Contributions to Management Science

Nezameddin Faghih

Digital Entrepreneurship

Exploring Alertness, Orientation, and Innovation in the Digital Economy

Springer

Contributions to Management Science

The series *Contributions to Management Science* contains research publications in all fields of business and management science. These publications are primarily monographs and multiple author works containing new research results, and also feature selected conference-based publications are also considered. The focus of the series lies in presenting the development of latest theoretical and empirical research across different viewpoints.

This book series is indexed in Scopus.

Nezameddin Faghih
Editor

Digital Entrepreneurship

Exploring Alertness, Orientation, and Innovation in the Digital Economy

Springer

Editor
Nezameddin Faghih
UNESCO Chair Professor Emeritus
Cambridge, MA, USA

ISSN 1431-1941 ISSN 2197-716X (electronic)
Contributions to Management Science
ISBN 978-3-031-58358-2 ISBN 978-3-031-58359-9 (eBook)
https://doi.org/10.1007/978-3-031-58359-9

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

This book is dedicated to all the historical figures who had revolutionary impact on applied mathematics *and* engineering*, particularly the prominent* engineers *who were also effectively* applied mathematicians *in their respective historical roles and made seminal contributions to the process of* digital transformation*, whose influence ultimately shaped the* Digital Age*, an era that is thus indebted to* applied mathematics:

***Menelaus*:** *Menelaus* of Alexandria (70–140), Greek mathematician and astronomer, the first to recognize *geodesics* on a curved surface as natural analogs of *straight lines*. He wrote treatises on the *Elements of Geometry*, *Triangles* and *Spherical Propositions* ("Sphaerica"). *Sphaerica* dealt with the *geometry* of the *sphere* and its application to astronomical measurements and *calculations*.

***Diophantus*:** *Diophantus* of Alexandria (200/214–284/298), Greek mathematician who contributed to the *number theory* and wrote a series of "Arithmetica" treatises dealing with equations with integer coefficients and finding integer solutions.

***Khwarizmi*:** Muhammad ibn Musa al-*Khwarizmi* (780–850), Persian polymath with influential works in mathematics, whose name and contributions gave rise to the *numeral system*, and the terms "algorithm," "algorism," and "digit," and he is referred to as the founding father of *algebra* (derived from the title of his book on the subject, *Al-Jabr*), *trigonometry* (producing accurate *sine* and *cosine* tables and the first table of *tangents*), *arithmetic*, *computation*, *astronomy*, *cartography*, and *geography*.

***Buzjani (Buzhgani)*:** Abu al-Wafa *Buzjani* (*Buzhgani*, 940–998), Persian mathematician and astronomer who made important innovations in *trigonometry* and *business arithmetic* (including the first use of *negative numbers*), compiled the *sines* and *tangents* tables (at 15′ intervals), introduced the *secant* and *cosecant* functions, defined the *tangent function*, and established several *trigonometric* identities in their modern form.

***Karaji*:** Abu Bakr Muḥammad ibn al Ṭasan al-*Karaji* (953–1029), Persian mathematician and engineer, whose three main treatises in *mathematics* are: *Innovations in Arithmetic*, *The Glory of Algebra*, and *Proficiency in Arithmetic*. Karaji wrote in *mathematics* and *engineering* and is known as the first to present the theory of *algebraic calculus* and to

begin the liberation of *algebra* from *geometry*. He systematically studied *algebraic monomials* with *power* (*exponent*) and was the first to define rules for them. His work on *algebraic polynomials* provided rules for *algebraic operations* for *addition*, *subtraction*, and *multiplication* of *polynomials*, although it did not include division. He also introduced the idea of *reasoning* by *mathematical induction*. Furthermore, although the importance of a *general binomial theorem* had been noted by Khayyam, Karaji had already discovered the *triangular arrangement* of the *coefficients of the binomial expansion*, later known as *Pascal's triangle*. Finally, in the book *Extraction of Hidden Waters* Karaji pointed out the *sphericity of the earth* long before *Galilei* and *Kepler*.

