two, i.e. VUCA and Analytics can manage successfully in an unpredictable business world. The book explores the power of analytics in the VUCA world to make valuable predictions for the business and how successful leaders can design their crisis-management techniques using a new VUCA model in the form of VUCA analytics to develop a new perspective in smart decision making.

Distinguished Features of the proposed Book:

- State-of-the-art documentation of futuristic Analytics methods and applications right from beginner level to advanced level.
- Excellent reference material for academic scientists, researchers, and research scholars.
- Shows readers how to use analytics in the VUCA world of business to discover patterns and make predictions for all types of businesses.
- The proposed book will empower the rethinking processes, i.e. how we integrate Analytics in VUCA and use the resulting perceptions to advance decisions.
- This book will show new directions to stakeholders to select important services to allow integrated systems to perceive reason, learn, and act intelligently in real-life scenarios.

Kiran Sood
Chitkara Business School, Chitkara University, Punjab, India

Simon Grima
University of Malta, Malta; University of Latvia, Latvia

Chapter 1

Exploring Scientific Publications in the Field of Management in Tertiary Education Using Bibliometric Analysis

Adriana Grigorescu^{a,c}, Adriana AnaMaria Davidescu^{b,c}, Eduard Mihai Manta^d, Cristina Maria Geambasu^d and Ionel Magdalena^a

^a*National University of Political Studies and Public Administration, Bucharest, Romania*

^b*Department of Statistics and Econometrics, Bucharest University of Economic Studies, Bucharest, Romania*

^c*National Scientific Research Institute for Labour and Social Protection, Bucharest, Romania*

^d*Doctoral School of Cybernetics and Statistics, Bucharest University of Economic Studies Bucharest, Romania*

Abstract

Purpose: As a result of the transition from the paradigm of ‘knowledge and skills’ learning to the university of uncertainty, the concept of VUCA has grown for the revision of various adaptive models of educational practices.

Need for Study: The primary goal is to explore the research field of the educational system and learning environments; the investigation of scientific knowledge is enabled by bibliometric analysis, revealing through it the fluctuations of the literature.

Methodology: To better view the historical evolution of publications in the educational system field, two data samples were integrated into this study, with the focus of the chapter being on the authors, keywords, articles, journals, subject analysis, word cloud analysis, and cluster analysis. The first includes 1,620 Web of Science-recorded documents published between

1991 and 2022, and the second sample comprises 159 Scopus-recorded papers published between 1978 and 2022.

Findings: The first empirical results show that interest in this subject escalated around 2008. The main concerns around this research field are the labour market, teaching-learning, technology, economic development, the medical field, and sustainability. After 2020, a new subject took amplitude, seemingly connected to the educational system and learning environment, that subject being 'COVID-19.

Practical Implications: The relationship between authors, keywords, and sources is illustrated through Sankey diagrams, from which valuable information can be extracted: nine of the Scopus authors have published articles in the '*Journal of Higher Education Policy and Management*' documents that present the following list of keywords: 'higher education', 'education', 'management', 'leadership', and 'tertiary education'.

Keywords: VUICA; education management; bibliometric analysis; Scopus; WoS; tertiary education; higher education

1. Introduction

The world is currently experiencing major changes, and the definition of VUCA has created more and more signs of volatility, scepticism, intricacy, and ambiguity (Friedman, 2007). Rapidly expanding various changes have imposed new requirements on people, procedures, methods, frameworks, and structures, producing the ideal environment for personality development and the formation of active, mobile, and adaptive thought. Nearly every aspect of life is being impacted by these aspects of the new world, and higher education institutions are no exception.

The idea of how institutions govern certain areas of society is evolving. The construction and evolution of institutions, which set new concepts for the nature of universities and their topics of interaction, are the main areas of focus, not the effectiveness of their functioning. In view of the impact of the information revolution on the world economy, academics and practitioners reevaluate universities' growth patterns, their functions as public institutions, and concerns related to university reform (Barnett, 2012).

