Contributions to Management Science

Nezameddin Faghih
Amir Forouharfar *Editors*

Strategic Entrepreneurship

Perspectives on Dynamics, Theories, and Practices

Springer

Contributions to Management Science

More information about this series at http://www.springer.com/series/1505

Nezameddin Faghih • Amir Forouharfar
Editors

Strategic Entrepreneurship

Perspectives on Dynamics, Theories, and Practices

Springer

Editors
Nezameddin Faghih
Cambridge, MA, USA

Amir Forouharfar
Shiraz, Iran

ISSN 1431-1941 ISSN 2197-716X (electronic)
Contributions to Management Science
ISBN 978-3-030-86031-8 ISBN 978-3-030-86032-5 (eBook)
https://doi.org/10.1007/978-3-030-86032-5

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 the loving memory of Mohammad Khan Enayat (1925–1964), an intellectual, a thinker, an outstanding Mayor, a great executive manager, and administrative head of the municipality, who served as a superior strategist aligned with domestic social aspirations, striving to plan for development of Estahban (Fars, Iran), the land of figs and saffron.

Foreword

The dramatic expansion of research on business creation over the past three decades reflects the recognition of its critical role in economic growth and adaptation. This has been accompanied by greater attention from policy makers seeking to facilitate business creation. They often try to improve the preparation of potential entrepreneurs and the context in which they implement new firms.

Entrepreneurial success involves assessments of opportunities and developing appropriate strategies. Established businesses are more effective when they identify and plan for changes in their political, economic, and competitive contexts—the focus of strategic planning. Both emerging and established businesses are more successful when they focus on and systematically evaluate future opportunities. The major differences are in the resources and assets available for implementing a new venture.

While relatively recent, research on the interface and overlap of entrepreneurial strategies and corporate future planning has drawn considerable attention from different scholarly communities. Published output continues to grow and the scope has expanded. An overview of the current status of strategic entrepreneurship research will be of service to those emphasizing this important feature of the entrepreneurial process. This overview makes an important contribution in this regard.

Steamboat Springs, CO, USA — Paul Davidson Reynolds

Acknowledgments

The editors would like to express their sincere gratitude to Lorraine Klimowich for her great efforts in the publication process of this book, and to all chapter authors as without their generous contributions completing this volume would not have been possible. They would also like to wholeheartedly thank those who have devoted their time, efforts, support, and generosity throughout the chapter review process: Şuay Nilhan Açıkalın, Adeleke Oladapo Banwo, Osman Bayraktar, Vincent Blok, Ebrahim Bonyadi, Alireza Bostani, Rossella Canestrino, Milenka Linneth Argote Cusi, Léo-Paul Dana, Mozhgan Danesh, Petra Dannecker, Ege Erkoçak, Veit Etzold, Elizabeth Gatewood, Diala Kabbara, Jonas Löher, Thomas S. Lyons, Belinda Mandigma, Valentinas Navickas, Maliheh Omidvar, Maria Orero-Blat, Zahoor Ahmad Paray, Shahamak Rezaei, Domingo Ribeiro-Soriano, Leyla Sarfaraz, Lida Sarreshtehdari, Mahshid Sazegar, Jonathan M. Scott, Masoumeh Hosseinzadeh Shahri, Serge Francis Simen, Dalia Streimikiene, Jackson J. Tan, Mansoureh Vahab Zadeh.

Contents

An Introduction to Strategic Entrepreneurship: Perspectives on the Dynamics, Theories, and Practices

Nezameddin Faghih and Amir Forouharfar

Abstract This edited volume on strategic entrepreneurship embraces well-timed topics as diverse as a proposed contextual strategic entrepreneurship model of development, the fourth industrial revolution and HRM, the informal enterprises, under-theorized aspects of social entrepreneurship strategies, the concept of time in strategy formulation, corporate entrepreneurship strategy and internationalization, complexity theory and its application to entrepreneurship and administration, strategic usage of crowdfunding platforms in modern businesses, technology-based entrepreneurship, strategic views to the current turbulent markets, women-led entrepreneurial firms and finally strategic entrepreneurial succession for family businesses. Through each single topic the authors, who are experts in the theme they picked, have tried to unfold an emerging aspect in strategic entrepreneurship which could benefit not only the academic readers but also the entrepreneurship practitioners on the ground.

Keywords Strategic Entrepreneurship (SE) · Competitive Strategic Entrepreneurship · Strategic Entrepreneurship Pitching · Corporate Entrepreneurship Strategy (CES) · Social Entrepreneurship Strategy · Strategic Entrepreneurial Succession · Group of Seven (G7) Economies · Global Entrepreneurship Monitor (GEM) · Global Innovation Index (GII) · The Fourth Industrial Revolution · Big Data · Human Resources · Informal Enterprises · Strategic Timing Ontology (Being) · Strategic Timing Epistemology (Knowledge) · Strategic Timing Axiology (Evaluation) · Social and Humane Entrepreneurship · Internationalization · Social Entrepreneurship Skills · Complexity Theory · Crowdfunding Platforms · Technology-Based Entrepreneurship · Venture Inception · Growth Loops · Women-Led Entrepreneurial Firms · Entrepreneurial Families

N. Faghih (✉)
UNESCO Chair Professor Emeritus, Cambridge, MA, USA

A. Forouharfar
Independent Scholar, Shiraz, Iran

N. Faghih, A. Forouharfar (eds.), *Strategic Entrepreneurship*, Contributions to Management Science, https://doi.org/10.1007/978-3-030-86032-5_1

Entrepreneurship has been identified, associated, and conjugated with creative destruction, risk, economic change, and reward. Yet strategic entrepreneurship, considered as the intersection of strategy and entrepreneurship, a balance of advantage-seeking and opportunity-seeking behavior, a coalition of exploitation and exploration; can potentially represent a more systemic and structured approach to entrepreneurial activities. Nevertheless, the evolving nature, the essence, and description of this construct, within the conceptual, theoretical, and practical perspectives, raise question regarding the underlying elements of strategic entrepreneurship. Fundamentally, however, strategic entrepreneurship analyses involve a combination of distinct entrepreneurial actions (with a focus on opportunity) and actions creating competitive advantage (with an essence of strategic management). Consequently, the complementary arguments between entrepreneurs and strategic management have led to the emergence, development, education, and research in strategic entrepreneurship (Hawley, 1901; Knight, 1921; Schumpeter, 1934; McClelland, 1962; Lumpkin & Dess, 1996; Hitt et al., 2001a, b; Ireland et al., 2001; Hitt et al., 2017; Meyer et al., 2002; Ireland et al., 2003; Ireland & Webb, 2007; Luke, 2009; Ibrahim et al., 2016; Westgren & Wuebker, 2019; Hughes et al., 2020).

Contradiction, complexity, chaos, and change characterize the twenty-first century entrepreneurship and business dynamics, identified by competition, risk, unpredictability, and innovative managerial mindsets, which have a dominant influence on firm success in this century. In such environmental instability, markets tend to exhibit growing, competitive, complex, uncertain, unpredictable, chaotic, and turbulent dynamics, attributed to open systems (with input/output interactions and interchanges in the form of information, material, or energy) sensitive to initial conditions. Within such competitive environments, markets undergo permanent change and evolution, with increased risk, unpredictability, and turbulence, demanding innovative management, in conjunction with entrepreneurial mindsets (Bettis & Hitt, 1995; Faghih, 2000; Hitt & Reed, 2000; Hitt et al., 2001a, b; Ireland et al., 2001; Hitt et al., 2017; Faghih, 2003; Faghih, 2005; Kuratko & Audretsch, 2009; Kuratko & Audretsch, 2013; Coccia, 2019).

Nevertheless, entrepreneurial activities, referred to as opportunity-seeking processes, have traditionally been identified, associated, and integrated with innovation, risk and returns, which particularly involve with dynamic, competitive and environments (Hawley, 1901; Knight, 1921; Schumpeter, 1934; Schumpeter, 1954; Miller, 1983; Schendel & Hitt, 2007; Luke, 2009).

However, since the mid-1980s, researchers explored entrepreneurship as a partner for strategy and began to examine a new structured approach to entrepreneurship research by combining and convolving entrepreneurship and strategy. Especially, noting that strategy and strategic management involve with competitive advantage and value creation, it could also represent a natural relationship and an important balance for entrepreneurship. Thus, debates, attentions and arguments also turned to associated economic benefits of entrepreneurship, and that strategic entrepreneurship is the convolution of entrepreneurial and strategic perspectives to create wealth (Storey, 1994; Davis et al., 1996; Dess et al., 1997; Hitt et al., 2001a,

b; Venkataraman & Sarasvathy, 2001; Schendel & Hitt, 2007; Luke, 2009; Ibrahim et al., 2016).

The book, divided into three parts, consists of 14 chapters, including this introductory chapter.

Part I contains three chapters devoted to strategic entrepreneurship dynamics and mechanisms. The first chapter in this part of the book develops a taxonomy of economic development ranking within the Group of Seven (G7) economies and proposes a strategic entrepreneurship model of development. Today, strategic entrepreneurship has been purposefully solidifying the entrepreneurial activities in each industry to obtain sustainable development. The strategic management philosophy can be applied to the nexus of entrepreneurship, innovation, and economy to foster development and competitiveness in the entrepreneurial sector. Also, the pivotal elements of the strategic management model can be replicated with the critical components of entrepreneurship along with the integration of indices of innovation and economy. Performing a development analysis during such replication modeling allows us to understand and anticipate economic behaviors with the final aim of implementing competitive strategies for a robust economy. The primary objective of this chapter is to introduce a strategic entrepreneurship theoretical model with the use of taxonomic analysis to rank the Group of Seven (G7) economies regarding their development factors. The main data consist of two indicators from Global Entrepreneurship Monitor (GEM)—physical infrastructure and internal market dynamics—and four indices from Global Innovation Index (GII)—infrastructure, market sophistication, business sophistication, and creative goods and services. The methodology includes performing a numerical taxonomy on the GEM indicators and GII indices to calculate a development factor for each G7 economy. The results consist of development ranking of the G7 economies, from 2015 to 2019, in two separate cases: one set of results without the consideration of GDP in the taxonomic analysis stages, and another set of results with the consideration of GDP. The strategic entrepreneurship framework demonstrated in this study suggests strategic choices that policymakers, business executives, and stakeholders in innovative technologies, can make to achieve and maintain a top-notch competitive advantage.

The impact of the Fourth Industrial Revolution and big data on human resources is also studied by considering it in Italian companies. The Fourth Industrial Revolution poses new challenges and increasing market competition for human resources required with new skills. This chapter examines the impact of big data on human resources in many companies and some universities in Italy. In this research, companies are divided into two main groups, i.e., leading companies that use or produce big data and analytics, and ICT (Information and Communications Technology) companies that offer services related to big data. Through interviews and questionnaires, the research attempts to identify certain challenges faced by companies and territorial strategies required to improve the skills and retain their human resources. This includes the need to channel and adequately blend tacit knowledge with the new codified knowledge born out of the enabling technologies,

to increase employee loyalty and membership toward the company to minimize attrition to competition.

Moreover, the logic of production in the informal enterprises and its implications for the public policy is studied by presenting the case of Bolivia. The informal sector has been the subject of research and study of economic science for more than five decades. In this sense, the logic of production of informal companies has been a subject of wide discussion due to the structure of productive heterogeneity in developing countries. Accordingly, the chapter investigates the production logic of informal companies, differentiating it from the production logic of traditional capitalist companies. According to this, a different form of production emerges against the capitalist one whose main objective is not the accumulation of capital, but the satisfaction of basic needs and recognition of members in the informal productive unit; thus, showing itself as an antithesis of conventional capitalist accumulation logic. To achieve this objective, the chapter addresses the case of informal commerce and service companies in Bolivia, a country characterized by a strong presence of informal sector in its economy.

Part II consists of five chapters focusing on strategic entrepreneurship concepts and theories. It begins by considering a metaphorical approach to the fundamental grounds in strategic timing, which is a contribution to the ontological perception, axiological evaluation, and epistemological classification of timing in strategic management. Thus, the first chapter of this part of the book focuses on addressing the fundamental grounds of strategic timing. Since timing is the result of our cognitive faculty, the chapter uses cognitive metaphors with a philosophical approach to discuss the ontology (being), epistemology (knowledge) and axiology (evaluation) of strategic timing as its objectives. The ontologically cognitive perception of time provides the necessary grounds to attribute *contextual, contingent, comparative, directional, futuristic, optimal, progressive,* and *perspectival* characteristics to strategic timing. Moreover, the epistemological discussions of strategic timing with the intention to provide a solid classification for strategic timing led to the *5P's of strategic timing: predictive timing, preventative timing, preemptive timing, proactive timing,* and *promotive timing*. All the 5P's have an early but a futuristic orientation since all of them try to respond to the strategic time contingencies in advance; that is, before its emergence on the ground. Additionally, the chapter analyzes and unfolds the axiological methods of strategists for evaluating the most optimal and fittest timing under either *intuitionist* or *positivist* approaches of timing evaluation. Finally, the chapter ends with the recommendation of a *Strategic Timekeeping System* (STS), analogous to the scientifically proved mechanism of the brain, for the timekeeping to benefit the pluralist and all-embracing knowledge of competent organizational strategists from different strategic backgrounds, contexts, and expertise to be able to deal with not only ever-changing but also uncertainty-stricken temporal issues of the strategic management in our time. The intention behind STS is organizing the collective endeavor of the strategists within all the departments of an organization to acquire an insightful synergism that potentially leads to a *competitive timing* with the highest *harmony*, *adaptability*, and *decisiveness*, which could result in a maximum strategic *timeliness*, *flexibility,* and *swiftness*, respectively.

Additionally, going on a quest for social and humane intentions within strategic entrepreneurship is approached by a systematic literature review, in the second chapter of this part of the book. It proposes a systematic literature review of Strategic Entrepreneurship (SE), aiming to improve the existing understanding of the issue, with reference both to the development of the notion over the time and the way it relates to other fields of study, like Social and Humane Entrepreneurship. For this investigation, *Scopus* and *Web of Science (WoS)* are used as databases. Then 183 articles (93 full papers and 90 abstracts) are finally selected and examined according to the following analytical categories: (1) Years in which the articles were published; (2) Countries where authors have published research on strategic entrepreneurship; (3) Journals in which authors have published their research; and (4) Type of adopted methodology. A thematic analysis of the literature is subsequently performed in order to answer the following research questions: How has the concept of SE evolved since its first appearance in management research? In what areas of knowledge was SE more extensively investigated so far? How does SE relate to other concepts like Social and Humane Entrepreneurship? However, according to the research findings, a growing interest in strategic entrepreneurship has been developing for the last 20 years, especially with reference to the two main areas of knowledge: *Innovation* and *Knowledge Spillover.* By contrast, SE was never examined in the field of humanistic management, and never referred to firms' simultaneous pursuing of both economic and social aims. In order to fill the existing gap, an integrative framework for further research is finally proposed.

Moreover, in the next chapter, Corporate Entrepreneurship Strategy and Internationalization is also approached by a literature review. It is to be noted that in recent years, the number of research papers concerning entrepreneurial activities carried out by organizations and companies has notably increased. In many cases, this rising interest has been associated with studying organizational performance based on the elements of the Corporate Entrepreneurship Strategy (CES). This has not been the case, however, in the field of internationalization processes. The purpose of this chapter is to analyze the specific impact of CES internal elements on the outcomes of these internationalization processes. The most relevant papers on this topic are examined based on a systematic literature review. The positive effect of these elements on the internationalization outcomes of the organizations is shown.

Furthermore, the fourth chapter of this part of the book considers a crucial element of social entrepreneurship strategy by defining, measuring, and developing social entrepreneurship skills. In this theoretical and conceptual chapter, it is attempted to answer the questions: What are the essential skills of social entrepreneurship? How can these skills be measured in a way that permits them to be developed? How can the answers to these two questions be used to develop successful social entrepreneurs? The chapter posits a conceptual framework for developing social entrepreneurship skills, identifies the skills that must be developed, and offers a tool for guiding the development process through a clinical skills assessment. It concludes by discussing the implications of this approach for social entrepreneurship development/education and strategy.

How strategic entrepreneurship benefits public administration is analyzed with a potential application of complexity theory, in the next chapter. Sustainable development is a tool to build shared prosperity for today and future societies. This chapter studies the correlation between features of public administration and sustainable development. The aim is to outline the role of strategic entrepreneurship in public administration through the lens of complexity theory from a critical perspective. From the perspective of the epistemological dimension of complexity, the multiple linear regression (MLR) analysis is used to assess the correlation between three features of public administration (*effectiveness*, *accountability*, and *inclusiveness*) and *levels of prosperity* delivered in 102 selected countries, as well as their correlation with *entrepreneurship*. Based on the findings, effectiveness and accountability are of great importance, and strategic entrepreneurship appears as an emergent attractor characterizing how an administration works to build up prosperity. The results will help public policymakers and planners build sustainable capacity to improve public administration performance and facilitate the path of prosperity for societies.

Part III includes five chapters pertinent to strategic entrepreneurship practices. It begins by exploring the strategic entrepreneurship pitching on crowdfunding platforms, with a traction toward emerging advanced technologies. The emerging technologies such as virtual reality, artificial intelligence, machine learning, 5G, Internet-of-Things (IoT), and other technological advancements are drastically shaping different industries, including entrepreneurs and their businesses, as well as the investors of entrepreneurial firms. Consequently, a growing number of entrepreneurs have incorporated these technological advancements, i.e., advanced technologies, in their start-up ventures seeking investment from crowdfunding platforms. Due to the complex and emerging nature of these advanced technologies, little is known about whether involving these latest technology transformations in a crowdfunding project could create a strategic advantage over other projects in their conversations about funding acquisition with the general public. Through the empirical analyses of project descriptions and success rate from the data of two leading crowdfunding platforms, this chapter analyzes the strategic importance of highlighting a single or multiple trendy topics on the funding outcomes—both the amount of funding pledged and the additional resources pledged to a project. The results suggest that crowdfunding projects featuring a trendy technology transformation are likely to achieve more funding, thus a better success rate of the project proposal, compared to the non-trendy projects. Such findings expand the current theoretical understanding on technological crowdfunding and provide strategic implications for the entrepreneurs in term of the composition of their fundraising conversations.

Besides, the relationship between technology-based entrepreneurship, venture inception, entrepreneurial background, and aspirations are studied in the next chapter. Technology-based entrepreneurship has been studied from a range of perspectives. However, this research area still needs further development. This chapter conducts qualitative analysis of seven cases of start-ups in the Spanish entrepreneurial ecosystem. To do so, it conducts semi-open interviews, the information from

which is contrasted with data from the venture's website in order to triangulate the information. The chapter aims to detect relationships between the background and aspirations of entrepreneurs and the inception type of their ventures. Here, inception type refers to the system or structure within which an entrepreneur chooses to develop a venture. The results show that novice entrepreneurs accumulate a strong industry background but lack entrepreneurial experience and business knowledge. Hence, they usually choose to nurture their ventures within a business ecosystem. By contrast, habitual entrepreneurs already have entrepreneurial experience in the sector, so they fit more closely with the theoretical concept of the 'garage' or lone entrepreneur.

Moreover, critical innovation strategies for achieving competitive strategic entrepreneurship, in ever-increasing turbulent markets, is examined in the third chapter of this part of the book. Strategic entrepreneurship is an activity that enables the firm to take advantage of important opportunities or to cope with consequential environmental threats. Innovation is one of the critical elements of strategic entrepreneurship that supports strategies of firms to achieve and/or sustain competitive advantage in turbulent markets. This contribution presents different innovation strategies for strategic entrepreneurship to increase and/or sustain competitiveness and performance of firms in markets, and also how strategic entrepreneurship could be accompanied by crisis management.

The fourth chapter of this part of the book explores growth loops from perceptions of growth to motivations for growth, in high-growth women-led entrepreneurial firms. The growth of a firm depends on its adaptability (Barringer et al., 2005), or, in other words, on the evolution of its business model and its capacity to generate a flow, if not of innovations, then at least of innovative suggestions shared throughout the employee corpus (Foss & Saebi, 2017). Amongst the factors at the origin of this flux, it should be mentioned in particular, the entrepreneurs' regulatory role, and interactions between the head of the firm and employees based on the way in which they steer the company (Redien-Collot & Radu, 2014; Fust et al., 2018). The entrepreneurs' growing cognitive skills in applying performance monitoring systems is rarely questioned. The study reported in this chapter concludes that, for a significant sample of women founders and heads of high-growth firms, there are three steering options generating three types of fairly remarkable swathes of innovative propositions on the part of employees. Two of these steering models present fairly radical sociocognitive breaks with traditional models. In view of these results, it is impossible to see female leadership as a single (repressed) alternative to masculine models of entrepreneurial success. Women entrepreneurial emancipation has several implications in the understanding of the strategic deployment of their firms. This chapter explores how the spirit of emancipation drives women's entrepreneurship, including their strategic choices and the freedom to innovate experienced by their employees (Rindova et al., 2009).

Furthermore, rethinking strategic entrepreneurial succession and unfolding hidden aspects of the entrepreneurial families' iceberg constitute the theme of the next chapter, which elaborates on the metamorphosis from the traditional family enterprise to the strategically innovative family enterprise. The shift from a traditional

understanding of succession to a more innovative way of understanding succession is also addressed in this chapter. Succession is not analyzed from a rational, conscious, and objective perspective, but rather from an innovative, reflective, open, and creative one. The chapter concludes with a recommendation to rethink the widely adopted iceberg analogy used in understanding the perceivable and hidden processes in succession. The strategically innovative thinker in an era of new Renaissance, who places the individual person at the forefront embracing creative ignorance, flips the traditional iceberg bringing all that is not visible to the forefront, placing human beings and the family sub-system at the center of comprehension and knowledge.