***Khayyam*:** Ghiyath al-Din Abu al-Fath Umar ibn Ibrahim *Khayyam* Nishaburi (known as *Omar Khayyam*, 1048–1131), Persian polymath, known for his contributions to mathematics, astronomy, philosophy, and poetry. As a mathematician, Khayyam is most notable for his contributions to understanding of the *parallel postulate* and *classification* as well as *solving cubic equations* through *geometric solutions* with *conic intersections*. In fact, Khayyam applied *algebra* to *geometry*, and his work is seen as an attempt to *unify algebra and geometry*. In particular, he also contributed to the *Euclidean* and *non-Euclidean geometry*, theoretical study of the concept of *real numbers*, *irrational numbers*, the *binomial theorem*, and extracting the *nth root of natural numbers*.

***Nasireddin Tusi*:** Muhammad ibn Muhammad ibn al-Hasan al-*Tusi* also known as Khwajeh Nasir al-Din al-*Tusi* (1201–1274), Persian polymath, astronomer, scientist, architect, philosopher, and a well-published author who has written on *mathematics*, *engineering*, *ethics*, and other topics. *Nasireddin Tusi* excelled in *logic* and *mathematics*, often credited as the creator of *trigonometry* as a *mathematical discipline*, provided *proofs* for the *law* of *sines* and *tangents* for *plane* and *spherical triangles*, and was the first to write extensively about *trigonometry* as distinct and independent from astronomy, and thus *trigonometry* achieved the status of an independent branch of *mathematics* distinct from astronomy.

***Kashi (Kashani)*:** Ghiyath al-Din Jamshid Masud al-*Kashi* (or al-*Kashani*, 1380–1429), Persian mathematician and astronomer, credited with the *law of cosines*, which in French is known as "Théorème d'Al-Kashi" (*Theorem of Al-Kashi*), as he was the first to explicitly state *the law of cosines* in a form suitable for *triangulation.* His other contributions are *The Key to Arithmetic*, *The Treatise on the "Circumference," The Treatise of Chord and Sine*, and computation of values for π and *sin 1°*, which were the most accurate approximations in his time (16-digit accuracy in the decimal system) and were not surpassed for centuries. He also invented a *mechanical planetary computer* and the *Plate of Conjunctions* (an *analog computer* used to determine the time of day at which *planetary conjunctions* occur and to perform *linear interpolation*).

***Napier (Neper)*:** John *Napier* (Latinized name: Ioannes *Neper*, 1550–1617), Scottish landowner, mathematician, physicist, and astronomer, who is famous for introducing the *logarithms* and using the *decimal point* in *arithmetic and mathematics.*

***Descartes*:** René *Descartes* (1596–1650), French philosopher, scientist, and mathematician, who, although widely recognized as an important figure in the rise of modern science and philosophy, had mathematics central to his methodology of study. His influence in mathematics is very significant, and the *Cartesian coordinate system* was also named after him. Descartes connected *geometry* and *algebra* to *analytic geometry* and provided the basis for the *calculus*. He is known as the father of *analytic geometry.*

***Newton*:** Sir Isaac *Newton* (1642–1726/27), English polymath, mathematician, astronomer, physicist, natural philosopher, and author, whose fundamental contributions, with great genius and skill, considerably advanced every branch of *mathematics* up to that time. In *mathematics*, *Newton* is credited for his significant contributions to *calculus*, development of *infinitesimal calculus*, *power series*, use of *fractional indices*, *generalization* of the *binomial theorem* (to *non-integer exponents*), development of a method for approximating *roots of a function*, *Newton's identities* (*Girard–Newton formulae*), *Newton's method* (*Newton–Raphson method*), classification of *cubic plane curves* (*polynomials* of degree three in

two variables), approximation of partial sums of *harmonic series* by *logarithm*, and *finite difference theory*.