The perception of educational activities changes in the information society as the economy shifts from a traditional economy to a knowledge economy: from books to online courses, from using stereotypical research methods to forming scientific partnerships with businesses, and from conventional educational activities to adaptive learning formats as generations change. The university, which is a byproduct of the social, cultural, economic, and political contexts that interact and change over time, adapts to its surroundings and is more and more subject to the 'new norm' that is characterised by the reality of the present. In this situation, tertiary education management needs to be done well.

The ambition of this study is to analyse the academic field of higher education management, focusing on the variability of the literature and future research routes using scientific mappings to analyse scientific knowledge. To explore the historical growth of topics such as publications, papers were collected from the WoS (Web of Science) and Scopus platforms. The period covered by WoS is from 1991 to 2022, totalling 1,620 documents, while the period covered by Scopus is from 1978 to 2022, totalling 1,590 documents, all of which are filtered through the authors, the keywords they used, papers, sources, and subject analysis to explain the temporal growth terms of publications.

The motivation for this research was to provide an explanation of the research questions that followed.

RQ1. Who are the best scholars, and what are the best publications, institutes, and countries that study higher education management?

RQ2. Is research geographically concentrated and how interconnected?

RQ3. What are the most important keywords and relevant research clusters related to them?

RQ4. What is the conceptual, intellectual and social framework of primary research publications?

This chapter is divided into five parts. The first part focusses briefly on demonstrating the importance of the topic. The following part is dedicated to theoretical questions and reveals the most important conclusions on the subject. The third section presents the data and methods of operation, and the following section presents the empirical results. The conclusions are presented at the end of the chapter.

2. Literature Review

The world of VUCA is driving the revision of various models of adaptive educational practice in various countries around the world as it shifts from the educational framework of ‘knowledge and skills’ to the framework of ‘schools of uncertainty’ and the framework of ‘variable motivational developmental education’ (Asmolov, 2015). As modern systems study their quantitative and qualitative characteristics, the complexity of processes occurring around the world is increasing, and decision-making in developing environments in uncertainty is based on the need to make decisions. This is because even small changes in the system can have a significant and even completely unexpected effect.

The definition of assessment quality includes the effectiveness of the assessment process, a program of assessments in a course or curriculum, test questions, tasks, assessments, and exams, as well as the policies, procedures, and administration of the assessment process. At all levels of education, poor quality of assessment is an issue that has major repercussions. It has an impact on the relevance, accuracy,

and dependability of data on students' performance and progress for the goals of studying and selection (Anderson & Rogan, 2010; Hambleton & Murphy, 1992). Nonetheless, in higher education, the results of poor-quality assessments have a big influence on students' social interaction and behaviour. A student's ability to meet the demands society places on graduates, such as pursuing employment, employing cutting-edge information, critically thinking, engaging in lifelong learning, and fostering future innovation, will be determined in large part by the assessment findings.

Management of tertiary education refers to the process of planning, organising, controlling and coordinating resources and activities of tertiary institutions such as universities, colleges, and technical schools. Tertiary education is a crucial component of every country's educational system, and managing these institutions necessitates an amalgamation of educational and managerial abilities.

Kuusisto-Ek (2022) reviews the bibliography on strategic management in higher education institutions and provides an examination of key approaches and theories in this area. The topic explores the role of strategic management in improving institutional performance, competitiveness, and sustainability.

A thorough assessment of the literature by Manatos et al. (2017) shows how the field of excellence management in colleges and universities has developed over time. As a first addition, it provides a comprehensive analysis of research on the topic of higher education quality management. The next and most important addition is an analysis of the procedure for incorporating quality management into institutional global management systems. As the emphasis is primarily on quality management, the literature was analysed by distinguishing three essential levels in higher education integration: a process level, an organisational level, and a level of quality management principles.

At the beginning of the century, quality management has become gradually ingrained in an increasing number of organisations. This illustrates the growing realisation that quality management practices must be closely scrutinised if long-term development is to be achieved (i.e. that 'quality of management' is just as important as 'quality management'; Rosa & Amaral, 2007).