Finally, circa 2380 years ago, *Xenophon* (b. ca. 430-25 b.c.e., d. after 356), the Athenian writer, military leader, and strategist, in his book *Cyropaedia*, a semi-fictional biography of *Cyrus the Great* (559–29 b.c.e.), founder of the Achaemenid empire, sketching a dialogue between *Cambyses*—the father—and *Cyrus*—the son—on the topic that "tactics and maneuvers and drill were only a small part of all that is implied in generalship" wrote: "And pray what will be the use of tactics to an army without supplies, without health, without discipline, without knowledge of those arts and inventions that are of use in war?" (*Xenophon*—Book I—Sect. 14). Strategy in any context, either military or organizational, which is the topic of this edited volume, needs to be exerted and accompanied with other prerequisites; otherwise it falls short and ends in catastrophe or fiasco. Strategy, among others, requires insight, knowledge, supplies, discipline, vision and sensible tactical moves in any scenarios. Although it is a large-scale goal-oriented roadmap for acquiring a particular goal, it calls for a prior condition and its true understanding, which inherently stem from the rigorous study of the strategic dynamics, theories, practices and contexts in order to either form or construct them, or at least to learn our weaknesses vs. strengths, our threats vs. opportunities and ultimately formulating the fittest strategy upon (Xenophon, cr. 370 BC/ 1914; Mazzei, 2018).

It is hoped that this book, presenting perspectives on the dynamics, theories, and practices of strategic entrepreneurship, is appealing to a wide spectrum of global audience and academics and can provide a useful reference work in strategic entrepreneurship education and research. Academics, researchers, and scholars, who teach and conduct research in strategic entrepreneurship, have contributed chapters and addressed the most recent issues in this field. Thus, it is also hoped that the book can provide creative discussions and align well with scholarly and intellectual interests in strategic entrepreneurship.

It should also be noted that facts, information, opinions, views, findings, conclusions, comments, positions and strategies expressed by the contributors and chapter authors are theirs alone, and do not necessarily reflect the views, opinions, positions or strategies of the editors of this contributed volume, and do not constitute endorsement or approval by the editors. Authors and contributors are responsible for their citing of sources and the accuracy of their references and bibliographies. The editors of this book cannot be held responsible for any errors or for any consequences arising from the use of the information contained in the chapters or any lacks or possible violations of third parties' rights. Although every effort is made by the

editors to see that no inaccurate or misleading data, opinion or statements appear in this contributed volume, the data, their use and interpretations, and opinions appearing in the chapters are the sole responsibility of the authors and contributors concerned. The editors accept no liability whatsoever for the consequences of any such inaccurate or misleading data, information, opinion, or statements.

References

Barringer, B., Foard, J., & Neubaum, D. (2005). A quantitative content analysis of the characteristics of rapid-growth firms and their founders. *Journal of Business Venturing, 20*(5), 663–687.

Bettis, R. A., & Hitt, M. A. (1995). The new competitive landscape. *Strategic Management Journal, 16*, 7–19.

Coccia, M. (2019). Why do nations produce science advances and new technology? *Technology in Society, 59*, 1–9. https://doi.org/10.1016/j.techsoc.2019.03.007

Davis, S., Haltiwanger, J., & Schuh, S. (1996). *Job creation and destruction*. MIT Press.

Dess, G. G., Lumpkin, G. T., & Covin, J. G. (1997). Entrepreneurial strategy making and firm performance: Tests of contingency and configurational models. *Strategic Management Journal, 18*(9), 677–695.

Faghih, N. (2000). *On the transfer of science and technology*. Navid Publications.

Faghih, N. (2003). *Dynamic systems: Principles and identification*. SAMT Publications.

Faghih, N. (2005). *A cryptography of change and development in human systems*. Navid Publications.

Foss, N. J., & Saebi, T. (2017). Fifteen years of research on business model innovation. *Journal of Management, 43*, 200–227.

Fust, A. P., Jenert, T., & Winkler, C. (2018). Experiential or self-regulated learning: A critical reflection of entrepreneurial learning process. *Entrepreneurship Research Journal, 8*(2), 1–11.

Hawley, F. B. (1901). Final objections to the risk theory of profit: A reply. *The Quarterly Journal of Economics, 15*(4), 603–620.

Hitt, M. A., Ireland, R. D., Camp, S. M., & Sexton, D. L. (2001a). Guest editors' introduction to the special issue strategic entrepreneurship: Entrepreneurial strategies for wealth creation. *Strategic Management Journal, 22*(6–7), 479–491.

Hitt, M. A., Ireland, R. D., Camp, S. M., & Sexton, D. L. (2017). Strategic entrepreneurship: Integrating entrepreneurial and strategic management perspectives. In M. A. Hitt, R. D. Ireland, S. M. Camp, & D. L. Sexton (Eds.), *Strategic entrepreneurship: Creating a new mindset* (pp. 1–16). Blackwell. https://doi.org/10.1002/9781405164085.ch1

Hitt, M. A., & Reed, T. S. (2000). Entrepreneurship in the new competitive landscape. In K. A. Heppard & G. Dale Meyer (Eds.), *Entrepreneurship as strategy competing on the entrepreneurial edge* (pp. 23–48). SAGE Publications.

Hitt, M. A., Ireland, R. D., Camp, S. M., & Sexton, D. L. (2001b). Strategic entrepreneurship: Entrepreneurial strategies for wealth creation. *Strategic Management Journal, 22*(special issue), 479–491.

Hughes, M., Hughes, P., Morgan, R. E., Hodgkinson, I. R., & Lee, Y. (2020). Strategic entrepreneurship behaviour and the innovation ambidexterity of young technology-based firms in incubators. *International Small Business Journal, 39*(3), 202–227.

Ibrahim, N., Rizal, A. M., & Mahadi, B. (2016). Strategic entrepreneurship in family business. *International Journal of Innovation and Business Strategy, 6*(2), 45–59.

Ireland, R. D., Hitt, M. A., Camp, S. M., & Sexton, D. L. (2001). Integrating entrepreneurship and strategic management actions to create firm wealth. *Academy of Management Executive, 15*(1), 49–63.

Ireland, R. D., Hitt, M. A., & Sirmon, D. G. (2003). A model of strategic entrepreneurship: The construct and its dimensions. *Journal of Management, 29*(6), 963–989.

Ireland, R. D., & Webb, J. W. (2007). Strategic entrepreneurship: Creating competitive advantage through streams of innovation. *Business Horizons, 50*(1), 49–59.

Knight, F. (1921). Risk, uncertainty, and profit. http://www.econlib.org.library/Knight/knRUP1.html

Kuratko, D. F., & Audretsch, D. B. (2009). Strategic entrepreneurship: Exploring different perspectives of an emerging concept. *Entrepreneurship Theory and Practice, 33*(1), 1–17.

Kuratko, D. F., & Audretsch, D. B. (2013). Clarifying the domains of corporate entrepreneurship. *International Entrepreneurship and Management Journal, 9*(3), 323–335.

Luke, B. (2009). Strategic entrepreneurship in New Zealand's state-owned enterprises: Underlying elements and financial implications (Doctoral dissertation, Auckland University of Technology).

Lumpkin, G. T., & Dess, G. G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of Management Review, 21*(1), 135–172.

Mazzei, M. J. (2018). Strategic entrepreneurship: Content, process, context, and outcomes. *International Entrepreneurship and Management Journal, 14*(3), 657–670.

McClelland, D. C. (1962). Business drive and national achievement. *Harvard Business Review, 40*(4), 99–103.

Meyer, G. D., Neck, H. M., & Meeks, M. D. (2002). The entrepreneurship-strategic management interface. In M. A. Hitt, R. Duane Ireland, S. Michael Camp, & D. L. Sexton (Eds.), *Strategic entrepreneurship: Creating a new mindset* (pp. 19–44). Blackwell.

Miller, D. (1983). The correlates of entrepreneurship in three types of firms. *Management Science, 29*(7), 770–792.

Redien-Collot, R., & Radu, M. (2014). SME's leaders: Building collective cognition and competences to trigger positive strategic outcomes. In K. Todorov & D. Smallbone (Eds.), *Handbook of research on strategic Management in Small and Medium Enterprises* (pp. 148–158). IGI Global.

Rindova, V., Barry, D., & Ketchen, D. (2009). Introduction to a special topic forum on entrepreneuring as emancipation. *The Academy of Management Review, 34*(3), 477–491.

Schendel, D., & Hitt, M. A. (2007). Comments from the editors: Introduction to volume 1. *Strategic Entrepreneurship Journal, 1*(1/2), 1–6.

Schumpeter, J. (1934). *The theory of economic development*. Transaction Publishers.

Schumpeter, J. (1954). *History of economic analysis*. Allen & Unwin.

Storey, D. (1994). *Understanding the small business sector*. Routledge.

Venkataraman, S., & Sarasvathy, S. (2001). Strategy and entrepreneurship: Outlines of an untold story. In M. A. Hitt, R. Freeman, & J. Harrison (Eds.), *The Blackwell handbook of strategic management* (pp. 650–668). Blackwell.

Westgren, R., & Wuebker, R. (2019). An economic model of strategic entrepreneurship. *Strategic Entrepreneurship Journal, 13*(4), 507–528.

Xenophon (cr. 370 BC/ 1914). *Cyropaedia: The education of Cyrus*, translated by Henry Graham Dakyns. J. M. Dent and Sons.

Part I
Strategic Entrepreneurship: Dynamics and Mechanisms

Economic Development at G7 Country Level: Taxonomy of Economic Development Ranking and Proposition of a Strategic Entrepreneurship Model of Development

Nezameddin Faghih, Parsa Bandamiri, and Mahshid Sazegar

Abstract Today, strategic entrepreneurship has been purposefully solidifying the entrepreneurial activities in each industry to obtain sustainable development. The strategic management philosophy can be applied to the nexus of entrepreneurship, innovation, and economy to foster development and competitiveness in the entrepreneurial sector. Also, the pivotal elements of the strategic management model can be replicated with the critical components of entrepreneurship along with the integration of indices of innovation and economy. Performing a development analysis during such replication modeling allows us to understand and anticipate economic behaviors with the final aim of implementing competitive strategies for a robust economy. The primary objective of this chapter is to introduce a strategic entrepreneurship theoretical model with the use of taxonomic analysis to rank the Group of Seven (G7) countries regarding their development factors. The main data consist of two indicators from Global Entrepreneurship Monitor (GEM)—physical infrastructure and internal market dynamics—and four indices from Global Innovation Index (GII)—infrastructure, market sophistication, business sophistication, and creative goods and services. The methodology includes performing a numerical taxonomy on the GEM indicators and GII indices to calculate a development factor for each G7 economy. The results consist of development ranking of the G7 economies, from 2015 to 2019, in two separate cases: one set of results without the consideration of GDP in the taxonomic analysis stages, and another set of results with the consideration of GDP. The strategic entrepreneurship framework demonstrated in this study suggests strategic choices that policymakers, business executives, and stakeholders

N. Faghih
UNESCO Chair Professor Emeritus, Cambridge, MA, USA

P. Bandamiri (✉)
Experimental Surgery Program, Faculty of Medicine and Health Sciences, McGill University, Montreal, QC, Canada
e-mail: parsa.bandamiri@mail.mcgill.ca

M. Sazegar
Independent Scholar, Montreal, QC, Canada

N. Faghih, A. Forouharfar (eds.), *Strategic Entrepreneurship*, Contributions to Management Science, https://doi.org/10.1007/978-3-030-86032-5_2

in innovative technologies, can make to achieve and maintain a top-notch competitive advantage.

Keywords Taxonomy · Entrepreneurship · Innovation · Economy · Global Entrepreneurship Monitor (GEM) · Global Innovation Index (GII) · World Economic Forum (WEF) · Group of Seven (G7)

1 Introduction

With rapid advancements in business technology and its automation during the 2010s, economic development and its assessment and ranking are vital annual strategic objectives for any country which has set massive-scale economic goals. With respect to economic development, entrepreneurship and its contemplative management give the impetus to the current global governance systems for accomplishing a successful economic model. Evidence supports that entrepreneurial activities of a country are closely tied to its innovational capacities and economic growth to impact its development process. In addition, amalgamating the inner strategies of entrepreneurship, innovation, and economy of any comprehensive establishment such as a country leads us to its history of economic development which can be tracked and analyzed with the purpose of managing the current set of facilities and systems serving a nation. The introduction of development programs with the utility of theories and models usually yields economic growth, increase in public welfare, infrastructure-based development, systematic and long-term government investments in transportation, housing, education, poverty alleviation, and other socioeconomic indicators. Therefore, development programs generally facilitate the utilization of effective and efficient strategies in the fields of entrepreneurship and strategic management.

There are two major approaches to economic development: either the Keynesian economics with the presumption for the highest intervention of government in the public economy, or the neoclassical economics which, in contrary, condemns the excessive governmental interventionism policies in the public economy (Crotty, 1992; Gordon, 1992; Wolff and Resnick, 2012). The Keynesians believe that more job creation and provision of goods and services in emerging or unsaturated markets, which have had not responded or ill-responded to the customers' demands, spur the economic growth (Cogan et al., 2010). On the other hand, the neoclassical standpoint refuses to condone the disturbance within the free market caused by the involvement of government forces through laissez-faire activities; for example, abstention by governments from interfering in the workings of the free market (Henry, 2008). As entrepreneurship concentrates on creating more jobs and requiring people to work freely, this chapter advocates the neoclassical point of view due to studying the G7 as a developed group of countries. The previous literature majorly acclaims the Keynesian perspective especially regarding periods of time when the economy is crashing and attempting to survive a financial crisis (Leijonhufvud,

2009). However, the G7 spent a healthy economy during the five-year period that their data was scrutinized throughout this study. Thus, governments and policymakers favor the economic development perpetuation by avoiding unnecessary interception of the entrepreneurial activities within the market. In the discussion section of this chapter, we will further continue on why the neoclassical approach outweighs the Keynesian approach.

Much research has been done to combine specific aspects of strategic management and entrepreneurship, thus, a new concept called strategic entrepreneurship has emerged. However, to date, different terms and explanations related to strategic entrepreneurship have resulted from many studies. We will first provide a literature review on the concepts intended for the goal of this chapter. The literature review starts with the history of strategic entrepreneurship and a few theories that have been published so far. Then, we will describe the significance of the relationship between entrepreneurship, innovation, and the economy. Eventually, with the help of the theories and models that have emerged from previous literature, a theoretical model regarding strategic entrepreneurship is introduced in the methodology section.

2 Literature Review

Strategic entrepreneurship is a relatively recent concept which is constantly perceived as theology in need of a balance between its strategic management side and its entrepreneurial side (Kyrgidou and Hughes, 2010). Each of these two components has its own sublayer which forms the definition they have today. The introduction of strategic entrepreneurship is the result of a unique research conference in Germany where some of the world's most famous researchers came together to explore this concept in depth. They called the combination of strategic management and entrepreneurship, strategic entrepreneurship, and examined different perspectives on strategic entrepreneurship (Van Stel et al., 2005; Kuratko and Audretsch, 2009; Hitt et al., 2009; Hitt and Duane, 2017).

Strategic management is equally necessary in order to achieve a competitive advantage that can be used for differentiation. The strategic management process guides an organization to ensure its continued growth and modernization, as well as providing a basic framework for developing and implementing strategies to ensure that an organization continues to operate effectively (Kaplan, 2001). One of the basic components of strategic management is SWOT development programs (strengths, weaknesses, opportunities and threats). This process is very dynamic and enables companies to ensure long-term competition and efficiency. Also, the external and internal analyses of the organizations are assessed by SWOT analysis (Thompson et al., 2007). Strategic management fulfills the strategic implementation by vision, mission, and objectives with the addition of the external and internal analysis for an organization. Implementation plans the creation of strategic choice. An organization's efforts are strategically implemented when it aligns with its

strategic choices (Barney and Hesterly, 2006). Eventually, all the process of strategic management becomes the procurement of strategic competition. Strategic management, based on the actual action of management, is progressively an effect on the creation of societies in modern industrial, economies novel to the society (Hitt and Duane, 2017).

In the same way SWOT helps the strategic management model to reach strategic choice toward the final purpose which is a competitive advantage, a high validity can be given to the model of strategic entrepreneurship which is updated from the strategic management model. We have come up with a novel strategic entrepreneurship model, a function of several inputs and outputs. The inputs are entrepreneurship, innovation, and the economy. The analysis function is a numerical taxonomy to calculate development factors and the outputs are strategic entrepreneurship choice, strategic entrepreneurship implementation, and entrepreneurial competitive advantage. Before proposing our strategic entrepreneurship model, have provided a literature review on the intertwining of our model's inputs: entrepreneurship, innovation, and economy.

Moreover, entrepreneurship is among the most crucial solutions or pathways to promote a society toward innovation and economic growth (Mcfadzean et al., 2005; Mueller, 2007; Naudé, 2011; Wong et al., 2005). Also, societies with well-established economic buildouts showing high interest in the improvement of their innovation intend to explore the most in entrepreneurship (Bosma et al., 2018; Doran et al., 2018). A prominent pioneer in the field of entrepreneurship, Joseph Schumpeter, proposes the notion that countries advance economically through creative destruction, where new businesses displace the old businesses through creative innovation (Schumpeter 1942). Schumpeter's works—as one of the greatest economists of the twentieth century (Kessler, 1961; Morgenstern, 1951)—has been undeniably key in understanding the heart of entrepreneurship and innovation relative to the existing capitalism in the world. However, more recent works by Audretsch et al. (2006) suggest that the millennial generation needs to focus on creative construction rather than attempting to expel older businesses. It is in the nature of entrepreneurship and innovation to connect the missing link between the new knowledge of recent start-ups and old experience or knowledge of older businesses for continuous progress in a country's economic performance (Acs et al., 2008). Also, entrepreneurship and innovation have an overlapping context where both are constantly under the scope of sociologists, psychologists, economics experts, and politicians (Baumol, 1990). Economic opportunities of all nations are enormously dependent on the extent of entrepreneurship and innovation that is employed within their communities (Nijkamp, 2010). Thus, with the same level of vitality, researchers continuously study the areas where entrepreneurship and innovation converge, as well as, their conducive effect on the world's economy.

The extent of surveys and literature on linking entrepreneurship, innovation, and economic growth altogether is endlessly broad. Wennekers and Thurik (1999) perceive that entrepreneurship consists of a spectrum of micro to macro dimensions—individual to aggregate level—with the genuine motive of advancing an economy. Innovation role-plays a catalyst from micro to macro levels in order to speed up and

strengthen the relationship between entrepreneurship and economic growth (Audretsch and Thurik 2001). Entrepreneurship could embrace different types and levels of benefits with itself; personal wealth, power, and reputation at the micro-level (Baumol, 1990), and/or advantageous contributions to the national income at the macro-level (Murphy et al. 1991), and/or non-beneficial activities with the intentions to ameliorate living standards of a community (Benz, 2006). Additionally, according to Śledzik (2013), the bridge between entrepreneurship and innovation strengthens the fundamental frames on which a country's economy relies, and any turbulence pruning a society's entrepreneurial and innovative activities sinks down its economic worth as well.

Despite the vast literature advocating the innovation's merits within a society, innovation is able to on certain occasions leave damaging effects on society (Davidsson, 2004). This is one of the two recognized social realities of entrepreneurship where innovation has little to no use for the sustainment of a self-employed entrepreneur. Nevertheless, the focus of this chapter is on the second distinguished social reality of entrepreneurship where innovation acts as the central dogma (innovation feeds the entrepreneur and the resulting entrepreneurship feeds back the loop of innovation/entrepreneurship) toward the success of an entrepreneur. This is defined as the 'Schumpeterian entrepreneurship' which is explained further below.

Indeed, many definitions of entrepreneurship have been provided by the various sources that have studied entrepreneurship in-depth, nevertheless, Schumpeter's definition of entrepreneurship has been of acceptance for the last century. Schumpeter imposes insights on the fact that entrepreneurship is created when a person indulges in new combinations against the common old methods that are in use by other people (Schumpeter and Opie, 1934). And even Schumpeter floats on the idea that entrepreneurs do not necessarily create any original content, but they only conduct benefits from their business in a different fashion with greater bonuses (i.e., financial benefits, societal values, technological advances, etc.) (Schumpeter, 1942). These new combinations and formulas being pressed into shape by the entrepreneurs are ignited by the innovative capabilities they entail (Schumpeter and Opie, 1934).

Moving a century past Schumpeter's definition of entrepreneurship, Global Entrepreneurship Monitor (GEM)[1], as a very credible institution of experts in the field of entrepreneurship for the last couple of decades, interprets entrepreneurship as "any attempt at new business or new venture creation, such as self-employment, a new business organization, or the expansion of an existing business, by an individual, a team of individuals, or an established business." New businesses or ventures, being the term used by GEM, are equal to Schumpeter's definitions of new combinations that are formulated by an entrepreneur's innovation.

The impact of innovation on the development of entrepreneurship is a theme that GEM has considered through its annual reports. Nevertheless, when it comes to an

[1] https://www.gemconsortium.org/report.

isolated analysis of constituents forming innovation, Global Innovation Index (GII)[2] is a well-known entity which provides an annual ranking for the countries based on their performance in innovation. GII props the investigation on who finances innovation and how innovation is sustained by the governing powers and organizations. In their latest annual report, GII prospers to implement 80 indicators and 7 indices to rank the innovation capacity of 131 economies.

The GEM and GII reports are published annually and the 2019 report, for instance, of GEM included 50 economies—although more than 100 different countries, since 1999, have collaborated with GEM. The GII dataset represents 92.5% of the world's population and 97.6% of the world's GDP (in current US dollars). GEM is supervised by Babson[3], KEOF[4], etc. GII is supervised by Cornell University, the World Intellectual Property Organization (WIPO)[5], *Institut Européen d'Administration des Affaires* (INSEAD)[6], and WEF (World Economic Forum)[7], which provide relevant details to the performance of many economies in the world.

Global Entrepreneurship Monitor (GEM), Global Innovation Index (GII), and World Economic Forum (WEF)—which maintains the world bank data among many other financial data—have gathered and examined the statistics on many countries' entrepreneurship, innovation, and economy, respectively. The number of countries included in GEM, GII, and WEF reports exceeds more than 50 countries. Due to the wide domain of data from 50 countries, we only chose to study the G7 countries with the purpose of regarding them as an economic epitome for other countries. Stam and Van Stel (2011), through the empirical analyses of Global Entrepreneurship Monitor (GEM) data, denote that entrepreneurship is non-effective for low-income countries and effective for high-income countries; hence, the researchers' work enacts as a reason for selecting the G7's data as these countries stand highest in the global income rankings while they are noticeably impacted by the practice of entrepreneurship within their nation. In addition, another factor that we considered for selecting the G7 countries to be examined analytically is that the GEM data on various indicators is limited regarding many countries and this shortage of information disrupts the input flow during taxonomy stages which is going to be reviewed in our methodology.