***Leibniz*:** Gottfried Wilhelm *Leibniz* (1646–1716), German polymath, scientist, mathematician, philosopher, and diplomat, and a prominent figure in the history of mathematics, who made major contributions to *technology*, anticipating concepts that appeared much later, especially in *probability theory* and *computer science*.

***Bernoulli*:** Jacob *Bernoulli* (1654–1705) Swiss mathematician, one of the founders of the *calculus of variations*, who discovered the fundamental mathematical constant e (the number *Euler* later called e). He also had important contributions to the field of *probability* (where he derived the first version of the *law of large numbers*).

***Euler*:** Leonhard *Euler* (1707–1783), Swiss mathematician, logician, physicist, engineer, astronomer, and geographer, who made many ground-breaking discoveries in *mathematics* such as *graph theory*, *topology*, *analytic number theory*, *complex analysis*, *infinitesimal calculus*, and introduced many *modern mathematical terms, concepts, and symbols*, such as $f(x)$ for the value of a *function*, π (the ratio of a circle's circumference to its diameter), e (the base of *natural logarithm*), i (the *imaginary* unit), Σ (for *summation*), and Δ (for *finite differences*).

***Laplace*:** Pierre-Simon Marquis de *Laplace* (1749–1827), French polymath who is known as one of the greatest scientists of all time and who made significant contributions to the

development of mathematics, engineering, statistics, astronomy, physics, and philosophy. In addition to formulating *Laplace's equation*, he initiated *Laplacian differential operator* and *Laplace transform*, which play an important role in the development of many branches of engineering and science.

***Fourier*:** Jean-Baptiste Joseph *Fourier* (1768–1830), French mathematician and physicist, best known for inventing Fourier series, Fourier transform, Fourier analysis, and harmonic analysis, which play a significant role in the development of engineering, science, and technology.

***Gauss*:** Johann Carl Friedrich Gauss (1777–1855), German mathematician, physicist, and geodesist, who made significant contributions to mathematics and statistics.

***Boole*:** George *Boole* (1815–1864), British mathematician, logician, and philosopher, who worked in the fields of *differential equations* and *algebraic logic*. *Boolean logic* and *Boolean algebra*, which were introduced by George Boole, played a fundamental role in the development of *digital electronics*, all modern *programming languages*, *set theory*, *statistics*, and the foundations of the *Information Age*.

***Wiener*:** Norbert *Wiener* (1894–1964), American mathematician, computer scientist, and philosopher who is the creator of *cybernetics* and *theorized intelligent behavior* as a result of *feedback mechanisms* that can be *simulated by machines*, which was an important initial step toward the development of modern *artificial intelligence*. He also

played a fundamental and leading role in the study of *mathematical* and *random noise processes*, which are of great importance in *information*, *communication*, and *control systems*.

***Shannon*:** Claude Elwood *Shannon* (1916–2001), American mathematician, electrical engineer, computer scientist, and cryptographer who demonstrated the *electrical applications* of *Boolean algebra* in constructing *logical numerical relationships* and developed the theory behind *digital circuits* and *digital computing* that changed *digital circuit design* from an art to a science. A turning point from classical cryptography to *modern cryptography* and the *mathematical theory of communication*, his seminal contributions played a fundamental role in the foundations of the *Information Age*, making him the father of *Information Theory*.

Preface

Nezameddin Faghih

Generations have passed away, and this is a new generation:
the moon is the same moon, the water is not the same water
When letters are drawn as digital figures:
rocks become as wax for love of them.
Their numbers are in the likeness of waves:
the wind has brought them in numbers
Sell your old ones in this unique fast-paced market
and buy new ones to get sterling kingdom
This newness has oldness as its opposite
but that newness is without opposite or like or number
Who can really find such markets
where you can buy a rose in that rose garden
Who, really, can find markets like this
where with a single rose you can buy rose-gardens
A hundred groves come to you for a seed
a hundred mines for a nickel
Every one, then, has a separate customer
in this market of one does what one pleases (Rumi. 1207–1273)