Although finding a particular and unequivocal interpretation of quality management may be difficult, if not impossible, it is generally approved to serve as a 'philosophy or approach to management' comprised of a 'set of mutually reinforcing principles, each of which is supported by a set of practises and techniques' (Dean & Bowen, 1994).

Indeed, as noted by Orton and Weick (1990), universities are loosely coupled systems that can be viewed as 'organized anarchies' due to their fragmented internal and external environments, motivated by 'dispersed stimuli or incompatible expectations' (Cohen et al., 1972; Deem, 1998; Orton & Weick, 1990; Weick, 1976).

However, there are signs that universities are becoming more interested in integrating their primary operations and, as a result, their management methods. A noteworthy example is the creation of instruments for categorising and ranking higher education institutions, as well as for including a wide variety of characteristics and performance indicators (Duque, 2013; Van Vught & Westerheijden, 2010).

[Bilimoria et al. \(2020\)](#) identify key strategies for higher education institutions to navigate the VUCA environment, including strategic planning, organisational learning, leadership development, and collaboration with industry and other stakeholders. The chapter concludes by highlighting the importance of adapting to the VUCA environment and developing the skills and capacities necessary to thrive in an uncertain and rapidly changing world.

3. Data and Methodology

To inspect the idea of management in tertiary education, the investigation uses a bibliometric analysis, using a collection of terms devoted to a topic in the literature, such as ‘tertiary education’/‘higher education’/‘post-graduate’, and ‘management’. The WoS database included the years 1991–2022, and the Scopus database covered the years 1978–2022. The search language used was English. A journal classification filter was used to get higher journal content accuracy. Therefore, the categories of journals filtered were Education and Educational Research, Management, Economics, Business, and Multidisciplinary Studies.

With the advent of academic databases, such as the WoS, the number of publications based on bibliometrics has increased, and access to bibliometric data has been relatively easy. Such data can be efficiently analysed using software for bibliographic analysis, such as Leximancer, Gephi, and VOS Viewer, and academic interest in bibliographic analysis has lately risen.

This has resulted in the adoption of bibliometric approaches in fields such as finance ([Yu et al., 2018](#)), marketing ([Donthu et al., 2020](#)), e-commerce ([Kumar et al., 2021](#)), sustainable development ([Davidescu et al., 2022](#)), business ([Kumar et al., 2021](#)), human resources ([Andersen, 2019](#)), and management ([Zupic & Čater, 2015](#)). Bibliometric analysis investigations span from examining publications to compiling trends and examining the intellectual, conceptual, or social structure of the research subject.

Throughout the investigation, the entire record for each paper received during the investigation was concatenated and transformed as plain text files before being loaded into the Bibliometrix package and Biblioshiny programme. Bibliometrix can analyse large amounts of data and analyse scientific publications. Biblioshiny, a Shiny data analysis tool, is built around the Bibliometrix algorithm ([Aria & Cucurullo, 2017](#)). Biblioshiny is a web-based tool that allows individuals to do bibliometric and visual studies on papers ([Grima et al., 2020, 2021](#); [Hicham et al., 2023](#)).

The research technique is made up of four major parts: data collecting and design of the study, processing the data, visualisation, and conclusion. It makes use of the Bibliometrix and Biblioshiny packages to depict scientometric metrics related to management in tertiary education. The method is based on a descriptive bibliometric assessment of the field’s development, the most productive nations, the most cited articles, the most prolific sources, the effect of authors, the relationship between keywords, authors, journals, and trend topics.

The management in tertiary education intellectual, conceptual, and social structure, as well as the issue of economic and financial performance study, are then examined using network and cluster analysis. The social structure looks at

the collaboration network that spans institutions, authors, and countries, whereas the intellectual structure looks at the co-citation network (research articles, academic authors, and scientific publications). Authors, abstract word clouds, and publications are all grouped together in cluster analysis using coupling. Descriptive and network data are used to create citation analysis.