The G7 countries consist of Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States. The member countries of G7 are taxonomized on two indicators derived from GEM data (internal market dynamics and physical infrastructure) and four indices derived from GII data (infrastructure, market

[2] https://www.globalinnovationindex.org/about-gii.

[3] Babson College, Babson Park, MA, United States Lead Sponsoring Institution and Founding Institution.

[4] Korea Entrepreneurship Foundation Sponsoring Institution.

[5] https://www.wipo.int/global_innovation_index/en/2020/.

[6] https://www.insead.edu/.

[7] https://www.weforum.org/.

sophistication, business sophistication, and creative goods and services), from 2015 to 2019.

Therefore, the purpose of this chapter is to provide a ranking for the G7 economies based on their development factor '*fi*' that is calculated through the numerical taxonomy of the indicators and indices derived from GEM and GII datasets as they reflect their entrepreneurship and innovation, respectively. While our work revolves around the study of the development factors of G7 nations in the field of economy, the analysis has been done in two ways: one with the selected indicators from GII indices and GEM indicators, and also another way to be selected from those indices and indicators with the addition of the extracted GDP from GII report (sourced from WEF) of the G7 countries in the classification analysis. Thus, analysis has been done with two modes: a group of selected data from GII and GEM with GDP, and another group of selected data without GDP of G7 countries.

Hereby, the intention is to determine if GDP (derived from WEF) influences the development factor of each G7 nation and, consequently, the aforementioned rankings of the G7 members.

3 Methodology

Here, we will first introduce a strategic entrepreneurship model that originates from the strategic management model. The strategic management process is modeled in a way to identify a set of inputs, place them in an analysis function, and formulate strategies as your outputs. The inputs within the strategic management model are an organization's current missions, visions, and strategies. The analysis function is a SWOT analysis—an analysis of strengths, weaknesses, opportunities, and threats; with the help of the SWOT analysis the management strategies can be implemented with the ultimate goal of gaining a competitive advantage (Gregory, 2018).

Our proposed strategic entrepreneurship model is built similarly regarding an analysis method to perform on a set of inputs, to reach a set of strategies, as outputs, so competitive entrepreneurial strategies are accomplished. Based on the literature on the relationship between entrepreneurship, innovation, and economy, these three indicants are analyzed via numerical taxonomy—an analysis process which is described in the following section—and our outputs will be development factors that can gain an entrepreneurial value for any entity. Figure 1 represents the strategic entrepreneurship model (bottom) optimized from the strategic management model (top).

The inputs of the strategic entrepreneurship model that we have theorized include indicators related to entrepreneurship, indices related to innovation, and GDP, as a key representative variable of the economy. However, we tested an alternative to our model where we do not use GDP as an input to observe the extent of GDP's impact on the development of a nation. The datasets of GEM and GII (GII, Global Innovation Index, 2015; 2016; 2017; 2018; 2019; 2020) are used as indicators and indices to put as input data into the optimized strategic entrepreneurship model.

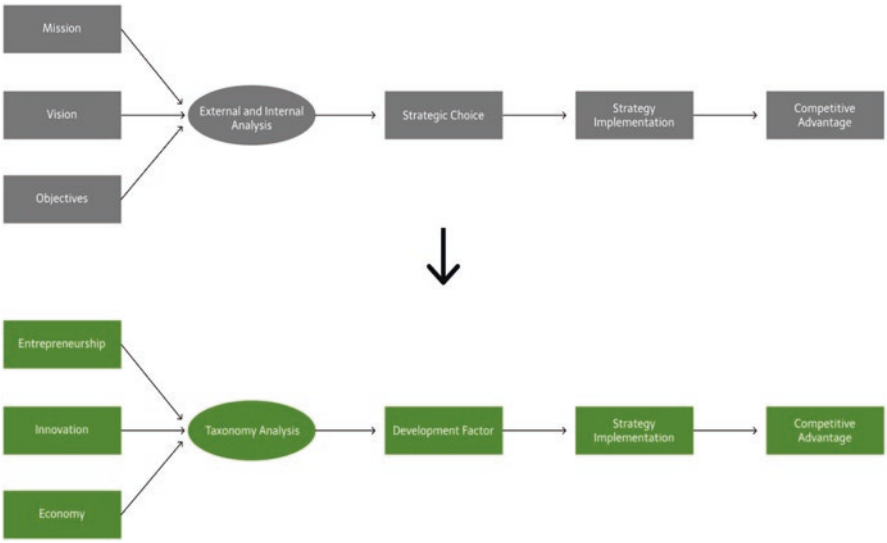


Fig. 1 The strategic entrepreneurship model (bottom diagram) proposed based on strategic management model (top diagram)

The data extracted from Global Entrepreneurship Monitor (GEM) and Global Innovation Index (GII) from 2015 to 2019 are the set of determines to calculate for the development factor '*fi*' of G7 countries by taxonomic analysis. The eight-step taxonomic analysis that we performed on the GEM indicators and GII indices is shown below in Fig. 2 (Quesne, 1969; Phillips, 1983; Faghih and Sazegar 2019a, b).

Eventually, the results of the taxonomic analysis on the G7 development factors—which were derived from GEM indicators and GII indices in the first place—are explained to compare the economic development of the G7 countries in two separate cases; with or without considering their GDP. The methodology pathway of this chapter is as follows:

Firstly, this chapter will investigate the GEM framework conditions of entrepreneurship and describe the laying indicators in their framework, with the justification of the selection process of two indicators from 12 components within the National Entrepreneurship Context Index (NECI).

The next section will introduce the GII indices, sub-indices, pillars, and sub-pillars. The selection procedure of four specific GII indices and why they were the focus of this chapter is explained as well. The main concept behind this chapter's inclusion of the specifically selected GEM indicators and GII indices is how their overlap is supported by the body of research from the past. It is also recommended that other indicators in GEM and other indices in GII to be utilized for further exploration of various aspects overlapping between strategic entrepreneurship in innovation and economic growth.

Finally, a numerical taxonomy based on the selected GEM indicators and GII indices of the G7, as inputs, and a calculated development factor '*fi*', as output,

Fig. 2 Eight steps of taxonomy methodology. (Source: Authors' own work and design)

concludes the methodology of this chapter with a ranking for the G7 economies. It is noteworthy to mention that two scenarios of taxonomy are performed with and without the GDP of the G7 nations to interpret the influence of GDP on entrepreneurship and innovation.

4 Entrepreneurial Framework Conditions of GEM

From 2015 to 2019, 50 or more economies have participated in the GEM Adult Population Survey (APS), which has surveyed over 150,000 individuals annually through extended interviews. The results from the survey are gathered inside the National Entrepreneurship Context Index (NECI) and the linked experts have rated this body of data for each country in an entrepreneurial framework of conditions. The conditions of NECI consists of 12 components, which is labeled 'indicators' for the sake of this chapter's methodology, and a score of 1–10 is given to each indicator by the experts.

GEM's extensive indicators offer inclusive perspectives of entrepreneurship in a framework of conditions such as government policies and programs, research and development (R&D), infrastructure, education, etc. (Fig. 3 includes all 12 rated conditions of the entrepreneurial framework). However, ten out of twelve indicators were excluded from the taxonomic analysis due to the limitations of a book chapter. GEM's indicators are largely inclusive and changing each year and for each

Fig. 3 Expert Ratings of Entrepreneurial Framework Conditions which constitute the Global Entrepreneurship Monitor (GEM) conceptual model for each country; the green indicators represent the selected indicators for this study. Source: Authors' own work based on GEM data)

economy, while the participating economies differ in each year's GEM report, plus the fact that the number of surveyed entrepreneurs varies through each report. Expert ratings of the entrepreneurial framework conditions are represented inside each GEM annual report for the cooperating countries. The total number of economies, from which each specific country ranks out of, is as follows: 62 for 2015, 65 for 2016, and 54 for 2017, 2018, and 2019. Figure 3 represents the 12 GEM indicators from which two indicators have been selected (highlighted in green)—physical infrastructure and internal market dynamics—for the taxonomic analysis in the results section.

5 Selection of Internal Market Dynamics from GEM Correspondent with Market Sophistication from GII

Despite the crucial magnitude of all 12 indicators within NECI for successful entrepreneurship in society, internal market dynamics and physical infrastructure lie in the center of scrutiny for this chapter's intentions. Internal market dynamics directly connect to a specific index of GII which is market sophistication. According to Guerzoni (2007), market sophistication justifies the user's awareness of their need and the heterogeneity in the market flow. This clicks the motive for industries and entrepreneurs to innovate within the market. The tactics brought into play via the network of all industries not only provoke dynamics in the course of a competitive

innovation but intrinsically in the market as well (Gottinger, 2016). Furthermore, Liu (2010) provides a conceptual model that indicates consumer sophistication enhancing the innovative essence of a market. However, the amount of research in finding cause and effect between market dynamics and sophistication is very limited and requires more groundwork by the R&D companies.

6 Selection of Physical Infrastructure from GEM Correspondent with Infrastructure from GII

Furthermore, the physical infrastructure section of GEM can be accredited by the same governing economic authorities as to the infrastructure component of GII. Van De Ven (1993) notes that the accumulation of countless institutional efforts, resources, and infrastructural events co-produce altogether in a long-term fashion to construct and shift an industrial infrastructure. Plus, Audretsch et al. (2015), being one of the first studies to investigate the mutual give and take between infrastructure and entrepreneurship, state that targeting specific industries and local start-ups is achieved through particular infrastructure policies to increase activity in the entrepreneurial culture.

7 Selection of Business Sophistication and Creative Goods and Services from GII

Another two important variables taken into account for the taxonomic approach are the GII indices of business sophistication and creative goods and services that potentially confine the creativity on both sides of the entrepreneurs and customers. A recent empirical study by Kirikkaleli and Ozun (2019) supports that the boundaries of innovation expand with positive trends in business sophistication, accompanying long-term economic stability as well. The much-needed art of creativity in innovation is highly dependent on how the product or service triggers the innovative demands in the industry. The analysis of creative industries substantiates the fact that investments spent on innovation in goods and services enable not only the creative sectors but also a wider extent of all industries to have access to data and resources supporting their innovation activities (Bakhshi and Mcvittie, 2009). More so, the inefficiency of the firms within a country is abbreviated with greater business sophistication and escalated contribution to innovation through the appropriate realms of industries (Salas-Velasco, 2018).

8 GII Framework of Innovational Capabilities

Alongside the GEM framework toward the facility of entrepreneurship, GII has structured a framework of indices and sub-indices supporting innovation. The indices of GII are based on two sub-indices: input datum and output datum. Each input and output index is articulated on pillars that contain their own sub-pillars. In Fig. 4, five input pillars and two output pillars are demonstrated as a conceptual map of enabling innovative activities within a national economy. Figure 4 also illustrates a sub-pillar of creative outputs as well as the four selected variables (highlighted in green) meeting the specific objectives of this chapter.

It is necessary to mention that from hereafter the literal terms used by GII are changed in this chapter to differentiate the GII variables from the GEM variables; that being said, anywhere along this chapter the term 'index' is used, the four green-highlighted variables, that include three pillars and one sub-pillar, are referenced. Unlike GEM, which has a qualitative assessment, GII involves a quantitative evaluation. The compilation of data from over 30 references building a relationship of cause and effect between innovation factors leads to a median of the numbers in the five input pillars and two output pillars.[2] A score is given to each variable and the score is calculated through weighted averaging.[2]

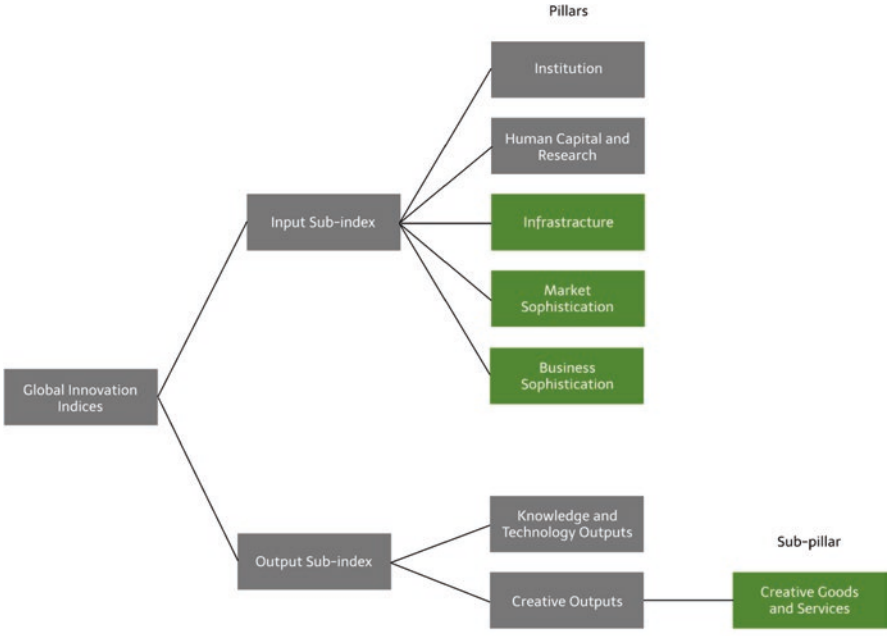


Fig. 4 Input and output indices of the Global Innovation Index (GII); green indices represent selected indices for this chapter. Source: Authors' own sketch based on GII model and data

Moreover, GII indices include institutions, human capital and research, infrastructure, market sophistication, business sophistication, knowledge and technology outputs, and creative outputs. Among the aforementioned indices, the selected variables from GII labeled as GII indices in this chapter, are infrastructure, market sophistication, business sophistication, and a sub-variable of creative outputs, creative goods, and services, to be analyzed in this chapter.

GEM considers the notable role of entrepreneurship as effective pathways of attitude, perceptions, and activities driven by the motivation to slide society in the direction of an infallible economy. On the same note, GII values the well-being and economic growth of a nation by fostering innovation between the young members of its society and accredits the necessary perspective of innovation in applying to market dynamics, containment of the same dynamic actions, and adjusting the range of indices and elements that locate beyond the common traditional scales and looping back to the essence of innovation.[2]

This chapter considers the case of advanced economies, such as the G7 and economies that rely on their forces to achieve their goals through targeted planning, alignment of laws, regulations, market rules, and the coordinated dynamics of entrepreneurial change. Therefore, data from the studied economies are extracted from GEM and GII, which can provide appropriate criteria for accurate performance in entrepreneurship, and appropriate data for innovation-based economies in applying innovative strategies to promote development. Consequently, the aforementioned six indicators/indices, along with the gross domestic product (GDP), of the G7 are analyzed in a taxonomic method so that the differentials reflected in the Standard Matrices, signifying the influences of impactful factors of an economy, are sorted within the taxonomic homogenization process. The computational methods to begin the taxonomy are described below.

9 Computational procedure

The following section describes the seven stages of computational classification via taxonomic analysis (Le Quesne, 1969; Phillips, 1983; Faghih and Sazegar 2019a, b).

9.1 Step 1: Data Matrix Formation

Consider:

$$Xoj = \left(\sum_{i=1}^{n} Xij\right) \tag{1}$$

At the first step of the computational analysis, primary tables of data matrices are formed, which contain two indicators taken from GEM and four indices extracted

from GII. The rows and columns of the data matrix include the countries and their corresponding GEM or GII indices, respectively. The indicators/indices in columns and the countries in the rows are analyzed comparatively. At the bottom of each table, the summation and average of the values in each column is measured and assigned for each year. Matrix is set up with 'n' members (1, 2, 3… *n*) to present the '*m*' (as an indicator of each study) variables. In Eq. (1), '*i*' refers to rows and '*j*' to columns. Hence, the data matrices for the G7 countries (in both cases of excluding and including GDP) are formed by using the GEM and GII data, from 2015 to 2019, as shown in Tables 6, 7, 8, 9, 10, 11, 12, 13, 14, and 15 (in the Appendix).

Also, it is noted that the GEM's data were non-existent for some years, for specific countries, and it should be forecasted by a predictable analysis method; hence, these implied GEM indicators, for France in the years of 2015 and 2019 and for Japan in 2016, were predicted by regression interpolation and then they were placed in a data matrix for the starting of taxonomy.

9.2 Step 2: Standard Matrix Formation

In the Standard Matrix Formation stage, forming of dimensionless data matrix is performed and due to the fact that the indicators may not be in the same dimensions. The GEM indicators are scored from 1 to 9, the GII indices are scored from 1 to 100, and the GDP for each country is unitized by US dollars (billions). Thus, the units of these variables are not identical and a standardization of units is required for further comparison of the variables. Standardization of data matrix enables us to eliminate the units of each variable. Consequently, the dimensionless elements Z_{ij} contain Standard Matrices which is figured by the process below:

$$Sj = \sqrt{\sum_{i=1}^{n} (Xij - \overline{Xj})^2 / n} \tag{2}$$

$$Z_{ij} = \left(X_{ij} - X_{oj}\right) / S_j \tag{3}$$

'*Xij*' is a component of the Data Matrix, '*Xoj*' is an average of each column of Matrix, as it is shown in Eq. (1), and '*Sj*' is a Standard Deviation of each column of matrix, for the '*j*' indicators derived from the GEM and the GII data report from 2015 to 2019. So, in this data analysis, '*i*' characterizes the G7 economies from 2015 to 2019. The corresponding Standard Matrices were computed. Moreover, for the Standard Matrices, the average and the standard deviation of data (in each group and year) were calculated to have an average of zero and a Standard Deviation of unity in the *Z* Matrices (due to the elimination of discrepancies between the indicators' units and generation of scale-free indices). Therefore, standard '*Z*' matrices can be appropriately used to unify elements. These variables can be affected by fundamental changes affecting entrepreneurial governance.

Tables 16, 17, 18, 19, 20, 21, 22, 23, 24, and 25 (in the Appendix) demonstrate the GEM and GII Data Standard Matrices for the G7 economies in each year—excluding and including their GDPs.

9.3 Step 3: Computation of Compound Distance Matrices

The Compound Distances, D_{ab}, the distances between economy 'a' and economy 'b', for the G7 economies is determined:

$$Dab = \sqrt{\sum_{i=1}^{n} \left(Zaj - Zbj\right)^2} \tag{4}$$

In addition:

$$D_{aa} = 0, \qquad D_{bb} = 0, \qquad D_{ab} = D_{ba}$$

The Compound Distance Matrices 'D' are symmetric, with zero diagonal elements, and each element 'D_{ab}' refers to the 'distance' between the two economies (a, b). During this process, the Compound Distance Matrix 'D' is calculated for the G7—again, excluding and including each economy's GDP. Tables 26, 27, 28, 29, 30, 31, 32, 33, 34 and 35 (in the Appendix) show the results for the compound data matrices of the G7 economies in each year—excluding and including GDP. Each element 'D_{ab}' of matrix 'D' represents a distance value between two economies ('a' and 'b'). The shortest distance from economy 'a' to economy 'b' is represented by the smallest value in each row.

9.4 Step 4: The Shortest Distance Calculation

At this stage of Taxonomic Analysis, the elements of the zero diagonal matrices 'D' represent the distances between interrelated economies in rows and columns. The intersection of the rows and columns in 'D' matrices are calculated values which indicate the shortest distance between two economies. Next, the lowest value in each row is marked as the shortest distance of the two specified economies in the specified year. Indeed, the closest distance between the two economies 'a' and 'b' identifies a 'model' for economy 'b' and a 'shade' for economy 'a'.

As explained below, the shortest distances between the investigated economies are highlighted in Tables 26, 27, 28, 29, 30, 31, 32, 33, 34 and 35 (in the Appendix).

9.5 Step 5: Figuration of Optimal Chart

In this step, the shortest distances exemplify an optimal chart by connecting the similar economies together. For this purpose, an optimal chart figuration is achieved through directing a vector toward the 'model' economy, meanwhile the length of the vector equals to the shortest distance between the 'model' and the 'shade'.

To underline the homogeneous economies, the shortest distance between $d(+)$ and $d(-)$ must lie between the upper and lower limit distances. The upper and lower limit distances, $d(+)$ and $d(-)$, are calculated from Eqs. (5) and (6); where d is the average of shortest distance and S_d is the mean standard deviation of the shortest distance:

$$d(+) = d + 2S_d \tag{5}$$

$$d(-) = d - 2S_d \tag{6}$$

Based on the central limit theorem, 95.45% of the population falls inside the area around the mean, modeled as a Gaussian (normal) distribution having a width of four standard deviations, which is, $-2\ S_d$ to $+2\ S_d$ (Quesne, 1969; Phillips, 1983; Faghih and Sazegar 2019a, b).

The measures for $d(+)$ and $d(-)$ are quantified for the G7 economies in the span of 2015 to 2019 from Eqs. (5) and (6). Any outliers relative to upper $d(+)$ and lower $d(-)$ bounds are marked for elimination; basically, the group of the economies are examined step by step in order to remove the outlier economy and, after each elimination, the procedure is reiterated until the remaining economies sort out within the desired domain. The prior aim of homogenization of the G7 economies is accomplished through the implied iterative procedure; in the case that any compound distance matrix is not homogenized in the initial stage, the un-homogenized compound matrix is reinforced and homogenized by the elimination/reiteration process.

Tables 26, 27, 28, 29, 30, 31, 32, 33, 34 and 35 (in the Appendix) show the first step of the Compound Distance Matrices 'D' calculations for the G7 countries from 2015 to 2019. The homogenization is acquired for all the years except 2016 because United States is eliminated in the first step of homogenization. So, the next step of homogenization is performed without the inclusion of United States and after this step a homogenized group is obtained for 2016. Figures 5, 6, 7, 8, and 9 portray the final values of the shortest distance between economies for each year—excluding and including GDP. Table 36 (in the Appendix) located below Fig. 5 depicts the second step of the homogenization where an optimal graph for the homogenized group (without the US), specifically including GDP, is achieved for 2016.