Focusing on some emerging features of digital entrepreneurship and examining alertness, orientation and innovation in the digital economy, this volume provides a deeper discussion to highlight the importance of new aspects of digital entrepreneurship and research progress in this field. It covers a wide range of topics such as promoting the growth of the digital economy through the alertness of entrepreneurs; predicting entrepreneurial performance through the lens of entrepreneurial orientation and digital adoption with a machine learning approach; proposing a guide to emphasize the key aspects of social media analytics; examining the digital pathology ecosystem and key drivers for investment in more efficient disease diagnosis and monitoring; exploring how humane orientation contributes to the intention to use digital entrepreneurship with a gender perspective; examining digital social entrepreneurship and innovation opportunities in developing economies; exploring the challenges and opportunities of digital Pentepreneurship; and finally, presenting a qualitative exploration of digital Pentecostal entrepreneurship strategies and

motivations. Each chapter of the book presents some features and emerging aspects of digitalization and digital transformation in economy, innovation, and entrepreneurship, which can be useful not only for researchers and academics but also for entrepreneurs and policymakers.

Digitalization is recognized as one of the main trends in the change and transformation of life, society, economy, and business. Digitalization creates changes for firms by applying digital technologies in organizations or operational environments. The impact of digitalization will be greater and greater, and several authors have compared it to the industrial revolution. Digitalization can be considered a much more fundamental change than simply digitizing existing products or work processes. The term digitization is technically used to refer to the process or act of digitizing, which is the conversion of analog signals or data (e.g., text, images, and video) into digital form for further use. However, digitalization and digital transformation are commonly used to refer to the changes associated with the application of digital technology in all facets and aspects of human life and society. Digitalization is also known as the transformation of existing services or products into digital forms and variants, resulting in advantages over tangible products. Digitalization may also refer to the adoption or increased use of computer or digital technology by an industry, organization, economy, etc. For instance, health management can exemplify the difference between digitization and digitalization. If the Health Department were to digitalize its process, it would implement digital health reporting forms instead of paper forms and allow for submission of reports and orders in electronic format. If this method is correct, patients do not need to carry paper and test results. According to these definitions, digital transformation may be defined as changes in roles, work practices and business propositions resulting from the adoption of digital technologies in organizations or in the operational environment of organizations. This refers to multi-level changes, including: process level (applying new digital tools and simplifying processes by reducing manual steps), organization level (providing new services and abandoning old methods and providing existing services in new ways), business area level (changing roles and value chains in ecosystems and society), and society level (change in society structures, for example, type of work, means of influencing decision-making). However, digitalization is not only about converting existing processes to digital versions but also about rethinking current operations from new perspectives made possible by digital technology. The benefits of digitalization are enormous, especially in economic growth. Digitalization allows governments to work more efficiently and transparently, and countries that are at the most advanced stage of digitalization enjoy far greater economic benefits than countries that are at an early stage. Digitalization also has a significant proven impact on reducing unemployment, improving quality of life and increasing citizens' access to public services.

Tomorrow's growth relies on the development of the digital economy, which is becoming more popular every day and has emerged as a strong force in boosting the growth of various economies. By strengthening the digital economy, an economic system expands and supports national development in various fields that aim to promote the well-being of society. It is a critical subject to study and has become a

national priority around the world. The whole world agrees with these claims, but it deserves a more accurate diagnosis to open new perspectives for businesses. Its concepts require further development for deeper advancement of relevant knowledge to obtain new theories and concepts that can be improved at higher levels. However, a growing trend is observable in the digital economy, and the economy of the twenty-first century has become an economy of information, knowledge, and intangibles. In addition, the opportunities and challenges of the digital economy are important for the economic systems of many countries. Globalization has now entered a new phase of qualitative development, characterized by the advancement of ICT (information and communication technology), the spread and expansion of the Internet and mobile communications. As a result, it has united the world into a single communication system and created an integrated and unified information and financial space. These are caused by the convergence of economics, socio-cultural, and technological phenomena that are currently changing the traditional forms of commercial exchanges. All these events indicate new trends in the development of the socio-economic structure of societies. Furthermore, the concepts and issues of "cognitive capitalism" and "creative class" have also been raised and discussed, and thus, close attention to the digital economy is critical to strengthening and growing economic systems. In such cases, extensive theoretical and empirical research, quantitative and qualitative studies should be considered to gain a clearer insight and perspective.