Common citation analysis methods include bibliographic coupling, co-citation, and co-word. When two records quote the same work, there is bibliographic coupling (Kessler, 1963), but co-citation (Small, 1973) identifies the most citing records. According to the co-occurrence of terms in article abstracts, keywords, or titles, the co-word study (Callon et al., 1983) analyses the network structure over time. Citing related words encourages temporal growth in a discipline where conceptual frameworks are developed through textual discussion (Marty, 1964).

4. Empirical Results

According to Tables 1 and 2, this study is based on 1,620 documents indexed on the WoS platform and 1,590 documents that are indexed on the Scopus platform. All are presented under different forms such as articles (WoS – 856; Scopus – 1,246), books (WoS – 1; Scopus – 10), book chapters (WoS – 58; Scopus – 64), editorial materials (WoS – 6; Scopus – 3), proceedings papers (WoS – 629), and reviews (WoS – 14; Scopus – 76). Scopus documents were published in 741 different sources during a time span of 44 years, from 1978 to 2022, and their authors used 3,932 keywords and 55,024 references. With regard to the WoS documents, all were published in 787 different sources, in a time span of 31 years, starting in 1997 until 2022, and the authors used 4,535 keywords and 52,392 references.

Table 1. Main Information Regarding the Documents – WoS.

Description	Results
Timespan	1991:2022
Sources (Journals, Books, etc.)	787
Documents	1,620
Mean years from publication	6.06
Mean citations per documents	6.61
Mean citations per year per doc	0.9594
References	52,392
article	856
book chapter	58
article; data paper	6
article; early access	39
article; retracted publication	1
book	1

Table 1. (Continued)

Description	Results
editorial material	6
proceedings paper	638
review	15
Keywords Plus (ID)	1,925
Author's Keywords (DE)	4,535
Authors	4,583
Author Appearances	5,000
Authors of single-authored documents	351
Authors of multi-authored documents	4,232
Single-authored documents	367
Documents per Author	0.353
Authors per Document	2.83
Co-Authors per Documents	3.09
Collaboration Index	3.38

Source: Created by the authors.

Table 2. Main Information Regarding the Documents – Scopus.

Description	Results
Timespan	1978:2022
Sources (Journals, Books, etc.)	741
Documents	1,590
Mean years from publication	8.76
Mean citations per documents	11.64
Mean citations per year per doc	1.278
References	55,024
article	1,249
book	10
book chapter	64
conference paper	165
conference review	14
data paper	1
editorial	3

(Continued)

Table 2. (Continued)

Description	Results
erratum	4
note	3
review	76
short survey	1
Keywords Plus (ID)	4,125
Author's Keywords (DE)	3,932
Authors	4,580
Author Appearances	4,925
Authors of single-authored documents	395
Authors of multi-authored documents	4,185
Single-authored documents	435
Documents per Author	0.347
Authors per Document	2.88
Co-Authors per Documents	3.1
Collaboration Index	3.62

Source: Created by the authors.

4.1. Growth of Papers

In terms of the document evolution, the annual scientific production of the WoS papers, depicted in Fig. 1, remained relatively stable until the year 2005 when a noticeable increase in production occurred, the number of documents in the following years demonstrating an average growth rate of 14.69%. The number of Scopus indexed documents, presented in Fig. 2, registered an increase in 1990, but the annual growth rate, which was 11.51%, was lower than the growth rate of the WoS documents.

4.2. Importance of Sources

As mentioned before, the analysed documents have been published in 787 and 741 different sources according to the WoS and Scopus databases, respectively. Figs. 3 and 4 show the 20 most relevant sources for both databases (WoS and Scopus). It can be seen that for the WoS documents, 'Tertiary Education and Management' represents the most relevant source, having a number of 132 articles published in it. The next most relevant is 'PLOS One', having 70 published papers, and the third place is occupied by 'Advanced Science Letters' with 25 papers. Looking at Scopus data, the most relevant source, with 268 published articles is 'Journal of Higher Policy and Management', then the 'Journal of Surgical Education', with 74 documents, and in third place is 'PLOS One' that has 58 papers.