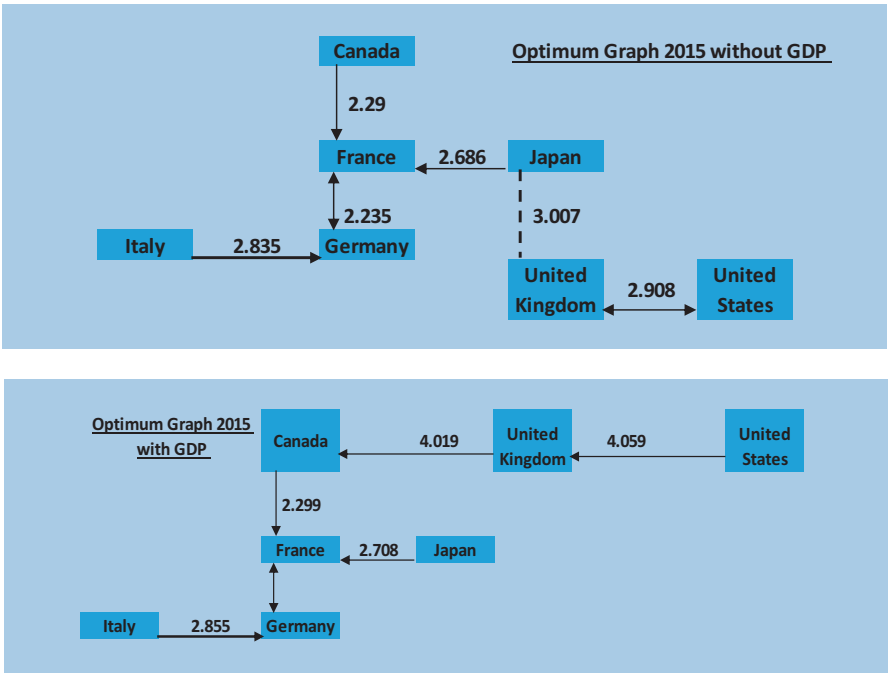


Fig. 5 Final values of the shortest distances between economies in the optimum graph for 2015

9.6 Step 6: Ranking of the Economies in Terms of Improvement and Development

Based on the previous step, should any G7 country be excluded in the homogeneous group, the new Data Matrix is formed for the homogenous group of economies and the Standard Matrix is formed again. In the Standard Matrix, the maximum value in each column is marked and labeled the 'Ideal Amount'. Equal rankings do not exist for the seven explored economies during the last 5 years of analyzation.

After the creation of a homogenized group the ranking process is started via a standard matrix and the elimination of outlier countries. Repeating the formation of 'Zoj' Matrix—previously mentioned in Step 2 of taxonomic analysis—is a vital step in ranking the development factors of the G7 economies. A better distinction of developmental factors enables us to shape a benchmark pattern.

The United States is an example of an economy which is eliminated as an outlier in 2016 only where GDP is included in the sequential homogenization process. With the help of step 6, we can observe the similarities between the economies that are more homogenous to each other based on their developmental factors. Obviously, the selected indicators and indices from GEM and GII are the samples that provide a comparison ruler to reflect on the development of the G7 economies.

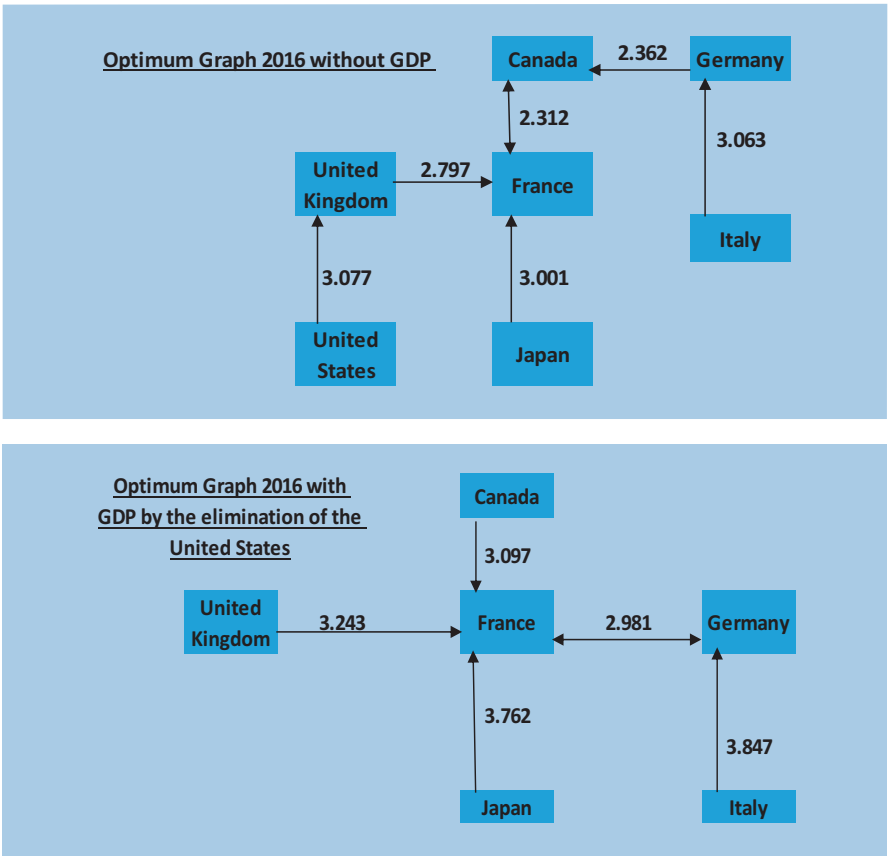


Fig. 6 Final values of the shortest distances between economies in the optimum graph for 2016

9.7 Step 7: Calculation of the Economies' Developmental Factors

To estimate the developmental factors for the G7 economies, the upper limit of the development pattern is determined and then placed in the calculation:

$$fi = \left(Cio / Co\right)$$

where, '*Cio*' is a pattern for the calculation of the development factors, and *Co* is obtained from Eq. (7):

$$\mathrm{Co} = \overline{Cio} + 2\,Sio, \tag{7}$$

where, $'\overline{Cio}'$ is the average and *'Sio'* is the standard deviation of the development factors. And the *fi* is achieved through Eq. (7) (Quesne,1969; Phillips,1983).

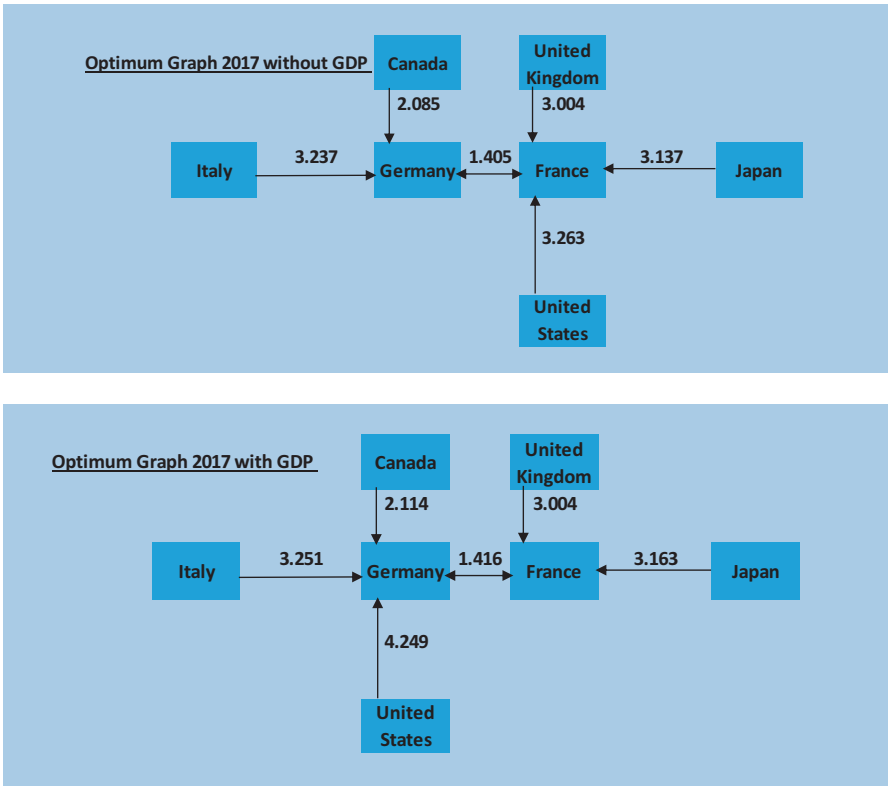


Fig. 7 Final values of the shortest distances between economies in the optimum graph for 2017

Development factors have a range between '0' and '1'. When '*fi*' values reach toward '0', the economy is more developed compared to when '*fi*' values reach toward '1'; in other words, the economy approaches less developed characteristics. Measuring the '*Cio*' and '*fi*' leads to the ranking of the economies based on the development factors. In this step, the G7 economies are ranked from top to bottom based on their development factors (*fi*), for each year from 2015 to 2019, as presented in Tables 1, 2, 3, 4, and 5.

10 Results

Finite implementations of selected indicators and indices in this chapter help in assessing the economic development of the G7 nations based on the credible sources used so that the extent of economic development for each of the seven economic leaders is laid out on a spectrum. The development factors that influence the economic growth of a country are originally derived from entrepreneurial activities and

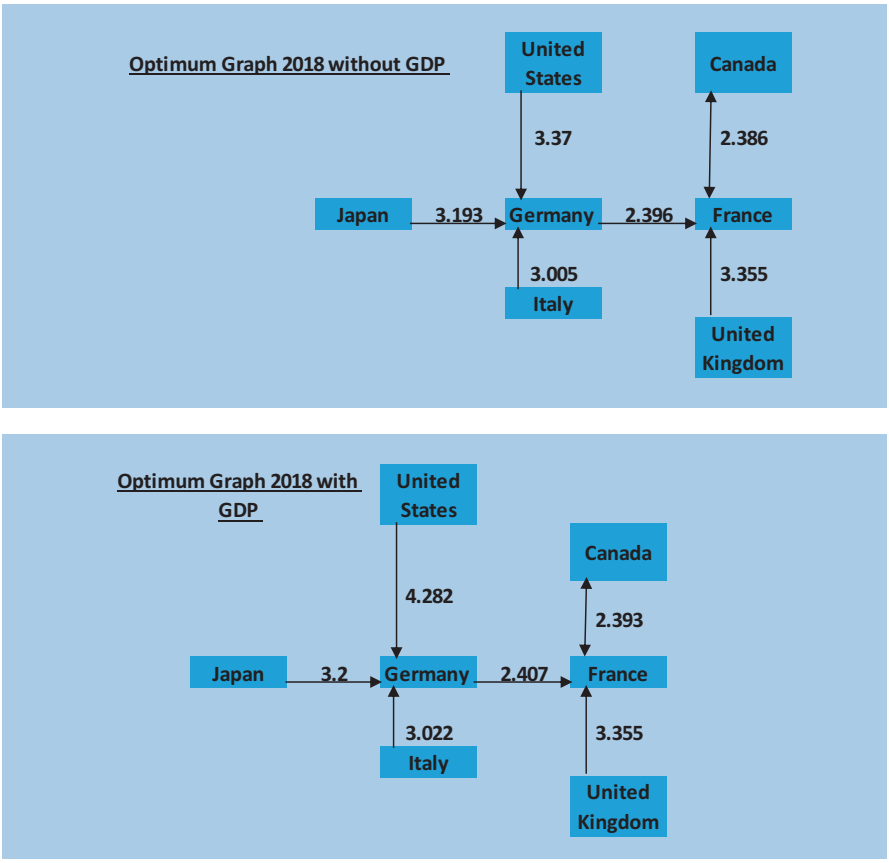


Fig. 8 Final values of the shortest distances between economies in the optimum graph for 2018

innovational efforts. In this analysis, despite the GEM and GII indicators and indices that link to entrepreneurship and innovation, GDP enacts as another factor relative to this chapter's work toward exploring dynamic and effective indicators in the field of entrepreneurship.

Six variables, which are four indices from GII and two indicators from GEM are analyzed to define the development factors of the G7 economies and rank them year by year from 2015 to 2019. In total, ten classifications of development rankings are achieved for the G7; half of the rankings do not consider GDP and the other half take GDP into account to see whether GDP has a significant impact on the development ranking of the G7 based on their entrepreneurial and innovative activities. In this regard, the United States is a perfect example of a country that has the highest GDP among the G7 which makes it a noticeable suspect to stand high in the development rankings when accounted for GDP. The United States is eliminated in the first stage of taxonomy in 2016 (Table 36 in the Appendix) as well as being ranked first in 2015, 2018 (only when GDP is considered), and 2019 among the G7

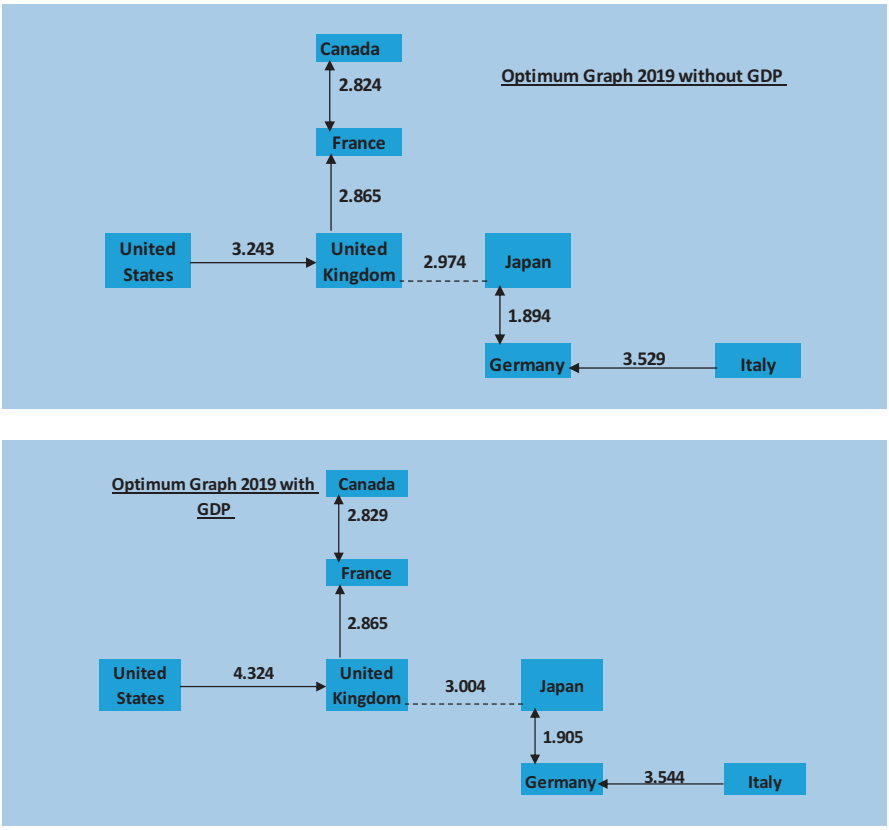


Fig. 9 Final values of the shortest distances between economies in the optimum graph for 2019

Table 1 Development degree for 2015

Development ranking '*fi*'		2015 year	*fi*=
Development factors within GEM and Gll Dataset without GDP in 2015			
United States	0.466	Canada	0.724
United Kingdom	0.504	France	0.686
Japan	0.515	Germany	0.816
France	0.686	Italy	0.949
Canada	0.724	Japan	0.515
Germany	0.816	United Kingdom	0.504
Italy	0.949	United States	0.466
Development factors within GEM and Gll Dataset with GDP in 2015			
United States	0.422	Canada	0.750
Japan	0.571	France	0.714
United Kingdom	0.576	Germany	0.813
France	0.714	Italy	0.932
Canada	0.750	Japan	0.571
Germany	0.813	United Kingdom	0.576
Italy	0.932	United States	0.422

Table 2 Development degree for 2016

Development ranking *'fi'*		2016 year	*fi*=
Development factors within GEM and Gll Dataset without GDP in 2016			
Japan	0.467	Canada	0.739
United States	0.492	France	0.674
United Kingdom	0.632	Germany	0.798
France	0.674	Italy	0.960
Canada	0.739	Japan	0.467
Germany	0.798	United Kingdom	0.632
Italy	0.960	United States	0.492
Development factors within GEM and Gll Dataset with GDP in 2016			
Japan	0.364	Canada	0.576
United Kingdom	0.493	France	0.525
France	0.525	Germany	0.622
Canada	0.576	Italy	0.748
Germany	0.622	Japan	0.364
Italy	0.748	United Kingdom	0.493

Table 3 Development degree for 2017

Development ranking *'fi'*		2017 year	*fi*=
Development factors within GEM and Gll Dataset without GDP in 2017			
Japan	0.538	Canada	0.826
United States	0.636	France	0.735
United Kingdom	0.652	Germany	0.813
France	0.735	Italy	0.960
Germany	0.813	Japan	0.538
Canada	0.826	United Kingdom	0.652
Italy	0.960	United States	0.636
Development factors within GEM and Gll Dataset with GDP in 2017			
Japan	0.556	Canada	0.805
United States	0.587	France	0.752
United Kingdom	0.715	Germany	0.799
France	0.752	Italy	0.968
Germany	0.799	Japan	0.556
Canada	0.805	United Kingdom	0.715
Italy	0.968	United States	0.587

economies based on the development factors studied in this chapter. As seen in Tables 26, 27, 28, 29, 30, 31, 32, 33, 34 and 35 (in the Appendix), progressive from 2015 to 2019, the shortest distance value is the greatest for the US compared to the other economies; in other words, the United States separates itself the most from the rest of the G7 economies.

After calculating for determining the homogenous economic countries, Tables 1, 2, 3, 4, and 5 have been resulted to demonstrate the development ranking according

Table 4 Development degree for 2018

Development ranking *'fi'*		2018 year	*fi*=
Development factors within GEM and Gll Dataset without GDP in 2018			
Japan	0.526	Canada	0.833
United States	0.578	France	0.716
United Kingdom	0.604	Germany	0.803
France	0.716	Italy	0.946
Germany	0.803	Japan	0.526
Canada	0.833	United Kingdom	0.604
Italy	0.946	United States	0.578
Development factors within GEM and Gll Dataset with GDP in 2018			
United States	0.520	Canada	0.812
Japan	0.558	France	0.733
United Kingdom	0.690	Germany	0.776
France	0.733	Italy	0.959
Germany	0.776	Japan	0.558
Canada	0.812	United Kingdom	0.690
Italy	0.959	United States	0.520

Table 5 Development degree for 2019

Development ranking *'fi'*		2019 year	*fi*=
Development factors within GEM and Gll Dataset without GDP in 2019			
United States	0.501	Canada	0.771
Japan	0.530	France	0.756
United Kingdom	0.607	Germany	0.716
Germany	0.716	Italy	0.980
France	0.756	Japan	0.530
Canada	0.771	United Kingdom	0.607
Italy	0.980	United States	0.501
Development factors within GEM and Gll Dataset with GDP in 2019			
United States	0.494	Canada	0.780
Japan	0.561	France	0.769
United Kingdom	0.701	Germany	0.720
Germany	0.720	Italy	0.968
France	0.769	Japan	0.561
Canada	0.780	United Kingdom	0.701
Italy	0.968	United States	0.494

to the advances of each country in its development factor. As observed in Tables 1, 2, 3, 4, and 5, Japan, with having the second-highest GDP among the G7 countries during the last 5 years, is ranked as the top country based on the selected GEM and GII indicators in the years of 2016, 2017, and 2018 (only when excluding GDP). On the other side of the spectrum, Italy falls at the bottom of these rankings in any of the last 5 years.

The ten classifications of the G7's development ranking are stated below to mention the highest and lowest developed economy given their calculated 'fi'. Below, the first five classifications of the results from the taxonomic analysis performed on the development factors (GEM indicators and GII indices) are listed for each year, when GDP was not considered in the analysis:

- In 2015, the United States with 'fi = 0.466' is closest to '0' and Italy with 'fi = 0.949' is closest to '1'; meaning that the United States and Italy are the most and the least developed countries, respectively.
- In 2016, Japan with 'fi = 0.467' moves ahead of the United States with 'fi = 0.492' in being the most developed country among the G7 economies. Italy with 'fi = 0.960' is ranked as the least developed country among the G7 countries.
- In 2017, Japan with 'fi = 0.538' moves ahead of the United States with 'fi = 0.636' in being the most developed country among the G7 economies. Italy with 'fi = 0.960' is ranked as the least developed country among the G7 countries.
- In 2018, Japan with 'fi = 0.526' moves ahead of the United States with 'fi = 0.578' in being the most developed country among the G7 economies. Italy with 'fi = 0.946' is ranked the least developed country among the G7 countries.
- In 2019, the United States with 'fi = 0.501' is closest to '0' and Italy with 'fi = 0.980' is closest to '1'; meaning that the United States and Italy are the most and the least developed countries, respectively.

Below are the findings from the taxonomic analysis performed on the development factors, when GDP was considered within the assessment:

- In 2015, the United States with 'fi = 0.422' is closest to '0', and consecutively Japan with 'fi = 0.571', while Italy with 'fi = 0.932' is closest to '1'; meaning that the United States and Italy are the most and the least developed countries, respectively.
- In 2016, with the emphasis on the fact that the United States has been eliminated due to the homogenization process, Japan with 'fi = 0.364' leads at the top of the rankings among the highest developed G7 economies. Italy with 'fi = 0.748' is ranked as the least developed country among the G7 countries.
- In 2017, Japan with 'fi = 0.556' leads ahead of the United States, which has a 'fi = 0.587', to be the most developed country among the G7 economies. Italy with 'fi = 0.968' is ranked as the least developed country among the G7 countries.
- In 2018, the United States with 'fi = 0.520' leads ahead of Japan with 'fi = 0.558' to be the most developed country among the G7 economies. Italy with 'fi = 0.959' is ranked as the least developed country among the G7 countries.
- In 2019, the United States with 'fi = 0.497' is closest to '0', and Japan with 'fi = 0.561' ranks follows the United States in being the highest developed economies. Italy with 'fi = 0.968' is closest to '1'; meaning it is ranked as the least developed country among the G7 countries.

The abovementioned results explain the fact that the United States and Japan, whether excluding or including GDP, stand above the other economies in the rankings of their development factors. Although the GDP might be demonstrated by the improvement of the social economy, it is a helpful variant due to a better

understanding of how the establishment of services or organizations with the aim of strengthening proper infrastructure for entrepreneurship form up creative entrepreneurs. Therefore, it could be obliged to study which indicators/indices affect the development of an entrepreneurial economy the most.