The digital economy is actually about 30 years old and arose out of the US government's decision to open up the Internet to civilian applications at a time when personal computers and smartphones are rapidly proliferating in homes and businesses. New ways of production and consumption emerged and gradually spread across all sectors, and the entire economy is now going digital. All sectors must therefore reckon with the emergence of one or more digital companies that will seriously question the organization and functioning of companies and markets. However, the digital economy is associated with dynamic efficiency, new activities and products, and economic growth occurs when different actors develop and deploy new technologies resulting from combinations of new ideas; the more connectivity, the more possible combinations and new technologies. Moreover, the digital economy can create fruitful feedback loops between education, research, knowledge, global access to digital technologies, and productive forces, in terms of long-term competitive advantage in societies due to the impact of digital forms of economic activities. This will lead to a change in culture and traditional approaches to education, which will ultimately benefit the rapid establishment of the digital economy. Nonetheless, linking economic and political imperatives to technological innovations in each country can accelerate the growth of the digital economy. This tremendous progress must be planned and organized by the private sector, monitored and controlled by the government, and assessed and evaluated by academia and civil society. The digital economy can provide numerous opportunities for education, information exchange, transparent trade and business, rapid technological innovation, international cooperation, increasing the productivity of existing industries, accelerating economic development, widespread use in all economic sectors, market

expansion, shaping new markets and industries, competitive advantage through existing digital technologies, optimization of internal business processes, digitalization, digital convergence, industrial integration, long-term economic growth, and high-quality economic development. It should also be noted that the management of human capital development, which is the basic engine of the development of the economic system, is vital in the integration of information technology in modern society. Additionally, the technology-based digital economy is one of the most important efforts to create opportunities for the development of a modern economic system that uses advanced technologies. The term digital economy widely supports the improvement of the national economy and the development and deployment of knowledge and technology.

Currently, information technology (IT) has brought significant achievements in industry and services. For instance, the digital economy provides digital technologies to various sectors of the economy, which is referred to as the digitalization of the economy. The digital economy includes growing economic activities that provide goods and services through digital technologies and electronic communication. The digital economy is fundamentally a driver of innovation and relies heavily on data and information technology. It aims to increase economic activities by developing and using digital data and ICT, supported by digital computing technology developed on various digital platforms through the development of Internet-based business. For some economists, the integration of knowledge, its investment in the company through the development of networks, the identification, collection, processing of information about and for customers, is central to the process of generating wealth and is the birth of the digital economy.

Undoubtedly, information and communication technology (ICT) has fundamentally changed the structures of the economy, that is, the value system, at a highly growing rate. Humans usually live in mental spaces, and the physical world is mostly presented to humans indirectly, that is, mediated by the media. Digital media are changing people's perception and understanding of the world with increasing speed and power. There seems to be a constant tendency towards perfectionism in the division of labor and the endless reconstruction of the value network, as well as the invention of new products and the emergence of new societies. Such processes are not unique to the digital economy but are simply the operating engine of an ongoing civilizational process that has operated throughout history.

Understanding the main features and characteristics of the digital economy is important since its evolution has a fundamental impact on economies and the creation of economic values. The digital economy includes three main components: supporting infrastructure, e-business processes (how to do business), and e-commerce transactions (selling goods and services online).

Digitalization is playing a transformative role in the global economy, especially by changing the entrepreneurial process. Digitalization provides new opportunities for entrepreneurs to start businesses and sell their services and products worldwide. They also influence entrepreneurial intention, which is defined as an individual's personal belief to take specific actions in the process of exploiting new business opportunities. However, as one of the most important consequences, recent

developments in the digital economy and digital technologies create new opportunities and are a significant driver for innovation and new value creation for entrepreneurs. In recent years, the world has experienced rapid development of digital technologies, which has resulted in the emergence of digital entrepreneurship and the creation of new digital businesses. Digital technology is a catalyst for structural and high-impact transformations, a real lever for change and development. The digital entrepreneurship ecosystem is rapidly evolving at an accelerated pace, and academia seems poised to catch up and keep pace with the latest developments. Digital entrepreneurship involves establishing a new business with an innovative business idea within the digital economy, using an electronic platform to offer products and services based on purely electronic value creation.

However, digital entrepreneurship is a subset of entrepreneurship in which part or all of what is physical in traditional organizations has been digitized, and as a result, it can be considered the reconciliation and adaptation of traditional entrepreneurship with a new approach to creating and doing business in the digital age.

Furthermore, the discussion of digitalizing innovation process has gained momentum in academia and scientific literature. The exponential growth of digital technologies is the main source of improvement in many business processes, which plays an important role in the field of innovation. It should be noted that in the last decade, digital technologies and digitalization have dramatically transformed the ways of life and business. Firms are transforming digitally not only as an approach to rethinking what their customers might like but also as a way to create operating models to take full advantage of new possibilities and thus outpace their competitors. In this perspective, innovation is critical for community development, business growth, and maintaining a competitive edge in markets. Moreover, the innovation process is still an interactive, uncertain, iterative, path-dependent, multitasking, and context-specific undertaking. Therefore, the key issue in business is to identify the right approaches to implement the innovation process, from the initial ideation stage to market diffusion. In this context, the term digital innovation is conceptualized as the creation (and subsequent change) in offerings, models, or business processes in the market that result from the application of digital technologies, and as a result, digital innovation management can refer to practices, principles, and the processes that underpin the effective orchestration and coordination of digital innovation.

However, digital transformation as a dominant theme and issue in the global economy is the process of adopting, implementing, and integrating digital technology in all areas and aspects of a business or activity in society. This can include changes in roles, work practices, and business propositions resulting from the application of digital technologies in organizations or in the operational environment of organizations. It fundamentally changes the way we operate and deliver value, as well as a cultural shift that requires constant challenging of the status quo and remains perplexing for academics and practitioners; that is, digital transformation breaks down familiar industrial, organizational, and geographic boundaries.

Focusing on and demonstrating the value of the digital economy, digital innovation, and digital entrepreneurship, this volume initiates a deeper conversation through representative chapters on new concepts and emerging trends in digital

transformation research and its perspectives in economics, innovation, and entrepreneurship. This book covers various aspects and features of digital transformation and addresses recent issues and future challenges in the field. The book consists of nine chapters that deal with digital transformation, focusing on the digital economy, digital innovation, and digital entrepreneurship.

It is hoped that this book will be of interest to a wide range of academics, researchers, policymakers, entrepreneurs, and global audiences and can be a useful reference in research on the emerging features and development of digitalization, digital transformation, digital economy, digital innovation, and digital entrepreneurship. Furthermore, it is hoped that this book can provide creative discussions, add insights, and align with scholarly and intellectual interests in understanding mainstream research and current trends in digitalization, digital transformation, digital economy, digital innovation, and digital entrepreneurship.