11 Discussion

A year-by-year analysis regarding the strategic entrepreneurship function of the G7 states is explained in this section to understand the points of strength or weakness of their inputs standardized to that of their peers which led them to their high or low level of development. As stated previously, each country's behavior is linked to three inputs: entrepreneurship, innovation, and economy. The indicators from GEM as the input data are analyzed through the optimized strategic entrepreneurship model, which represents entrepreneurial behavior. Also, the indices from GII are the input data that go through the analysis of the updated model to indicate the effect of innovation within strategic entrepreneurship. Even further, GDP is considered as an input data for the first half of the analysis to observe its effect on the output compared to the second half of the analysis where it is not considered as an input. As for the output, the development factor for each G7 economy is calculated to list the development ranking of the regions. Finally, the optimized model can suggest a strategic choice for guiding the entrepreneurial economies. Now, we will explore how each input variant influenced the G7 states' development factor 'f_i' ranking from 2015 to 2019.

2015 is the first year of development ranking with two types of input collection; first, with considering GDP, and second, without considering GDP. The top three developed countries with considering GDP are the United States (the US), the United Kingdom (the UK), and Japan, respectively. Consequently, France, Canada, Germany, and Italy rank fourth to seventh in G7. When GDP is not considered, the United Kingdom drops to the third position and Japan takes second place; the rest of the countries hold their positions. Japan's boost of position can be mainly attributed to its high GDP, second within G7, and scoring high at GII's infrastructure index and GEM's internal market dynamics indicator, first within G7. The development order of the last four countries follows the same pattern of their standardization in GEM and GII, and GDP when it was counted. The US scores highest of all GDPs, and of GII's indices, both market and business sophistication; this has allocated the US to rank first in the development rankings.

For 2016, when the G7's development ranking was analyzed without GDP, Japan, the US, and the UK rank first to third, respectively. Then, France, Canada, Germany, and Italy are the last four countries in the ranking, respectively. With adding GDP to the analysis stage, the US is eliminated in the fifth step of taxonomy calculation because of its extremely high scores, especially in GDP, along with the calculated target domain. In this regard, Japan ranks first, the UK ranks second, and the last four countries maintain their order of ranking similar to when GDP was ignored. Japan's GDP and its high internal market dynamics index, first in the

group, has placed it at the top. The UK, compared to the last four countries, scores relatively equal in all input data except its GII infrastructure index, first in the group that justifies its second position.

Either with or without considering GDP, in 2017, the highest to lowest development ranking belongs to Japan, the US, the UK, France, Germany, Canada, and Italy. Despite the US having the highest GDP, Japan leads the year by being successful in both GEM indicators, internal market dynamics, and physical infrastructure, as well as ranking second among G7 regarding GDP. It can be deduced from the data of 2015, 2016, and 2017 that Japan always stands on the podium as a top-tier developed economy mainly based on factoring in internal market dynamics and physical infrastructure indicators into the taxonomy function of the strategic entrepreneurship model.

In 2018, with the condition of not considering GDP in the calculation, Japan leads as the number one ranked country in the development ranking and the US descends to second place. First, this is partly rationalized by Japan's highest score in internal market dynamics indicator among G7. Second, the normalization of indicators through taxonomy analyzation gives rise to Japan's first position meantime factoring out the US's GDP. However, the normalization resulting from taxonomy is the key reason in the development rankings we see as outputs for each year; for instance, the UK has the highest score in the infrastructure index and the US scores the highest in the market sophistication index, which has reflected on their elevated development ranking. The same normalization behavior of taxonomy has aligned the last four countries in the group. With adding GDP to the taxonomy of 2018, the US shifts to the first position in the development classification mainly due to its excellent score in GDP, and the rest of the countries follow Japan reinforcing the standardization effect of taxonomy.

The last year of development ranking is 2019 in which the US precedes the group either with or without considering GDP. This can be linked to the fact that the US scores the highest in GDP, business and market sophistication indices, and creative goods and services sub-index. The respective order of countries proceeding the US is Japan, the UK, Germany, France, Canada, and Italy. Besides the aforementioned top ratings of the US, the highest score achieved by each country in an indicator or index is as follows: Japan in internal market dynamics indicator, the UK in infrastructure index, and France in physical infrastructure indicator.

The above description sheds light on the dynamic mutual relationship between the indicators and indices which push a country forward to its desired economic development. This development is strategically managed and optimized by the taxonomy process the strategic entrepreneurship model offers. The strategic entrepreneurship model intends to propose strategic choices that trace back to each of the inputs. The strategic operation and consistent analysis of the input dataset will allow any nation to take the leap toward a higher rank in development. The strategic choices evolve competitive advantage; GDP, internal market dynamics indicator, and business and market sophistication indices exemplify points of strength to ameliorate. The proposed strategic entrepreneurship model can encourage the authorities around the world to make strategic choices based on the input that synergy in the pioneers of G7 to rank high in development by corroborating GDP as an economic factor,

internal market dynamics as an entrepreneurship factor, and innovation factors such as market and business sophistication, and creative goods and services.

There has been an everlasting critique by economists about the extent of government intervention with respect to the input factors. Two principle economic approaches governments intake, either a Keynesian or a neoclassical approach. As we previously mentioned that entrepreneurship is linked to the optimization of economic welfare through assisting liberalization of markets, the better economic approach, from the perspective of this chapter, is the neoclassical standpoint to separate the intervention or regulation of the governments from the public economy. Despite some evidence that liberalized markets might not be efficient all the time and market failures are probable (Williamson, 2004), this chapter considered the data from the G7 economies with the familiarity of their degree of success in development. Therefore, the neoclassical approach is strategically effective for developed countries on account of three suggestions. First, by preventing any interference with the internal market, governments facilitate dynamics in the public economy. Second, the interference of political parties in strategy-making decisions forms a prejudice facing public economy to the advantage of certain policymakers; in consequence, the entrepreneurial opportunities will be distributed disproportionately through the general population. Third, as our data showed, the reports from GEM and GII are achieved by surveying samples of entrepreneurs who grow the competitive activities; the much-needed freedom of decision making cannot be opposed by the downward regulation of the government. However, the fact that the continuation or modification of the neoclassical approach for prolongation of economic development is a vast area of research on its own further lending credence to future investigations.

12 Conclusion

This chapter addresses a model for the concept of strategic entrepreneurship analogous to the strategic management model. By achieving the results from the taxonomy calculation, we intended to explore how the input variants influenced the G7's development ranking from 2015 to 2019. Overall, the taxonomy analyzation of three inputs from entrepreneurship, innovation, and economy gives us an interpretation of the order in which the G7 countries stand. While the United States, Japan, and the United Kingdom have been competing for the top three positions as the highest developed countries, in most years, Germany leads France, Canada, and Italy, respectively.

Both the United States and Japan's entrepreneurial activity levels seem to be highly affected by their GDP. In 2015, the United States, either with or without considering GDP in the analysis, ranks first among the G7 economies, however, it separates itself further from the second-ranked country, the United Kingdom, when calculated with GDP. Also, in 2015, the United Kingdom, depreciates to third place behind Japan when considering GDP; therefore, Japan shows to be more robust GDP-wise, in 2015, compared to the United Kingdom. In 2016, when GDP is not considered, Japan ranks first with the United States and the United Kingdom

following it, respectively. Whereas, when GDP is considered, the United States' GDP is extraordinarily high that it becomes an outlier who does not fit in the ranking and Japan leads ahead of the United Kingdom. In 2017, the development rankings do not differ with or without GDP and Japan leads ahead of the United States and the United Kingdom, respectively. The same pattern stays true for 2018 when GDP is ignored, but, with factoring in GDP, the United States takes the first spot from Japan. Lastly, in 2019, the development ranking of the G7 entails the United States as the top developed economy, followed by Japan and the United Kingdom, in order.

The strategic choices that countries implement into their economy indicate how much time and resource they put into each input variable. The strategies used by the top two developed economies in the G7, the United States and Japan, are highly driven by innovation (Bosma et al., 2019). Nevertheless, Japan has half the population of the US while only 10.6% of Japanese adults perceived that entrepreneurial opportunities existed in their country, in 2019, compared to 67.2% in the US (Bosma et al., 2019). The high level of perceived entrepreneurial opportunities evidenced by Bosma and colleagues validates our 2019 findings since the United States surpasses the G7, even Japan, as a thriving developed nation.

A survey study by Hoshino (2013) indicates that Japan generally does a poor job at exhibiting entrepreneurial indicators whereas Japan's specific indicators like physical infrastructure and internal market dynamics are valued most positively. Thus, even though Japan manifests weak entrepreneurship characteristics, it is given a huge advantage in the strategic entrepreneurship model due to our selection of physical infrastructure and internal market dynamics as specific indicators from GEM. Hoshino (2013) also states that Japan has shown an increasing tendency in entrepreneurial activity, entrepreneurial intention, and job growth. It is noteworthy to mention that our study has taken place a few years after Hoshino's report, hence, Japan's recent eminence in entrepreneurship could have resulted from Japan's efforts to improve its entrepreneurship attributes.

The triangle of entrepreneurship, innovation, and economy fortifies the development of countries at its center to move societies strategically toward a stronger and more sustainable entrepreneurial position in the current global financial competition. The highest developed countries in the G7 such as the United States and Japan reassure their top positions by re-investing into entrepreneurial indicators such as physical infrastructure and internal market dynamics, along with their GDP's high status. Nonetheless, for ranking high in economic development, government leaders need to incorporate entrepreneurship, innovation, and economy collectively in the implementation of strategic development choices. Our literature review on the relationship between the aforementioned three inputs reinforces how tightly they are connected together.

At last, this chapter established an evidence-based review on the effort the most economic developed group, the G7, have conserved during the past 5 years into three fundamental inputs. The economic policymakers have and will play a central role in guiding the public economy and its development; based on this review, there are three key points to focus on to raise an entrepreneurial behavior within the society. First, the analogous strategic entrepreneurship model processed the aforementioned

three inputs with specific representatives—i.e., indicators of GEM, indices of GII, and GDP. By continuously incentivizing the collection of more and high-quality data, policymakers will have more vigorous and variable input datasets which reduce the chance of misrepresentation or underestimation of the public economy. Second, based on the taxonomy analyzation on the entry inputs within this study, allocating resources and time into specific indicators/indices such as internal market dynamics and infrastructure is associated with potential rewards in economic development. Third, a neoclassical economic approach is recommended for sustaining a developed economy because strategic entrepreneurship grows stronger with the entrepreneurial endeavors of each and every citizen; any interruption by a handful of individuals such as the government will hinder the natural flux of innovative activities.

Acknowledgments The authorization granted to use the data and material originally provided by WIPO (the World Intellectual Property Organization) is appreciatively acknowledged. The secretariat of WIPO supposes no responsibility or liability with regard to the transformation of this data.

Appendix

Table 6 GEM and GII Data Matrix (Xij) for the G7 Economies in 2015

GEM and GII Dataset for the G7 Countries						
2015	Internal Market Dynamics (GEM)	Infrastructure (GII)	Physical Infrastructure (GEM)	Market Sophistication (GII)	Business Sophistication (GII)	Creative Goods and Services (GII)
Canada	3.8	60.9	6.97	73.5	49.3	23.3
France	4.48	60.8	7.22	59	49.3	34.6
Germany	4.5	56.7	6.44	59.2	49.2	28.1
Italy	4.26	57.6	5.11	53.6	40.6	27.4
Japan	6.5	63.1	6.9	64.3	50.4	35.9
United Kingdom	5.02	63	5.92	74.3	53.6	48.1
United States	5.64	58.8	7.1	81.5	55.4	39.7
Sum.	34.2	420.9	45.66	465.4	347.8	237.1
Ave.	4.886	60.129	6.523	66.486	49.686	33.871

(Source: Authors' work based on GEM & GII data)

Table 7 GEM and GII Data Matrix with GDP (Xij) for the G7 Economies in 2015

GEM and GII Dataset for the G7 Countries (with GDP)							
2015	GDP (US $)	Internal Market Dynamics (GEM)	Infrastructure (GII)	Physical Infrastructure (GEM)	Market Sophistication (GII)	Business Sophistication (GII)	Creative Goods and Services (GII)
Canada	1788.7	3.8	60.9	6.97	73.5	49.3	23.3
France	2846.9	4.48	60.8	7.22	59	49.3	34.6
Germany	3859.5	4.5	56.7	6.44	59.2	49.2	28.1
Italy	2148	4.26	57.6	5.11	53.6	40.6	27.4
Japan	4616.3	6.5	63.1	6.9	64.3	50.4	35.9
United Kingdom	2945.5	5.02	63	5.92	74.3	53.6	48.1
United States	17418.9	5.64	58.8	7.1	81.5	55.4	39.7
Sum.	35623.8	34.2	420.9	45.66	465.4	347.8	237.1
Ave.	5089.114	4.886	60.129	6.523	66.486	49.686	33.871

(Source: Authors' work based on GEM &GII data)

Table 8 GEM and GII Data Matrix (Xij) for the G7 Economies in 2016

GEM and GII Dataset for the G7 Countries						
2016	Internal Market Dynamics (GEM)	Infrastructure (GII)	Physical Infrastructure (GEM)	Market Sophistication (GII)	Business Sophistication (GII)	Creative Goods and Services (GII)
Canada	5.05	62.3	6.61	73.6	46.5	25.9
France	4.68	63.7	7.42	61.9	48	38
Germany	5.16	58.5	6.3	59.7	48.3	34.4
Italy	4.5	59.7	5.14	53.6	37.8	29.4
Japan	6.67	64.4	7.28	68.3	52.8	38.3
United Kingdom	4.24	66.4	6	71.6	49.2	48.6
United States	5.15	61.7	6.97	86.6	52.4	49.8
Sum	35.450	436.700	45.720	475.300	335.000	264.400
Ave	5.064	62.386	6.531	67.900	47.857	37.771

(Source: Authors' own work based on GEM & GII data)

Table 9 GEM and GII Data Matrix with GDP (Xij) for the G7 Economies in 2016

GEM and GII Dataset for the G7 Countries (with GDP)							
2016	GDP	Internal Market Dynamics (GEM)	Infrastructure (GII)	Physical Infrastructure (GEM)	Market Sophistication (GII)	Business Sophistication (GII)	Creative Goods and Services (GII)
Canada	1552.4	5.05	62.3	6.61	73.6	46.5	25.9
France	2421.6	4.68	63.7	7.42	61.9	48	38
Germany	3357.6	5.16	58.5	6.3	59.7	48.3	34.4
Italy	1815.8	4.5	59.7	5.14	53.6	37.8	29.4
Japan	4123.3	6.67	64.4	7.28	68.3	52.8	38.3
United Kingdom	2849.3	4.24	66.4	6	71.6	49.2	48.6
United States	17947	5.15	61.7	6.97	86.6	52.4	49.8
Sum	34067	35.450	436.700	45.720	475.300	335.000	264.400
Ave	4866.714	5.064	62.386	6.531	67.900	47.857	37.771

(Source: Authors' own work based on GEM & GII data)

Table 10 GEM and GII Data Matrix (Xij) for the G7 Economies in 2017

GEM and GII Dataset for die G7 Countries						
2017	Internal Market Dynamics (GEM)	Infrastructure (GII)	Physical Infrastructure (GEM)	Market Sophistication (GII)	Business Sophistication (GII)	Creative Goods and Services (Gll)
Canada	4.63	62.1	6.42	73.7	47.8	20.7
France	4.48	63.4	7.16	64.3	50.6	34.5
Germany	4.6	61.5	6.62	60	51.4	31.7
Italy	5.18	61.8	5.39	52.6	39.6	25.8
Japan	7.11	64.3	7.48	64.3	54.5	34.3
United Kingdom	4.44	67.1	5.94	70.2	52.2	45.6
United States	4.63	61	6.42	83.4	56.4	48.2
Sum	35.070	441.200	45.430	468.500	352.500	240.800
Ave	5.010	63.029	6.490	66.929	50.357	34.400

Source: Authors' own work based on GEM & GII data

Table 11 GEM and GII Data Matrix with GDP (Xij) for the G7 Economies in 2017

GEM and GII Dataset for the G7 Countries (with GDP)							
2017	GDP (US $)	Internal Market Dynamics (GEM)	Infra-structure (GII)	Physical Infrastruc-ture (GEM)	Market Sophistica-tion (GII)	Business Sophistica-tion (GII)	Creative Goods and Services (Gll)
Canada	1532.3	4.63	62.1	6.42	73.7	47.8	20.7
France	2488.3	4.48	63.4	7.16	64.3	50.6	34.5
Germany	3494.9	4.6	61.5	6.62	60	51.4	31.7
Italy	1852.5	5.18	61.8	5.39	52.6	39.6	25.8
Japan	4730.3	7.11	64.3	7.48	64.3	54.5	34.3
United Kingdom	2649.9	4.44	67.1	5.94	70.2	52.2	45.6
United States	18561.9	4.63	61	6.42	83.4	56.4	48.2
Sum	35310.1	35.070	441.200	45.430	468.500	352.500	240.800
Ave	5044.3	5.010	63.029	6.490	66.929	50.357	34.400

Source: Authors' own work based on GEM & GII data

Table 12 GEM and GII Data Matrix (Xij) for the G7 Economies in 2018

GEM and GII Dataset for the G7 Countries						
2018	Internal Market Dynamics (GEM)	Infrastructure (GII)	Physical Infrastructure (GEM)	Market Sophistication (GII)	Business Sophistication (GII)	Creative Goods and Services (Gll)
Canada	4.24	60.2	6.71	75.2	47.6	21.2
France	4.29	62.9	7.65	65	50.6	36.7
Germany	5.07	60.5	6.06	58.5	52.8	33.7
Italy	5.01	61.5	4.99	50.9	39.6	29.3
Japan	6.97	64	7.33	65.3	53.8	40.3
United Kingdom	4.91	65.8	5.59	72	53	57
United States	5.49	58.8	7.08	85.1	56.1	51
Sum	55.980	433.700	45.410	472.000	353.500	269.200
Ave	5.140	61.957	6.487	67.429	50.500	38.457

Source: Authors' own work based on GEM & GII data

Table 13 GEM and GII Data Matrix with GDP (Xij) for the G7 Economies in 2018

GEM and GII Dataset for the G7 Countries (with GDP)							
2018	GDP (US $)	Internal Market Dynamics (GEM)	Infrastructure (GII)	Physical Infrastructure (GEM)	Market Sophistication (GII)	Business Sophistication (GII)	Creative Goods and Services (Gll)
Canada	1763.8	4.24	60.2	6.71	75.2	47.6	21.2
France	2826.5	4.29	62.9	7.65	65	50.6	36.7
Germany	4149.6	5.07	60.5	6.06	58.5	52.8	33.7
Italy	2307.1	5.01	61.5	4.99	50.9	39.6	29.3
Japan	5405.1	6.97	64	7.33	65.3	53.8	40.3
United Kingdom	2880.3	4.91	65.8	5.59	72	53	57
United States	19362.1	5.49	58.8	7.08	85.1	56.1	51
Sum	38634.500	35.980	433.700	45.410	472.000	353.500	269.200
Ave	5527.786	5.140	61.957	6.487	67.429	50.500	38.457

Source: Authors' own work based on GEM & GII data

Table 14 GEM and GII Data Matrix (Xij) for the G7 Economies in 2019

GEM and GII Dataset for the G7 Countries						
2019	Internal Market Dynamics (GEM)	Infrastructure (GII)	Physical Infrastructure (GEM)	Market Sophistication (GII)	Business Sophistication (GII)	Creative Goods and Services (GII)
Canada	5.09	58.5	7.03	80.4	49.9	24.7
France	4.320	62.3	7.54	62.9	53.3	26.6
Germany	5.79	62	6.45	58.6	56.1	26.3
Italy	4.89	59.4	5.4	51.4	42.2	21.7
Japan	6.1	64	7.39	65.8	56.5	30.9
United Kingdom	4.85	64.4	6.54	76	54.3	40.4
United States	4.99	59.2	7.5	87	62.7	43.8
Sum	36.030	429.800	47.850	482.100	375.000	214.400
Ave	5.147	61.400	6.836	68.871	53.571	30.629

(Source: Authors' own work based on GEM & GII data)

Table 15 GEM and GII Data Matrix with GDP (Xij) for the G7 Economies in 2019

GEM and GII Dataset for the G7 Countries (with GDP)							
2019	GDP (US $)	Internal Market Dynamics (GEM)	Infrastructure (GII)	Physical Infrastructure (GEM)	Market Sophistication (GII)	Business Sophistication (GII)	Creative Goods and Services (GII)
Canada	1852.500	5.09	58.5	7.03	80.4	49.9	24.7
France	2968.500	4.320	62.3	7.54	62.9	53.3	26.6
Germany	4379.100	5.79	62	6.45	58.6	56.1	26.3
Italy	2398.200	4.89	59.4	5.4	51.4	42.2	21.7
Japan	5632.500	6.1	64	7.39	65.8	56.5	30.9
United Kingdom	3033.700	4.85	64.4	6.54	76	54.3	40.4
United States	20513.000	4.99	59.2	7.5	87	62.7	43.8
Sum	40777.500	36.030	429.800	47.850	482.100	375.000	214.400
Ave	5825.357	5.147	61.400	6.836	68.871	53.571	30.629

(Source: Authors' own work based on GEM & GII data)

Table 16 GEM and GII Data Standard Matrix (Zoj) for the G7 Economies in 2015

2015	G7's country Standard Matric (Zoj)					
Canada	−1.275	0.331	0.630	0.748	−0.089	−1.352
France	−0.476	0.288	0.982	−0.798	−0.089	0.093
Germany	−0.453	−1.471	−0.117	−0.777	−0.112	−0.738
Italy	−0.735	−1.085	−1.990	−1.374	−2.096	−0.828
Japan	1.896	1.275	0.531	−0.233	0.165	0.259
United Kingdom	0.158	1.232	−0.849	0.833	0.903	1.820
United States	0.886	−0.570	0.813	1.601	1.318	0.745
Ave.Z_{oj}	0.000	0.000	0.000	0.000	0.000	0.000
Soj	1.000	1.000	1.000	1.000	1.000	1.000

Table 17 GEM and GII Data Matrix with GDP (Zoj) for the G7 Economies in 2015

2015	G7's country Standard Matrix (Zoj)						
Canada	−0.646	−1.275	0.331	0.630	0.748	−0.089	−1.352
France	−0.439	−0.476	0.288	0.982	−0.798	−0.089	0.093
Germany	−0.241	−0.453	−1.471	−0.117	−0.777	−0.112	−0.738
Italy	−0.575	−0.735	−1.085	−1.990	−1.374	−2.096	−0.828
Japan	−0.092	1.896	1.275	0.531	−0.233	0.165	0.259
United Kingdom	−0.419	0.158	1.232	−0.849	0.833	0.903	1.820
United States	2.412	0.886	−0.570	0.813	1.601	1.318	0.745
Ave.Z_{oj}	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Soj	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Table 18 GEM and GII Data Standard Matrix (Zoj) for the G7 Economies in 2016

2016	G7's country Standard Matrix					
Canada	−0.020	−0.034	0.106	0.568	−0.293	−1.427
France	−0.526	0.520	1.203	−0.598	0.031	0.027
Germany	0.131	−1.538	−0.313	−0.818	0.096	−0.405
Italy	−0.772	−1.063	−1.883	−1.426	−2.172	−1.006
Japan	2.197	0.797	1.013	0.040	1.068	0.064
United Kingdom	−1.128	1.589	−0.719	0.369	0.290	1.301
United States	0.117	−0.271	0.594	1.865	0.981	1.446
Ave.Z_{oj}	0.000	0.000	0.000	0.000	0.000	0.000
Soj	1.000	1.000	1.000	1.000	1.000	1.000

Table 19 GEM and GII Data Matrix with GDP (Zoj) for the G7 Economies in 2016

2016	G7s country Standard Matrix (Zoj)						
Canada	−0.614	−0.020	−0.034	0.106	0.568	−0.293	−1.427
France	−0.453	−0.526	0.520	1.203	−0.598	0.031	0.027
Germany	−0.279	0.131	−1.538	−0.313	−0.818	0.096	−0.405
Italy	−0.565	−0.772	−1.063	−1.883	−1.426	−2.172	−1.006
Japan	−0.138	2.197	0.797	1.013	0.040	1.068	0.064
United Kingdom	−0.373	−1.128	1.589	−0.719	0.369	0.290	1.301
United States	2.421	0.117	−0.271	0.594	1.865	0.981	1.446
Ave.Z_{oj}	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Soj	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Table 20 GEM and GII Data Standard Matrix (Zoj) for the G7 Economies in 2017

2017	G7's country Standard Matrix (Zoj)					
Canada	−0.429	−0.471	−0.107	0.734	−0.504	−1.499
France	−0.598	0.189	1.029	−0.285	0.048	0.011
Germany	−0.462	−0.776	0.200	−0.752	0.205	−0.295
Italy	0.192	−0.624	−1.689	−1.554	−2.119	−0.941
Japan	2.369	0.646	1.520	−0.285	0.816	−0.011
United Kingdom	−0.643	2.067	−0.845	0.355	0.363	1.225
United States	−0.429	−1.030	−0.107	1.787	1.190	1.510
Ave.Z_{oj}	0.000	0.000	0.000	0.000	0.000	0.000
Soj	1.000	1.000	1.000	1.000	1.000	1.000

Table 21 GEM and GII Data Matrix with GDP (Zoj) for the G7 Economies in 2017

2017	G7's country Standard Matrix (Zoj)						
Canada	−0.626	−0.429	−0.471	−0.107	0.734	−0.504	−1.499
France	−0.456	−0.598	0.189	1.029	−0.285	0.048	0.011
Germany	−0.276	−0.462	−0.776	0.200	−0.752	0.205	−0.295
Italy	−0.569	0.192	−0.624	−1.689	−1.554	−2.119	−0.941
Japan	−0.056	2.369	0.646	1.520	−0.285	0.816	−0.011
United Kingdom	−0.427	−0.643	2.067	−0.845	0.355	0.363	1.225
United States	2.411	−0.429	−1.030	−0.107	1.787	1.190	1.510
Ave.Z_{oj}	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Soj	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Table 22 GEM and GII Data Standard Matrix (Zoj) for the G7 Economies in 2018

2018	G7's country Standard Matrix (Zoj)					
Canada	−1.057	−0.783	0.247	0.747	−0.570	−1.512
France	−0.998	0.420	1.290	−0.234	0.020	−0.154
Germany	−0.082	−0.650	−0.474	−0.859	0.452	−0.417
Italy	−0.153	−0.204	−1.660	−1.590	−2.143	−0.802
Japan	2.148	0.911	0.935	−0.205	0.649	0.161
United Kingdom	−0.270	1.713	−0.995	0.440	0.492	1.625
United States	0.411	−1.408	0.657	1.699	1.101	1.099
Ave.Z_{oj}	0.000	0.000	0.000	0.000	0.000	0.000
Soj	1.000	1.000	1.000	1.000	1.000	1.000

Table 23 GEM and GII Data Matrix with GDP (Zoj) for the G7 Economies in 2018

2018	G7's country Standard Matrix (Zoj)						
Canada	−0.654	−1.057	−0.783	0.247	0.747	−0.570	−1.512
France	−0.469	−0.998	0.420	1.290	−0.234	0.020	−0.154
Germany	−0.239	−0.082	−0.650	−0.474	−0.859	0.452	−0.417
Italy	−0.559	−0.153	−0.204	−1.660	−1.590	−2.143	−0.802
Japan	−0.021	2.148	0.911	0.935	−0.205	0.649	0.161
United Kingdom	−0.460	−0.270	1.713	−0.995	0.440	0.492	1.625
United States	2.402	0.411	−1.408	0.657	1.699	1.101	1.099
Ave.Z_{oj}	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Soj	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Table 24 GEM and GII Data Standard Matrix (Zoj) for the G7 Economies in 2019

2019	G7's country Standard Matrix (Zoj)					
Canada	−0.102	−1.312	0.272	0.980	−0.625	−0.766
France	−1.480	0.407	0.985	−0.508	−0.046	−0.521
Germany	1.150	0.272	−0.539	−0.873	0.430	−0.560
Italy	−0.460	−0.905	−2.008	−1.486	−1.935	−1.154
Japan	1.704	1.177	0.775	−0.261	0.498	0.035
United Kingdom	−0.532	1.358	−0.414	0.606	0.124	1.263
United States	−0.281	−0.996	0.929	1.541	1.554	1.703
Ave.Z_{oj}	0.000	0.000	0.000	0.000	0.000	0.000
Soj	1.000	1.000	1.000	1.000	1.000	1.000

Table 25 GEM and GII Data Matrix with GDP (Zoj) for the G7 Economies in 2019

2019	G7's country Standard Matrix (Zoj)						
Canada	−0.650	−0.102	−1.312	0.272	0.980	−0.625	−0.766
France	−0.468	−1.480	0.407	0.985	−0.508	−0.046	−0.521
Germany	−0.237	1.150	0.272	−0.539	−0.873	0.430	−0.560
Italy	−0.561	−0.460	−0.905	−2.008	−1.486	−1.935	−1.154
Japan	−0.032	1.704	1.177	0.775	−0.261	0.498	0.035
United Kingdom	−0.457	−0.532	1.358	−0.414	0.606	0.124	1.263
United States	2.404	−0.281	−0.996	0.929	1.541	1.554	1.703
Ave.Z_{oj}	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Soj	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Table 26 Compound Distance Matrix for The G7 economies without GDP in 2015 ('D' Matrix)

2015	Canada	France	Germany	Italy	Japan	United Kingdom	United States	shortest distance
Canada		2.290	2.680	4.239	3.818	4.013	3.552	2.29
France	2.290		2.235	3.999	2.686	3.357	3.284	2.235
Germany	2.680	2.235		2.835	3.852	4.287	3.656	2.235
Italy	4.239	3.999	2.835		5.142	5.323	5.808	2.835
Japan	3.818	2.686	3.852	5.142		3.007	3.071	2.686
United Kingdom	4.013	3.357	4.287	5.323	3.007		2.908	2.908
United States	3.552	3.284	3.656	5.808	3.071	2.908		2.908

Table 27 Compound Distance Matrix for The G7 economies with GDP in 2015 ('D' Matrix)

2015	Canada	France	Germany	Italy	Japan	United Kingdom	United States	shortest distance
Canada		2.299	2.710	4.239	3.858	4.019	4.687	2.299
France	2.299		2.243	4.001	2.708	3.357	4.348	2.243
Germany	2.710	2.243		2.855	3.855	4.291	4.517	2.243
Italy	4.239	4.001	2.855		5.164	5.325	6.531	2.855
Japan	3.858	2.708	3.855	5.164		3.025	3.963	2.708
United Kingdom	4.019	3.357	4.291	5.325	3.025		4.059	4.019
United States	4.687	4.348	4.517	6.531	3.963	4.059		4.059

Table 28 Compound Distance Matrix for The G7 economies without GDP in 2016 ('D' Matrix)

2016	Canada	France	Germany	Italy	Japan	United Kingdom	United States	short distance
Canada		2.312	2.362	3.643	3.283	3.516	3.445	2.312
France	2.312		2.684	4.324	3.001	2.797	3.224	2.312
Germany	2.362	2.684		3.063	3.658	3.985	3.719	2.362
Italy	3.643	4.324	3.063		5.870	4.809	5.860	3.063
Japan	3.283	3.001	3.658	5.870		4.114	3.300	3.001
United Kingdom	3.516	2.797	3.985	4.809	4.114		3.077	2.797
United States	3.445	3.224	3.719	5.860	3.300	3.077		3.077

Table 29 Compound Distance Matrix for The G7 economies with GDP in 2016 ('D' Matrix)

2016	Canada	France	Germany	Italy	Japan	United Kingdom	United States	short distance
Canada		2.318	2.385	3.643	3.317	3.525	4.591	2.318
France	2.318		2.690	4.326	3.018	2.798	4.319	2.318
Germany	2.385	2.690		3.076	3.660	3.987	4.596	2.385
Italy	3.643	4.326	3.076		5.885	4.812	6.577	3.076
Japan	3.317	3.018	3.660	5.885		4.121	4.176	3.018
United Kingdom	3.525	2.798	3.987	4.812	4.121		4.157	2.798
United States	4.591	4.319	4.596	6.577	4.176	4.157		4.157

Table 30 Compound Distance Matrix for The G7 economies without GDP in 2017 (‘D’ Matrix)

2017	Canada	France	Germany	Italy	Japan	United Kingdom	United States	shortest distance
Canada		2.319	2.085	3.327	4.089	3.918	3.652	2.085
France	2.319		1.405	3.985	3.137	3.004	3.263	1.405
Germany	2.085	1.405		3.237	3.529	3.573	3.291	1.405
Italy	3.327	3.985	3.237		5.267	4.811	5.583	3.237
Japan	4.089	3.137	3.529	5.267		4.339	4.475	3.137
United Kingdom	3.918	3.004	3.573	4.811	4.339		3.605	3.004
United States	3.652	3.263	3.291	5.583	4.475	3.605		3.263

Table 31 Compound Distance Matrix for The G7 economies with GDP in 2017 (‘D’ Matrix)

2017	Canada	France	Germany	Italy	Japan	United Kingdom	United States	shortest distance
Canada		2.325	2.114	3.327	4.128	3.923	4.750	2.114
France	2.325		1.416	3.987	3.163	3.004	4.344	1.416
Germany	2.114	1.416		3.251	3.536	3.576	4.249	1.416
Italy	3.327	3.987	3.251		5.292	4.813	6.328	3.251
Japan	4.128	3.163	3.536	5.292		4.355	5.110	3.163
United Kingdom	3.923	3.004	3.576	4.813	4.355		4.588	3.004
United States	4.750	4.344	4.249	6.328	5.110	4.588		4.249

Table 32 Compound Distance Matrix for The G7 economies without GDP in 2018 (‘D’ Matrix)

2018	Canada	France	Germany	Italy	Japan	United Kingdom	United States	Shortest distance
Canada		2.386	2.512	3.637	4.337	4.411	3.637	2.386
France	2.386		2.396	4.092	3.281	3.355	3.493	2.386
Germany	2.512	2.396		3.005	3.193	3.427	3.370	2.395
Italy	3.637	4.092	3.005		4.890	4.592	5.665	3.005
Japan	4.337	3.281	3.193	4.890		3.577	3.630	3.193
United Kingdom	4.411	3.355	3.427	4.592	3.577		3.895	3.355
United States	3.637	3.493	3.370	5.665	3.630	3.895		3.370

Table 33 Compound Distance Matrix for The G7 economies with GDP in 2018 (‘D’ Matrix)

2018	Canada	France	Germany	Italy	Japan	United Kingdom	United States	Shortest distance
Canada		2.393	2.546	3.639	4.383	4.415	4.750	2.393
France	2.393		2.407	4.093	3.311	3.355	4.522	2.393
Germany	2.546	2.407		3.022	3.200	3.434	4.282	2.407
Italy	3.639	4.093	3.022		4.920	4.593	6.393	3.022
Japan	4.383	3.311	3.200	4.920		3.604	4.365	3.200
United Kingdom	4.415	3.355	3.434	4.593	3.604		4.833	3.355
United States	4.750	4.522	4.282	6.393	4.365	4.833		4.282

Table 34 Compound Distance Matrix for The G7 economies without GDP in 2019 ('D' Matrix)

2019	Canada	France	Germany	Italy	Japan	United Kingdom	United States	Shortest distance
Canada		2.824	3.054	3.666	3.627	3.550	3.424	2.824
France	2.824		3.101	4.080	3.382	2.865	3.887	2.824
Germany	3.054	3.101		3.529	1.894	3.103	4.245	1.894
Italy	3.666	4.080	3.529		5.059	4.704	6.177	3.529
Japan	3.627	3.382	1.894	5.059		2.974	3.978	1.894
United Kingdom	3.550	2.865	3.103	4.704	2.974		3.243	2.865
United States	3.424	3.887	4.245	6.177	3.978	3.243		3.243

Table 35 Compound Distance Matrix for The G7 economies with GDP in 2019 ('D' Matrix)

2019	Canada	France	Germany	Italy	Japan	United Kingdom	United States	Shortest distance
Canada		2.829	3.082	3.667	3.680	3.555	4.588	2.829
France	2.829		3.110	4.081	3.410	2.865	4.833	2.829
Germany	3.082	3.110		3.544	1.905	3.111	4.999	1.905
Italy	3.667	4.081	3.544		5.087	4.705	6.852	3.544
Japan	3.680	3.410	1.905	5.087		3.004	4.665	1.905
United Kingdom	3.555	2.865	3.111	4.705	3.004		4.324	2.865
United States	4.588	4.833	4.999	6.852	4.665	4.324		4.324

Table 36 Compound Distance Matrix for The G7 economies with GDP in 2016 ('D' Matrix) after elimination of the United States

2016	Canada	France	Germany	Italy	Japan	United Kingdom	short distance
Canada		3.097	3.709	4.460	4.766	4.367	3.097
France	3.097		2.981	4.724	3.762	3.243	2.981
Germany	3.709	2.981		3.847	3.970	4.462	2.981
Italy	4.460	4.724	3.847		6.973	5.775	3.847
Japan	4.766	3.762	3.970	6.973		4.546	3.762
United Kingdom	4.367	3.243	4.462	5.775	4.546		3.243

References

Acs, Z. J., Desai, S., & Hessels, J. (2008). Entrepreneurship, economic development and institutions. *Small Business Economy, 31*, 219–234. https://doi.org/10.1007/s11187-008-9135-9

Audretsch, D. B., Heger, D., & Veith, T. (2015). Infrastructure and Entrepreneurship. *Small Business Economy, 44*, 219–230. https://doi.org/10.1007/s11187-014-9600-6

Audretsch, D. B., Keilbach, M., & Lehmann, E. (2006). *Entrepreneurship and Economic Growth*. https://doi.org/10.1093/acprof:oso/9780195183511.001.0001

Audretsch, D. B., & Thurik, R. (2001). What is new about the new economy: sources of growth in the managed and entrepreneurial economies. *Industrial and Corporate Change., 10*(1), 25–48. https://doi.org/10.1093/icc/10.1.267

Babson College, Babson Park, MA, United States Lead Sponsoring Institution and Founding Institution

Bakhshi, H., & Mcvittie, E. (2009). Creative supply-chain linkages and innovation: Do the creative industries stimulate business innovation in the wider economy? *Innovations, 11*(2), 169–189. https://doi.org/10.5172/impp.11.2.169

Barney, J. B., & Hesterly, W. S. (2006). *Strategic Management and Competitive Advantage: Concepts and Cases*. Prentice Hall.

Baumol, W. (1990). Entrepreneurship: Productive, Unproductive and Destructive. *Journal of Political Economy, 98*, 893–921.

Benz, M. (2006). Entrepreneurship as a non-profit-seeking activity. In *Institute for Empirical Research in Economics Working Paper #243*. University of Zurich.

Bosma, N., Content, J., Sanders, M., & Stam, E. (2018). Institutions, entrepreneurship, and economic growth in Europe. *Small Business Economy, 51*, 483–499.

Bosma, N., Hill, S., Lonescu-Somers, A., Kelley, D., Levie, J., & Tarnawa, A. (2019). The Global Entrepreneurship Research Association. In *London Business School*. Witchwood Production House.

Cogan, J. F., Cwik, T., Taylor, J. B., & Wieland, V. (2010). New Keynesian versus old Keynesian government spending multipliers. *Journal of Economic Dynamics and Control, 34*(3), 281–295.

Crotty, J. R. (1992). Neoclassical and Keynesian approaches to the theory of investment. *Journal of Post Keynesian Economy, 14*, 483–496.

Davidsson, P. (2004). *Researching Entrepreneurship*. Springer.

Doran, J., McCarthy, N., & O'Connor, M. (2018). The role of entrepreneurship in stimulating economic growth in developed and developing countries. *Cogent Economics & Finance, 6*(1), 1442093. https://doi.org/10.1080/23322039.2018.1442093

Faghih, N., & Sazegar, M. (2019a). A Taxonomy of Country Performance Based on GDP and Innovation Indicators for the Group of Twenty (G20). In N. Faghih (Ed.), *Globalization and Development : Contributions to Economics* (pp. 163–200). Springer.

Faghih, N., & Sazegar, M. (2019b). Globalization development within the group of twenty (G20) as indicated by globalization and innovation indices. In N. Faghih (Ed.), *Globalization and development: Economic and socio-cultural perspectives from emerging markets* (pp. 15–48). Springer.

GII, Global Innovation Index. (2015). Cornell University, INSEAD, and WIPO (2015): The Global Innovation Index 2015: Effective Innovation Policies for Development, Fontainebleau, Ithaca, and Geneva. ISSN 2263-3693 -ISBN 978-2-9522210-8-5

GII, Global Innovation Index. (2016). Cornell University, INSEAD, and WIPO (2016): The Global Innovation Index 2016: Winning with Global Innovation, Ithaca, Fontainebleau, and Geneva. ISSN 2263-3693 ISBN 979-10-95870-01-2

GII, Global Innovation Index. (2017). Cornell University, INSEAD, and WIPO (2017): The Global Innovation Index 2017: Innovation Feeding the World, Ithaca, Fontainebleau, and Geneva. ISSN 2263-3693 ISBN 979-10-95870-04-3

GII, Global Innovation Index. (2018). Cornell University, INSEAD, and WIPO (2018): The Global Innovation Index 2018: Energizing the World with Innovation. Ithaca, Fontainebleau, and Geneva. ISSN 2263-3993 ISBN 979-10-95870-09-8

GII, Global Innovation Index. (2019). Innovation Feeding the World, Cornell University, INSEAD, and WIPO (2019); The Global Innovation Index 2019: Creating Healthy Lives—The Future of Medical Innovation, Ithaca, Fontainebleau, and Geneva. ISSN 2263-3693 ISBN 979-10-95870-14-2

GII, Global Innovation Index. (2020). Cornell University, INSEAD, and WIPO (2020). The Global Innovation Index 2020: Who Will Finance Innovation? Ithaca, Fontainebleau, and Geneva. ISSN 2263-3693 ISBN 978-2-38192-000-9.

Gordon, M. J. (1992). The Neoclassical and a post Keynesian theory of investment. *Journal of Post Keynesian Economy, 14*, 425–443.

Gottinger, H. W. (2016). Innovation, dynamics of competition and market dynamics. *Archives of Business Research, 4*(1). https://doi.org/10.14738/abr.41.1737

Gregory, D. (2018). *Strategic management* (p. 73). McGraw-Hill.

Guerzoni, M. (2007). The impact of market size and users sophistication on innovation: The patterns of demand and the technology life cycle. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.1022025

Henry, J. F. (2008). The ideology of the Laissez program. *Journal of Economic Issues, 42*(1), 209–224.

Hitt, M. A., Ireland, R. D., & Hoskisson, R. E. (2009). *Strategic management: Competitiveness and globalization* (8th ed.). Cengage Learning.

Hitt, M. A., & Duane, R. (2017). *The intersection of entrepreneurship and strategic management research*. Blackwell Publishers Ltd.. https://doi.org/10.1002/9781405164214.ch3

Hoshino, M. (2013). Entrepreneurship characteristics of Japan: Comparison among innovation driven economies. *Annual Review of Economics, 29*, 29–44.

Kyrgidou, L. P., & Hughes, M. (2010). Strategic entrepreneurship: origins, core elements and research directions. *European Business Review, 22*(1), 43–63. https://doi.org/10.1108/09555341011009007

Kaplan, R. S. (2001). Transforming the balanced scorecard from performance measurement to strategic management. *Part I, Accounting Horizons, 15*(1), 87–104.

Kirikkaleli, D., & Ozun, A. (2019). Innovation capacity, business sophistication and macroeconomic stability: empirical evidence from OECD countries. *Journal of Business Economics and Management, 20*(2), 351–367. https://doi.org/10.3846/jbem.2019.9602

Kessler, M. (1961). The Synthetic Vision of Joseph Schumpeter. *Review of Politics, 23*, 334.

Kuratko, D. F., & Audretsch, D. B. (2009). Strategic entrepreneurship: exploring different perspectives of anemerging concept. *Entrepreneurship theory and practice, 33*(1), 1-17.

Leijonhufvud, A. (2009). Out of the corridor: Keynes and the crisis. *Cambridge Journal of Economics, 33*(4), 741–757.

Liu, J. Y. (2010). A conceptual model of consumer sophistication. *Innovative Marketing, 6*, 3.

Mcfadzean, E., Oloughlin, A., & Shaw, E. (2005). Corporate entrepreneurship and innovation part 1: The missing link. *European Journal of Innovation Management, 8*(3), 350–372. https://doi.org/10.1108/14601060510610207

Morgenstern, O. (1951). Obituary. *Economic Journal, 61*, 203.