Acknowledgments

The editor would like to express his sincere gratitude to Lorraine Klimowich for her great efforts in the publication process of this book. He would also like to wholeheartedly thank all chapter authors and reviewers who have devoted their time, effort, and generosity as without their generous support completing this volume would not have been possible: Agu Godswill Agu, Nunzia Auletta, Md. Abul Kalam Azad, Samaneh Bahrololoum, Cristina Blanco-González-Tejero, Ebrahim Bonyadi, Alireza Bostani, Agnitra Roy Choudhury, Mario Coccia, Mozhgan Danesh, Parsa Haghighatgoo, Maryam Khosravi, Francisco Liñán, Maria Belinda Mandigma, Enrique Caño Marín, Hamed Motaghi, Masoumeh Moterased, Fatemeh Homa Rezazadeh, Aidin Salamzadeh, Leyla Sarfaraz, Lida Sarreshtehdari, Jackson Tan, Jan Wiers, Bello Sani Yahuza.

Contents

An Introduction to *Digital Entrepreneurship*: *Exploring Alertness, Orientation, and Innovation in the Digital Economy* 1
Nezameddin Faghih
References 20

Examining the Role of Entrepreneurial Alertness in the Growth of the Digital Economy 29
Maryam Khosravi and Nezameddin Faghih
1 Introduction 30
2 Literature Review 32
3 Methodology and Data Analysis 34
4 Results 35
4.1 Alert Entrepreneurs' Cognition 36
4.2 A Cognition Based on Ideology and Ethics 39
4.3 Entrepreneurial Networking and Values in Digital Economy 41
4.4 Bottom-Up and Top-Down Policies 44
5 Contributions 48
5.1 Sensation, Imagination, and Judgment of Alert Entrepreneurs 48
5.2 Entrepreneurial Alertness and Justice Economy 50
5.3 Reconsidering Institutional Theory 51
6 Conclusion 52
References 52

Predicting Entrepreneurial Performance Through the Lens of Entrepreneurial Orientation and Digital Adoption: A Machine Learning Approach 63
Mozhgan Danesh, Masoumeh Moterased, Kamal Sakhdari, and Nezameddin Faghih
1 Introduction 64
2 Theoretical Framework 66

2.1 Entrepreneurial Orientation: Innovativeness, Pro-activeness, and Risk-Taking . . . 66
2.2 Digital Adoption . . . 66
2.3 Entrepreneurial Orientation and Digital Adoption . . . 67
2.4 Digital Adoption, Entrepreneurial Orientation, and Entrepreneurial Performance . . . 68
3 Methodology . . . 69
3.1 Sample and Data Collection . . . 70
3.2 Variable Definition . . . 72
3.3 Descriptive Statistics . . . 74
3.4 Correlation . . . 75
3.5 XGBoost Algorithm . . . 76
4 Finding and Results from the XGBoost Regression Algorithm . . . 77
4.1 Feature Importance . . . 77
4.2 XGBoost Regression Model Results . . . 78
5 Conclusions and Discussion . . . 79
6 Contributions, Limitations, and Future Research . . . 81
References . . . 82

Social Media Analytics for Digital Entrepreneurs . . . 89
C. Blanco-González-Tejero, E. Cano-Marin, and S. Ribeiro-Navarrete
1 Introduction . . . 90
2 Theoretical Background . . . 91
2.1 Social Media Analytics . . . 92
2.2 The Influence of Social Media in the Entrepreneurial Ecosystem . . . 92
2.3 Social Media Platforms . . . 94
3 Social Media Analytics Assessment Guide . . . 95
3.1 Design . . . 95
3.2 Data Mining . . . 98
3.3 Insights Generation . . . 99
4 Discussion, Implications, and Research Agenda . . . 103
5 Conclusions . . . 104
References . . . 105

Digital Pathology Ecosystem: Basic Elements to Revolutionize the Diagnosis and Monitoring of Diseases in Health Sector . . . 111
Mario Coccia
1 Introduction . . . 112
2 Theoretical Background . . . 113
3 Research Methodology . . . 115
4 Results . . . 117
4.1 Basic Elements for Structuring an Ecosystem that Supports the Development, Implementation, and Diffusion of Digital Pathology Technology in Health Sector . . . 117

4.2 Operation of Processes in Digital Pathology Ecosystem 120
5 Discussions 121
6 Conclusions and Prospects 123
References 125