Mueller, P. (2007). Exploiting Entrepreneurial Opportunities: The Impact of Entrepreneurship on Growth. *Small Business Economy, 28*, 355–362. https://doi.org/10.1007/s11187-006-9035-9

Murphy, K. M., Schleifer, A., & Vishny, R. W. (1991). The allocation of talent: Implications for growth. *Quarterly Journal of Economics, 106*(2), 503–530.

Naudé, W. (2011). Entrepreneurship and economic development: An introduction. *Entrepreneurship and Economic Development*, 3–17. https://doi.org/10.1057/9780230295155_1

Nijkamp, P. (2010). Entrepreneurship in a modern network economy. *Regional Studies, 37*(4), 395–405. https://doi.org/10.1080/0034340032000074424

Phillips, R. B. (1983). Shape Characters in Numerical Taxonomy and Problems with Ratios. *Taxon, 32*(4), 535–544. https://doi.org/10.2307/1221721

Quesne, W. J. L. (1969). A method of selection of characters in numerical taxonomy. *Systematic Biology, 18*(2), 201–205. https://doi.org/10.2307/2412604

Salas-Velasco, M. (2018). Production efficiency measurement and its determinants across OECD countries: The role of business sophistication and innovation. *Economic Analysis and Policy, 57*, 60–73. https://doi.org/10.1016/j.eap.2017.11.003

Schumpeter, J. A. (1942). *Capitalism, socialism and democracy*. Harper and Row.

Schumpeter, J. A., & Opie, R. (1934). *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle*. Harvard University Press.

Śledzik, K. (2013). Schumpeter's view on innovation and entrepreneurship. *Quarterly Journal of Economics and Economic Policy, 8*(4), 89–95.

Thompson, A. A., Strickland, A. J., & Gamble, J. E. (2007). *Crafting and executing strategy- the quest for competitive advantage: Concepts and cases* (15th ed.). McGraw-Hill Irwin Publisher.

Van De Ven, H. (1993). The development of an infrastructure for entrepreneurship. *Journal of Business Venturing, 8*(3), 211–230. https://doi.org/10.1016/0883-9026(93)90028-4

Van Stel, A., Carree, M., & Thurik, R. (2005). The effect of entrepreneurial activity on national economic growth. *Small Business Economy, 24*, 311–321.

Van Stel, A., & Stam, E. (2011). Types of entrepreneurship and economic growth. *Entrepreneurship, innovation,and economic development*, 78-95.

Wennekers, S., & Thurik, R. (1999). Linking entrepreneurship and economic growth. *Small Business Economics, 13*, 27–56. https://doi.org/10.1023/A:1008063200484

Williamson, J. (2004). *A short history of the Washington consensus*. Peterson Institute for International Economics.

Wolff, R. D., & Resnick, S. A. (2012). *Contending economic theories: Neoclassical, Keynesian, and Marxian*. MIT Press.

Wong, P. K., Ho, Y. P., & Autio, E. (2005). Entrepreneurship, Innovation and Economic Growth: Evidence from GEM Data. *Small Business Economics, 24*, 335–350.

A Study on the Impact of the Fourth Industrial Revolution and Big Data on Human Resources in Italian Companies

Lucio Poma and Haya Al Shawwa

Abstract The Fourth Industrial Revolution poses new challenges and increasing market competition for human resources required with new skills. This chapter examines the impact of Big Data on Human Resources in 38 companies and 3 universities in the Emilia-Romagna region. Companies were divided into two main groups: leading companies in the region that use or produce Big Data and Analytics and Information and Communications Technology (ICT) companies that offer services related to Big Data. Through interviews and questionnaires, it was possible to identify certain challenges faced by companies and territorial strategies required to improve the skills and retain their human resources. This includes the need to channel and adequately blend tacit knowledge with the new codified knowledge born out of the enabling technologies, to increase employee loyalty and membership towards the company to minimize attrition to competition.

Keywords Fourth Industrial Revolution · Big Data · Human resources · Competences · Skills · Training · Tacit knowledge · Codified knowledge · Loyalty · Membership · Corporate Academy · Emilia-Romagna · Italy

1 Introduction

Today, the tug of war between man and machine is undoubtedly a risk to the employment of low-skilled human resources. Since ancient times, the relationship between technology and work has been conflicting. While the discovery of inanimate sources of energy solved the issue of human and animal fatigue, the invention of simple or articulated machines has placed people's occupations at risk. Technological unemployment has ancient roots. Around year 1000 in Italy, watermills were introduced

L. Poma (✉)
Department of Economics and Management, University of Ferrara, Ferrara, Italy
e-mail: pmolcu@unife.it

H. Al Shawwa
Business Division, Higher Colleges of Technology, Sharjah, United Arab Emirates
e-mail: halshawwa@hct.ac.ae

N. Faghih, A. Forouharfar (eds.), *Strategic Entrepreneurship*, Contributions to Management Science, https://doi.org/10.1007/978-3-030-86032-5_3

in the process of fulling cloth, which was earlier performed by workers. One mill replaced more than 40 hands. A few centuries later, in France, this led to popular uprisings of workers against the construction of mills. However, this opposition proved futile and the mills not only spread rapidly but to other fields such as, iron production, sawmills, and paper production (Cipolla, 1995).

The biggest side effect of "modern" unemployment technology is its structural effect, which has gradually grown over time. When water mills was introduced, the workers who used to full cloth were able to find a new occupation. However, peasants lost their jobs in the fields because of the introduction of machines. This reminds us of the most important change highlighted in the third edition of the Principles of Political Economy and Taxation by David Ricardo (1817, 2015), as Sraffa (1951) recalls, which is Ricardo's change in opinion concerning the introduction of machines. While in the first edition the introduction of machines was considered beneficial for all social classes, in the third edition he believes that the use of machines is often detrimental to the interest of the working class. However, the large-scale introduction of machines will require a new workforce to manufacture the machines themselves. Since peasants removed from the fields due to machines could not easily become engineers, blacksmiths or carpenters, this job loss created imbalances in the labour market. If machines lead to unemployment in the agricultural sector, the supply chain of machine manufacturing grapples with a labour problem to cope with the massive increase in demand. As John Maynard Keynes stated in the Economic Possibilities for Our Grandchildren (1930), we are being afflicted with a technological unemployment. This means that unemployment due to the discovery of means of economizing the use of labour, is outpacing our ability to find new uses for labour.

As technology becomes more extensive, the labour market unsettlement or substitution effect is vast, and workers with varied capabilities are likely to become rapidly obsolete.

The new term, Industry 4.0, stresses that the Fourth Industrial Revolution is underway. This is not a simple technological change, but a more far-reaching process that involves the technological, economic, social and organizational spheres: a "disruptive innovation" that modifies the rules of the game and competition between companies and nations. No radical technological innovation can grow and spread without adequate organizational innovation which, if lacking, can be one of the main obstacles to the innovative process. Given the extent of the ongoing transformation, organizational innovation is not confined within the company, but involves the supply chain and the territory in which the company operates.

At the heart of the Fourth Industrial Revolution lies the Cyber Physical System (CPS) which finds its complete realization in the Internet of Things (IoT) or in an articulated sensor system that allows machinery and their components not only to interact with each other but also with people (Human-Machine relationship). These sensors lead to the collection of an immense amount of data (Big Data) which together with data collected outside the company must be stored and processed. In larger companies, which are facing the challenges of the Fourth Industrial Revolution, this has led to the creation of Data Analytics Units. The Fourth Industrial

Revolution poses new challenges for companies from the human resources standpoint. This includes channelling and adequately blending tacit knowledge with the new codified knowledge introduced by the enabling technologies, along with the need to increase employee loyalty and membership towards the company to minimize attrition to competition.

The question that is probed in this research is, what is the impact of Big Data in the most advanced companies in the Emilia-Romagna region? In addition, does Big Data only provide opportunities for STEM[1] graduates? From a quantitative point of view in this research, the answer is yes. However, an important consideration is that Big Data, in the Italian reality, is at its nascent beginning, especially of its cost-effective use. Interviews show that only 23% of the companies interviewed have ongoing Big Data projects.

This research aims to evaluate the impact of the Fourth Industrial Revolution and Big Data in "advanced" companies in the Emilia-Romagna region, with particular interest in human resources. Through direct interviews it was possible to identify certain strategies that companies need to execute to improve the skills and retain their human resources.

2 Methodology

This study is based on a research carried out by the Research Centre for Economic Studies, Nomisma, in 2018. This research included 38 large companies and three universities. The methodology followed six steps.

The first step involved extensive desk analysis and examination of the main contributions of academic literature on the Fourth Industrial Revolution and Big Data. The second step included interviews with people with knowledge and experience on the research subject as well as on the large companies that participated in Big Data conferences, seminars and projects in the region. This was paramount to collect useful information and to identify the companies to be investigated. Step three comprised the sampling of businesses, which were divided into two main groups: leading companies in the region that use or produce Big Data and Analytics and Information and Communications Technology (ICT) companies that offer services related to Big Data. The fourth step involved business interviews. The companies were contacted and were also required to complete a lengthy questionnaire. The fifth step included interviews with supervisors of computer engineering courses, in three out of the four universities in the region. This was a significant step that involved a more in-depth study on human resources with the training and market supply of these resources emerging as one of the strategic issues high in both intensity and recurrence. The final step focused on the elaboration of the results of the interviews and questionnaires.

[1] Science, Technology, Engineering and Mathematics.

The questionnaire was designed on the basis of a long networking experience of the Nomisma research centre and the first author of this study holds role of the scientific supervisor. There were no statistical tests carried out. The questionnaire is mainly qualitative and partly quantitative. The statistical credibility of the questionnaire was based on the extensive desk work and the aid of the previously established connections of the Nomisma research centre. The Nomisma research centre has a 30-year continuous relationship with all the major Italian and regional companies. With this aid, the authors had access to all the companies on the demand and supply side of Big Data and Data Analytics and those that participated in Big Data conferences, seminars and projects in the Emilia-Romagna region.

The questionnaire was considered valid because each individual question addressed specific and relevant aspects of Big Data and human resources. Application of construct validity was effectively facilitated using a panel of experts who were familiar with the measure and the phenomenon.

In addition, the companies interviewed represent the largest share that deal with these issues in the region, in terms of turnover and number of employees. It is important to reiterate that in the last 5 years, the Emilia-Romagna region leads in terms of GDP growth and export rates, in Italy. The region is also home to four main universities and the Big Data supercomputer, the most powerful in Europe.

3 Literature Review

Since its origins at Hannover Fair in 2011, the term "Fourth Industrial Revolution" has been used as a synonym for CPS in the production sector (B-Heuser and Hess, 2016). Over time, the term expanded to include many enabling technologies such as IoT, cloud manufacturing (cloud computing), smart manufacturing; and additive manufacturing technologies (3D). Many definitions of the Fourth Industrial Revolution have been articulated based on various standpoints and research areas. The Fourth Industrial Revolution can be defined as a new level of organization and management of the value chain in the product life cycle, or as a term that combines technologies with concepts of the value chain, within the modular structure of the intelligent factory (Smart Factory), the CPS monitors the physical process by creating a virtual copy of the physical world (Hermann et al., 2016), and cloud manufacturing for the Fourth Industrial Revolution (Thamesa & Schaeferb, 2016).

It's also the usage of available data, where production technologies can be enhanced and converted by the CPS which enables all the physical processes and information flows to be available when and where they are required across holistic manufacturing supply chains, multiple industries, small and medium-sized enterprises (SMEs), and large companies (Zhong et al., 2017). The CPS not only represents the meeting between the physical and the digital world, establishing global networks that include machinery, storage systems and production facilities (Shafiq et al., 2015), but also "systems of collaborating computational entities" in connection with the physical world (Monostori et al., 2016). The ability of two systems to

comprehend one another using the same functionality I called interoperability, (Chen et al., 2008). The architecture of the enterprise has evolved from one that was mainly internal during the 1980s into a vibrant and innovative front for interactions and interoperability, closely connected with the whole surrounding milieu. The enterprise architecture comprises of three subsystems that cooperate with each other: i) physical subsystem, including human and technical agents; ii) decision subsystem, where planning, decision and monitoring actions are carried out; iii) information subsystem, where information flows as well as process, storage and retrieval of data (Romero & Vernadat, 2016). Each of these subsystems can itself be viewed as a complex system, so enterprise architecture can be seen as a System of System (Ackoff, 1971; DiMario, 2010). The new technologies allow a close interaction between these three subsystems, not only within the enterprise but also with the subsystems of the value chain. Today, the most advanced version of Enterprise Resource Planning (ERP) manages IT systems that support intra-organizational collaboration between logistics, procurements, sales, marketing, human resources and finance. (Callaway, 2000; Møller, 2004). In the new millennium, the use of ERP has gone beyond the walls of the enterprise to extend to supply chains, including customers and the sales side of the marketplace through Supply Chain Management (SCM).

The CPS, acts in close collaboration with the diffusion of IoT which is the most widespread technology among the manufacturing companies of the Fourth Industrial Revolution. By relating humans with machines, IoT integrates knowledge between organizations (Lu, 2017), which, increases efficiency and effectiveness in company and value chain management. In 1999, Kevin Ashton first used the term Internet of Things (Ashton, 2009). The term illustrated the power of connecting radiofrequency identification in the field of supply chain management (Lee et al., 2017). Since then the term has received more attention in industry and academia, placing IoT between the revolution of the internet and the metamorphosis of objects (Sundmaeker et al., 2010). Today there are several definitions of IoT: (1) intelligent objects; (2) an extension of the Internet; (3) a global network infrastructure; (4) the interaction of information (Lee et al., 2017). IoT grasps different fields of knowledge, such as telecommunications, informatics, electronics, and social science for it to develop (Atzori et al., 2010). In this revolution, the role of the government is of unprecedented strategic significance, both in the supply and use of data and in guaranteeing human resources with suitable training to deal with the change.

Both CPS and IoT require the processing of an extraordinary amount of data. Therefore, today Big Data is at the heart of many manufacturing and service companies' action plans. The volume and level of detail of data captured by enterprises using IoT produced a vast flow of data that can be processed to create new products and services and more articulated competitive contexts. Expanding the definition, Boyd and Crawford (2012), describe Big Data as a cultural, technological and academic phenomenon that results from the interaction of three elements: technology, analysis, and mythology. Massive data sets offer a higher form of intelligence and knowledge that can generate insights, which were previously impossible. Big data is usually defined by four Vs: volume, variety, velocity and value (Zikopoulos et al.,

2012; Berman, 2013; Gantz & Reinsel, 2011) to which the fifth V (5Vs model) of "veracity" was in recently added (Bello-Orgaz et al., 2016). The diverse flows of information offer enterprises an enormous amount of data, which is growing exponentially every year (Kaisler et al., 2013), that are too complex to be processed with the standard software available to organizations and enterprises (Mayer-Schonberger & Cukier, 2013). It is linked with codified knowledge (Bandyopadhyay & Sen, 2011), which is then processed by complex algorithms, which can be pushed up to artificial intelligence (Duan et al., 2019; Xing et al., 2016). The data can be handled through a company's own Business Intelligence (BI) division or by using infrastructure as a Service (IaaS) delivered over the Internet and remote data centres, used mostly by small and medium-sized enterprises that lack the resources to create their own BI (Armbrust et al., 2010). It is considered a powerful technology to carry out complex and large-scale computing operations without the need to maintain costly computing hardware, dedicated space, and software (Hashem et al., 2015), and for this reason, it has extensively spread among organizations (Huan, 2013). However, three problems delay its application: (1) a fear linked to security in terms of data management for cybersecurity (Hipgrave, 2013; Lee, 2019); (2) the desire to not outsource information and strategic knowledge; (3) the customization of some of the processes necessary for a company.

The use of artificial intelligence would appear to crush human resources in a small corner, as noninterfering observers of automatic systems, which, in addition to producing, it replaces human resources in the decision-making processes (Onik et al., 2018; Forrester Research, 2018). The Fourth Industrial Revolution and Big Data require codified knowledge in order for them to operate, whereas in companies, there is a widespread of tacit knowledge. Generally our actions depend on a pool of knowledge, some of which we are conscious of, and some of which we are not, when not fully conscious, tacit knowledge is formed (Polanyi, 1958). Therefore, knowledge can be separated into two categories: codified knowledge and tacit knowledge. The first is transmitted through languages, IT systems, and theoretical and technical manuals. The second is usually passed from teacher to pupil through observation and learning by trial and error (Arrow, 1971).

Italian industrial districts and production chains produce a great amount of tacit knowledge, which forms the tradition and heritage of businesses. If this transmission method is interrupted, replaced by the new languages of the Fourth Industrial Revolution, this amount of tacit knowledge would be lost. For this reason, some large companies have created corporate academies (Allen, 2007; Prince & Stewart, 2002), with the aim of transferring and maintaining the pool of tacit knowledge present in companies and facilitating organizational change (Prince & Beaver, 2001). Furthermore, this structured training process aimed at creating a shared corporate sense (Allen, 2002), retains human resources within the company.

4 Results

From Table 1 below, it's evident that finding suitable human resources is of major concern for both companies, those who use or produce Big Data for their products and Information and Communications Technology (ICT) companies that offer services related to Big Data. Seventy-seven percent of the companies who use or produce Big Data stated the difficulty of finding the required human resources in the Italian market to develop Big Data and hire more data scientists or increase the size of their Data Analytics unit. However, only 23% of these production and service companies specified lack of human capital training or possession of specific skills as an issue. In other words, universities adequately train individuals with the correct and required skills for the needs of businesses, but they are numerically insufficient to meet the rapid demand of companies that develop Big Data. Similarly, ICT companies who offer Big Data services stated the difficulty in finding the needed resources (75%), and a higher percent specified lack of human capital possession of adequate skills as an issue (37%).

The major gap seems to be in the use and design of artificial intelligence. The competitive edge for companies dealing with Big Data will be based on data possession, immense data warehouses of personal data combined with powerful machines with enormous computing capacity. However, for artificial intelligence, competitive edge is due to the distinctive competences of human resources. The companies interviewed were aware of the strategic importance of ensuring adequate human resources, possibly the best, in the market.

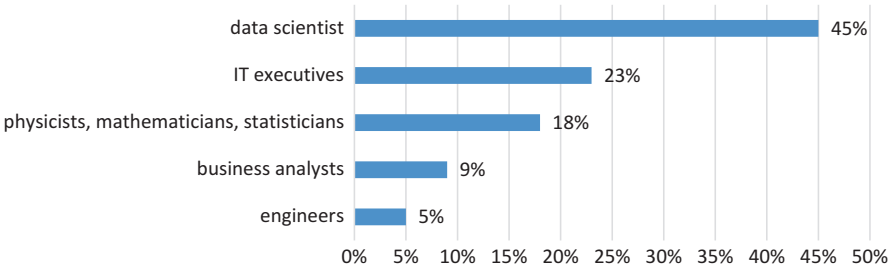
As shown in Fig. 1, the required professional skills for Big Data are mostly data scientists (45%), IT executives (23%), physicists and mathematicians (18%), business analysts (9%) and engineers (5%). Trainings in the region are robust and of high quality, but insufficient for the needs of today's competitive environment.

Although all four regional universities offer a three-year undergraduate program, master-degree programs in computer engineering, and degree courses in mathematics and physics, the number of these graduates is not enough to meet the demands of companies, who face stiff competition to hire such resources as soon as they graduate. All the companies interviewed agreed that the lack of specific skills is one of the biggest obstacles to the development of Big Data in their company.

Table 1 Difficulty finding human resources (ICT companies and production and service companies)

	ICT companies	Production and service companies
Deficiency in needed human resources	75.00%	76.92%
Lack of skills	37.50%	23.08%
No problem in finding adequate human resources	6.25%	23.08%

Source: Personal elaborations based on the interviewed companies, May 2018



Source: Personal elaborations based on the interviewed companies, May 2018

Fig. 1 Professional competences required (production and service companies). Source: Personal elaborations based on the interviewed companies, May 2018

The gap in the demand and supply of skills has a significant negative social impact. A significant part of employment with high added value is lost and the competitiveness of companies is weakened as acquiring adequate human resources is of central strategic value to Big Data. Government policy actions are vital to increase the competitiveness of companies in this rising competitive environment.

Big Data is one of the most interesting occupational scenarios in Italy. Of the sample of companies interviewed, 90% of ICT companies who offer Big Data-related services and 79% of production and service companies that demand Big Data, have forward-looking hiring strategy when it comes to Big Data. The latter is connected to a clear medium-term strategy (Fig. 2).

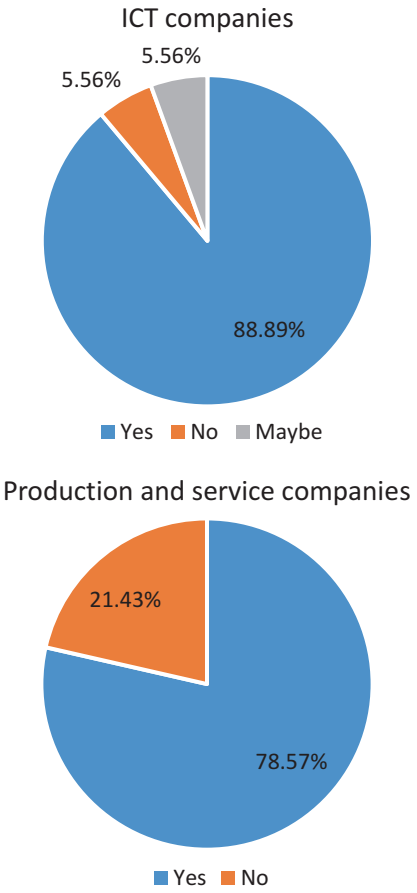
When it came to the preferred channels for finding and selecting these qualified human resources, both ICT and production and service companies preferred universities. New recruitment channels such as social platforms and specialized websites were also being considered (Figs. 3 and 4).

While, 54% of production companies are already thinking about Big Data and have started testing, the remaining 23% have not conceptualized any Big Data projects yet (Fig. 5).

That the Fourth Industrial Revolution, including Big Data, is a distant future reality for most companies. A recent interview with generic manufacturing drug companies showed that despite the large use of automated machines, the enabling technologies of the Fourth Industrial Revolution (including Big Data) are unknown to the large majority (59%) and only 30% of them believe that Big Data can significantly impact the competitiveness of their businesses over the next 5 years.