How Does Humane Orientation Contribute to Digital Entrepreneurship Use Intention? A Gender Perspective 135
G. Önder, J. Fernández-Serrano, and F. Liñán
1 Introduction 136
2 Theoretical Background: Behavioral Intention Toward ICT and Humane Orientation 137
2.1 Performance Expectancy—Behavioral Intention to Use ICT 138
2.2 Effort Expectancy—Behavioral Intention to Use ICT 139
2.3 Social Influence—Behavioral Intention to Use ICT 139
2.4 Humane Entrepreneurship—Behavioral Intention to Use ICT 140
2.5 Gender Moderating the Humane Entrepreneurship—Behavioral Intention to Use ICT Relationship 140
3 Methodology 141
3.1 Sample and Data Collection 141
3.2 Variables 142
3.3 Data Analysis 144
4 Empirical Results 144
4.1 Assessment of the Measurement Model 144
4.2 Assessment of the Structural Model 144
5 Discussion 147
6 Conclusion 148
References 150

Digital Social Entrepreneurship: Innovation Opportunities in Developing Economies 155
Nunzia Auletta, Patricia Monteferrante, and Aramis Rodríguez-Orosz
1 Introduction 156
2 From Technological Ventures to Digital Ventures: Opportunities for Social Entrepreneurship 157
2.1 Social Entrepreneurship 157
2.2 Technological Entrepreneurship 159
2.3 Digital Entrepreneurship 161
3 Method 162
3.1 Research Context and Case Selection 163
3.2 Data Collection and Analysis 163
4 Case Setting 164
4.1 Venezuelan Economic and Social Environment 164
4.2 Venezuelan Entrepreneurial Ecosystem 165
5 Case Studies 167
5.1 Asistensi: Telemedicine, Migrants, and Remittances 168
5.2 LaWawa: Forecasting Transportation Demand and Needs 171
5.3 Pana TECH: Personal Safety on the Road 174

6 From Technological Social Ventures to Digital Social Ventures 177
7 Conclusions: Toward a Model for Digital Social Entrepreneurship 180
References 182

Digital Pentepreneurship in Nigeria: Challenges and Opportunities 187
Agu Godswill Agu, Aidin Salamzadeh, Omotosho Tade Daniel, Uche Dickson Ben, Okocha Ebere Rejoice, Agu Okoro Agu, and Eke Chukwuma Nnate
1 Introduction 188
2 Literature Review and Theoretical Framework 190
2.1 Digital Pentecostal Entrepreneurship in Nigeria 190
2.2 Challenges and Opportunities for Digital Entrepreneurship: Empirical Review 192
2.3 Theoretical Framework 193
3 Methodology 194
3.1 Sample and Data Collection 195
3.2 Data Analysis Procedures 195
4 Results and Discussions 196
4.1 Descriptive Characteristics of Participants 196
4.2 Challenges Facing Digital Pentepreneurs 197
4.3 Digital Pentepreneurship Opportunities 198
5 Conclusions 200
References 201

Digital Pentecostal Entrepreneurship Strategies and Motivations in Nigeria: A Qualitative Exploration 205
Agu Godswill Agu, Tade Daniel Omotosho, Aidin Salamzadeh, Onwubiko Ngozi Dike, G. Etuk Samuel, and Okereafor Geff Etochkwu
1 Introduction 206
2 Literature Review and Theoretical Framework 208
2.1 Digital Entrepreneurship in Nigeria 208
2.2 Strategies and Motivations for Digital Entrepreneurship: Empirical Review 210
2.3 Theoretical Framework 211
3 Methodologies 213
3.1 Sample and Data Collection 214
3.2 Data Analysis Technique 214
4 Results and Discussions 215
4.1 Descriptive Characteristics of Participants 215
4.2 Digital Strategies Adopted by Pentepreneurs 216
4.3 Motivations for Digital Pentepreneurship 217
5 Conclusions 219
References 220

Index 227