Similarly, companies in the Emilia-Romagna region who have implemented Big Data projects have also estimated a 5-year duration to profit from the use of Big Data in their company.

This means that the introduction of Big Data in the business sector, or at least in the production and retail sectors is not immediate. While the intent that companies should embrace Big Data is strong, the application of the same in a company is fraught with uncertainty in the short-term. Hence, here there is a need for professionals with “humanistic” study backgrounds who can read this phenomenon from



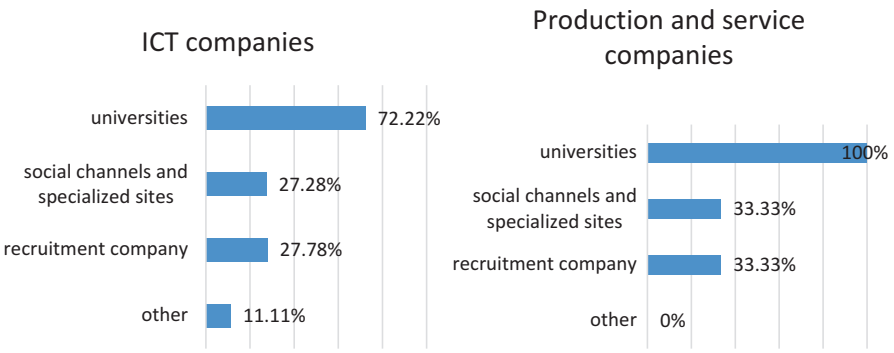
Source: Personal elaborations based on the interviewed companies, May 2018

Fig. 2 Responses for the question—Do you have a forward-looking strategy when it comes to hiring for Big Data skill sets (ICT companies and production and service companies). Source: Personal elaborations based on the interviewed companies, May 2018

a different perspective and assess its new business applications. Big Data, and the processing of a large amount of data, poses the challenge of artificial intelligence.

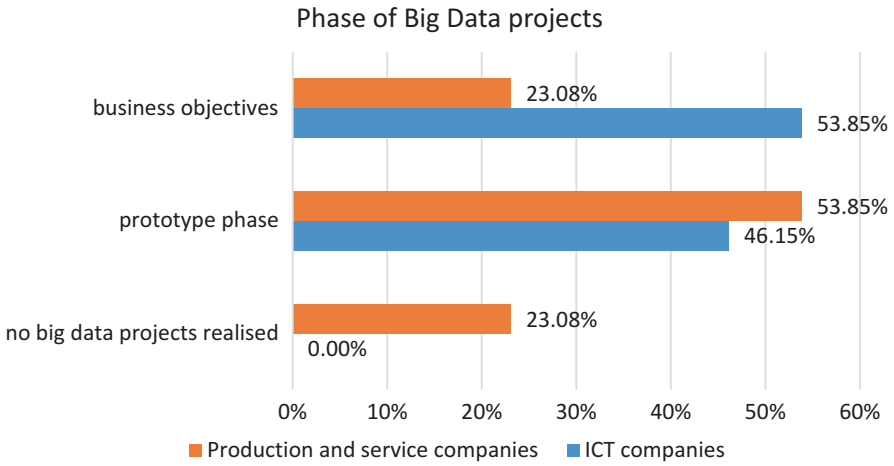
5 Discussion

While the Fourth Industrial Revolution is driven by an unprecedented technological change (CPS, IoT, Big Data and Artificial Intelligence), it is precisely because of its characteristics that it places human resources at the centre of the production and creative process. Data is the new black gold, but human resources with talent, skills



Source: Personal elaborations based on the interviewed companies, May 2018

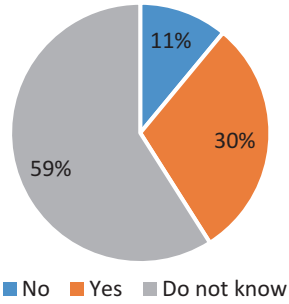
Fig. 3 Preferred recruitment channels (ICT companies and production and service companies). Source: Personal elaborations based on the interviewed companies, May 2018



Source: Personal elaborations based on the interviewed companies, May 2018

Fig. 4 Phase of Big Data projects in place (ICT companies and production and services companies). Source: Personal elaborations based on the interviewed companies, May 2018

and the ability to manage the new transformation, are as well. However, human resources can pose a constraint on accelerating change in three ways: First, specialized resources (in Science, Technology, Engineering and Mathematics (STEMs)) may be insufficient in number compared to the demand. Second, these resources must then adapt and conform their general IT skills to the requirement of the individual company. Third, it is necessary to redefine the skills of the human resources already operating in the company in the light of the new vocabulary of the Fourth Industrial Revolution. Therefore, it's necessary to plan and implement territorial and entrepreneurial strategies to deal with these three constraints.



Source: Personal elaborations based on the interviewed companies, May 2018

Fig. 5 Responses from companies on their belief of the impact of Big Data on their business in the next 5 years. Response for the question—Do you believe that Big Data will have an impact on your business in the next 5 years. Source: Personal elaborations based on the interviewed companies, May 2018

In Big Data, the job offers have grown rapidly driven by the *expansion effect* and the *enlargement effect* (Poma et al., 2020). The first constraint is attributable to the growth in the job offers (companies requiring labour), from companies which already use such skills (computer engineers, physical electronics etc.). This demand is driven by the potential of Big Data potential and the companies' decision to upgrade their analysis unit and research team. The *enlargement effect* is a new phenomenon. It is because of companies in sectors that historically have never used such skills, such as insurance, logistics or finance, which now need specialized skills to manage the massive amount of data they own, especially in the processing phase. Human resources that were previously required only by companies in the adjacent sectors are necessary for companies of any economic, productive, and service sector.

From a geographical point of view, the strategy is to help structure the degree courses provided by universities and the training courses provided by scientific institutes to make up for the missing skillsets required by businesses today, as well as making the geographical area more attractive so as to acquire resources from outside. For example, an important Italian pharmaceutical company has recently become a benefit corporation to attract the best American talent in the field of research. The younger generation prefers to work for a benefit corporation. Another example is of companies that have built data analytics units to create an interactive and challenging environment for their talented resources.

To overcome the second and third constraints (adapting general IT skills and redefining existing skills), the strategies of the companies have been geared towards increasing economic resources, training hours, and improving their existing structure. The more dynamic and larger companies have already begun knowledge transfer and internal trainings, which in more structured cases have led to the creation of corporate academies. The greater the company invests in human resources, the greater must be the loyalty of the latter towards the company. Therefore, along with

the training courses, companies also implement loyalty strategies. The companies that have invested the most in training and knowledge, have also used other strategies to increase the loyalty of their employees such as providing a medical plan for their family members, the possibility of ordering a full meal to take home to their family members, a more accentuated dynamism for the individual career, as well as awards for goals achieved by teams.

Many are of the view that the greatest competition for human resources in today's world, are machines. This stems from the fear that artificial intelligence will evolve to become more intelligent than human beings. Our view is that these human resources and machines should co-exist and work with each other. A correct interpretation of the Fourth Industrial Revolution places people at the centre of the production process. There's currently a technological revolution or a human capital revolution underway. While technologies are becoming more sophisticated, there's a need for new complementary human skills for these technologies to work. Therefore, the possession of quality human capital is vital for success. There would be no machines without human intelligence. A machine is an artificial intelligence device consisting of different parts and is used for performing different functions.

Unlike the old industrial revolutions and the old codified fixed mechanistic machines, artificial intelligence technologies represent a completely different reality and require the capabilities of a skilled workforce. In this new disruptive revolution, humans are the ones shaping the technology. Artificial intelligence learns from human habits. Robot manufacturing is now done with an intent to interact with humans, not to replace them. They extend human capabilities, and are able to operate in tiny contexts, for example, functioning as "mechanical" limbs that enhance human capabilities. In the production lines of the companies we visited, the employees run along the production line with devices in hand, punctually checking that all quality, reliability, and safety parameters are met, based on the measures required by the countries of destination. The same workers also have access to the "test centre" equipped with sophisticated machinery to test certain components or to check for anomalies in the production line.

Finally, enabling technologies, associated with the Fourth Industrial Revolution, introduce a new way of thinking and designing. From our interview and visit to a large packaging company equipped with a large operating unit of additive manufacturing (3D), we noticed that the company's young design engineers teach their older colleagues (who are often under 40 years of age) to design "from the void" and not from the full, as they were taught a few years ago. The classic technique of designing from the full was used to obtain a semi-finished product, one of the many components that once assembled together formed an automatic machine for packaging. Designing "from the void" does not just mean reproducing existing semi-finished parts in different ways, but rather imagining the production of more complex parts integrated with each other that cannot be realized with previous technologies. Old

and new knowledge must be intertwined and recombined to obtain products with unprecedented characteristics that allow the machine to perform new and more complex functions. The 3D printer gives shape to the void resulting in complex work, as opposed to the Middle Ages when threads were weaved by looms and the weaving of threads created cloth. These are not just two different processing techniques, but a completely different design modality. The technique changes in the sense of the techne' as intended by Heidegger (1953, 1962), that is, the knowledge which guides production, as the "idea", that precedes production. Therefore, all the engineers of this large enterprise must learn to "think" beyond the component they have to design, and realize what additive manufacturing can offer. This core reasoning must be extended to the entire production cycle. An example of this in the case of a large poultry company which we interviewed and visited. It has transformed its newly built smart warehouse making it central and the beating heart of their entire production and logistics organization.

It is therefore a new language that flows between machines, people and businesses. For this reason, in recent years, we are witnessing a flurry of acquisitions of strategic companies, who were once their subcontractors, by the heads of the supply chain (or the leading company). This strategy is followed for three reasons: to keep the strategic knowledge inside, to standardize the "language" between companies in the supply chain, and to acquire new tacit skills in terms of human resources.

6 Conclusions

One of the main developments of the Fourth Industrial Revolution is the focus on the new human–machine relationship, specifically, humans and machines working with each other. While the technological push of the Fourth Industrial Revolution will first need STEM-trained workers, the revolutionary push of the revolution will require a workforce with humanistic expertise to be able to "read" and interpret the underlying changes that these technologies bring to the company and its value chain. In this study that covered the Italian context, the Fourth Industrial Revolution poses three challenges for the Italian businesses in the Emilia-Romagna region, from a human resources context. First, the increasing urgency and need to meet the demand for graduates trained in the skills required by Big Data companies. Second, the interpolation of knowledge, being able to adequately mix the tacit knowledge disseminated in the company with the new codified knowledge introduced by the enabling technologies. Third, the need for higher the investment in human resources, to increase the loyalty (Poma, 2003), and membership of the company's staff to minimize the attrition to competition (Poma, 1995).

Appendix 1: Questionnaire Framework Designed for Production and Service Companies

General company information	• Quantity of data production and velocity of data production
• Company name	• First project related to big data
• Business sector	• Channels used to activate initial projects
• Year of commencement of activity	• Internal and external organization for the utilization of big data
• Name and role of interviewee	
Section A—Company positioning and innovation actions	*Section C—Indications on the professional figures specialized in data analytics*
• Company turnover	• Professional figures and required competencies for the development of big Data analytics
• Number of employees	• New recruitment programs
• Percentage of employees by qualification degree	• Difficulties in finding required professional figures
• Turnover trend, investments, occupation, exports	• Planned training activities
• Innovation activities in the last 3 years	*Section D—Other information related to the use of big Data*
• Modality of innovative processes	• Average annual budget for activities related to big data.
• Planning for innovation investments in the next 2 years	• Financing method
Section B—Elements related to the use of big Data	• Connections with other companies related to the use of big data
• Strategic goals the company aims to reach using advanced techniques of data analysis.	• Connections with educational institutions/ universities
• Actual achievement of goals in the last 3 years	• Connections with international institutions/ bodies for conducting educational and developmental activities
• Presence of obstacles in reaching goals	• Policy interventions to strengthen the adoption of technologies and processes related to big data.
• Impact and result of the introduction of data analytic techniques in business processes.	• Needed support from institutions to strengthen innovation activities
• Business function or area that mainly benefited most from big Data analytics	
• Level of adoption and use of big Data technologies	

Appendix 2: Questionnaire Framework Designed for ICT Companies

General company information	• Origin of the people employed
• Company name	• Information about customers concerning big Data projects
• Business sector	
• Year of commencement of activity	
• Name and role of interviewee	
Section A—Company positioning and innovation actions	*Section C—Indications on the professional figures specialized in data analytics*
• Company turnover	• Professional figures and required competencies for the development of big Data analytics
• Number of employees.	• New recruitment programs
• Percentage of employees by qualification degree	• Difficulties in finding required professional figures
• Turnover trend, investments, occupation, exports	• Planned training activities.
• Innovation activities in the last 3 years	*Section D—Other information related to the use of big Data*
• Modality of innovative processes	• Average annual budget for activities related to big data
• Planning for innovation investments in the next 2 years	• Financing method
Section B—Elements related to the use of big Data	• Connections with other companies related to the use of big data
• Type of consultancy/service offered	• Connections with educational institutions/ universities
• Customer location	• Connections with international institutions/bodies for conducting educational and developmental activities
• Level of adoption of technologies related to big data	• Policy interventions to strengthen the adoption of technologies and processes related to big data
• Level of use of technologies related to big data	• Needed support from institutions to strengthen innovation activities
• Professional figures/skills used	
• Number of full-time staff	

Appendix 3: Production and Service Companies Included in the Study

Company	Activity	Location
Bonfiglioli engineering	Industrial machines for quality control in packaging	Vigarano Pieve (FE)
BPER services S.C.p.A.	Banking services	Modena
CEFLA	Plant production, furniture, finishes and medical instruments	Imola
Chiesi	Pharmaceutical production	Parma
CIR food	Restaurant services	Reggio nell'Emilia
Coop Italia	Wholesale	Casalecchio di Reno (BO)
Coop Alleanza 3.0	Business	Castenaso
Cooperativa Bilanciai	Weighing systems production	Calderara di Reno (BO)
CRIF	Business information	Bologna
CRIT Sri	Research and analysis of technical-scientific information	Vignola (MO)
Granarolo	Food industry	Granarolo (BO)
IMA	Industrial machines for packaging	Ozzano dell'Emilia (BO)
Laboratorio "L'immagine Ritrovata"	Film restoration	Bologna
SCM group	Production of machinery and components	Rimini
SCS consulting	Consulting	Bologna
UnipolSai	Insurance and banking services	Bologna
Yoox net A porter	E-commerce	Bologna
SACMI	Engineering	Imola

Appendix 4: ICT Companies Included in the Study

Company	Activity	Location	Sector
4 science	Data management	Ravenna	ICT; healthcare; manufacturing
Axyon Al	Technology	Modena	ICT; financial, banking and insurance
BioDec	Project management and integration with business applications	Casalecchio di Reno (BO)	ICT; healthcare

Company	Activity	Location	Sector
CINECA	Information processing	Casalecchio di Reno (BO)	ICT; multisectoral
DataRiver S.r.l.	Data processing	Modena	ICT; healthcare; manufacturing
Dedagroup	Digital business	Bologna	ICT; multisectoral
Dedalus	Healthcare software	Bologna	ICT; healthcare; public Administration
DM Management & Consulting	MES systems for data collection and analysis	Bologna	ICT; manufacturing
Doxee S.p.A.	Customer communication management	Modena	ICT; multisectoral
Energy way	Industrial data management	Modena	ICT; multisectoral
Engineering	Software and IT services	Bologna	ICT; multisectoral
Expert system S.p.A.	Semantic intelligence	Modena	ICT; multisectoral
Fancy pixel S.r.l.	Customized software for industry	Ferrara	ICT; manufacturing
Gruppo Kedos	IT services	Parma	ICT; financial, banking and insurance; manufacturing
Iconsulting	Data warehouse, business intelligence, Performance management and big Data analytics	Casalecchio di Reno (BO)	ICT; multisectoral
Imola Informatica	IT consulting	Imola	ICT; financial, banking and insurance;
I.S.I. S.r.l.	Smart factory systems	Podenzano (PC)	ICT; manufacturing
Lepida	Technology and consulting	Bologna	ICT; pubic administration
Onit group S.r.l.	Computer technology and consulting	Cesena	ICT; healthcare; manufacturing
RTS Sistemi Informativi	Technology and consulting	Forli	ICT; manufacturing

Appendix 5: Universities Included in the Study

University	Location
University of Bologna (UNIBO)	Bologna
University of Modena and Reggio Emilia (UNIMORE)	Modena and Reggio Emilia
University of Ferrara	Ferrara

References

Ackoff, R. L. (1971). Towards a system of systems concepts. *Management Science, 17*(11), 661–671.

Allen, M. (2002). *The corporate university handbook: Designing, managing, and growing a successful program*. Amacom.

Allen, M. (Ed.). (2007). The next generation of corporate universities: Innovative approaches for developing people and expanding organizational capabilities. Wiley.

Armbrust, M., Fox, A., Griffith, R., Joseph, A. D., Katz, R., Konwinski, A., Lee, G., Patterson, D., Rabkin, A., Stoica, I., & Zaharia, M. (2010). A view of cloud computing. *Communications of the ACM, 53*(4), 50–58.

Arrow, K. J. (1971). *The economic implications of learning by doing* (Readings in the theory of growth) (pp. 131–149). Palgrave Macmillan.

Ashton, K. (2009). That "internet of things" thing. *RFiD Journal, 22*(7), 97–114.

Atzori, L., Iera, A., & Morabito, G. (2010). The internet of things: A survey. *Computer Networks, 54*(15), 2787–2805.

Bandyopadhyay, D., & Sen, J. (2011). Internet of things: Applications and challenges in technology and standardization. *Wireless Personal Communications, 58*, 49–69.

B-Heuser, V., & Hess, D. (2016). Guest editorial Industry 4.0–prerequisites and visions. *IEEE Transactions on Automation Science and Engineering, 13*(2), 411–413.

Bello-Orgaz, G., Jung, J. J., & Camacho, D. (2016). Social big data: Recent achievements and new challenges. *Information Fusion, 28*, 45–59.

Berman, J. J. (2013). *Introduction, in: Principles of big data*. Morgan Kaufmann.

Boyd, D., & Crawford, K. (2012). Critical question for big data. Provocations for a cultural, technological, and scholarly phenomenon. *Journal of Information Communication & Society, 15*(5), 662–679.

Callaway, E. (2000). *ERP—The next generation: ERP is web enabled for e-business*. Computer Technology Research Corporation.

Chen, D., Doumeingts, G., & Vernadat, F. (2008). Architectures for enterprise integration and interoperability: Past, present and future. *Computers in Industry, 59*(7), 647–659.

Cipolla, C. (1995). *Storia facile dell'economia italiana dal medioevo ad oggi*. Mondadori.

DiMario, M. J. (2010). *System of systems collaborative formation*. World Scientific Publishing Pte. Ltd..

Duan, Y., Edwards, J. S., & Dwivedi, Y. K. (2019). Artificial intelligence for decision making in the era of big data–evolution, challenges and research agenda. *International Journal of Information Management, 48*, 63–71.

Forrester Research. (2018). Emerging technology projection: The total economic impact™ of IBM Blockchain. *Forrester Research, 2018*.

Gantz, J., & Reinsel, D. (2011). Extracting value from chaos. *IDCi View*, 1–12.

Hashem, I. A. T., Yaqoob, I., Anwar, N. B., Mokhtar, S., Gani, A., & Khan, S. U. (2015). The rise of "big data" on cloud computing: Review and open research issues. *Information Systems, 47*, 98–115.

Heidegger, M. (1953) *La questione della tecnica*, in *Vortrage und Aufsatze,* Verlag 1957; trad. it. *Saggi e discorsi*, Mursia, Milano 1976.

Heidegger, M. (1962), *Ueberlieferte Sprache und techinsche Sprache*, Verlag 1989; trad. It. *Linguaggio tramandato e linguaggio tecnico*, ETS, Pisa 1997.

Hermann, M., Pentek, T., & Otto, B. (2016). 'Design principles for Industrie 4.0 scenarios', *49th Hawaii international conference on system sciences (HICSS). IEEE, 2016*, 3928–3937.

Hipgrave, S. (2013). Smarter fraud investigations with big data analytics. *Network Security, 12*, 7–9.

Huan, L. (2013). 'Big data drives cloud adoption in enterprise'. *IEEE Internet Computing*, *17*(4), 68–71.

Kaisler, S., Armour, F., Espinosa, J. A., & Money, W. (2013). Big data: Issues and challenges moving forward, system sciences. In *Proceedings of the 46th Hawaii international conference on system sciences* (pp. 995–1004). IEEE.

Keynes, J. M. (1930). Economic possibilities for our grandchildren. In *Essays in persuasion*. Palgrave Macmillan.

Lee, S.-E., Choi, M., & Kim, S. (2017). How and what to study about IoT: Research trends and future directions from the perspective of social science. *Telecommunications Policy, 41*(10), 1056–1067.

Lee, G. (2019). What roles should the government play in fostering the advancement of the internet of things? *Telecommunications Policy, 43*(5), 434–444.

Lu, Y. (2017). Industry 4.0: A survey on technologies, applications and open research issues. *Journal of Industrial Information Integration, 6*, 1–10.

Mayer-Schonberger, V., & Cukier, K. (2013). *Big data: A revolution that will transform how we live, work, and think*. Houghton Mifflin Harcourt.

Møller, C. (2004). *ERP II-next-generation extended Enterprise resource planning*. Aalborg Universitetsforlag.

Monostori, L., et al. (2016). Cyber-physical systems in manufacturing. *CIRP Annals - Manufacturing Technology, 65*(2), 621–641.

Onik, M. H., Miraz, M. H., & Kim, C. S. (2018). A recruitment and human resource management technique using Blockchain technology for industry 4.0. In *Proceeding of smart cities symposium (SCS-2018), Manama, Bahrain* (pp. 11–16). IET.

Polanyi, M. (1958). *Personal knowledge. toward a post-critical philosophy*. Routledge & Kegan Paul.

Poma, L. (1995). Economia e valori in A. O. Hirschman, L'Industria – Rivista di Economia e Politica Industriale, Anno XVI, n.1 gennaio-marzo.

Poma, L. (2003). *Oltre il distretto. Imprese e istituzioni nella nuova competizione territoriale*. Franco Angeli Editore.

Poma, L., Al Shawwa, H., & Maini, E. (2020). Industry 4.0 and big data: Role of government in the advancement of enterprises in Italy and UAE. *International Journal of Business Performance Management, 21*(3), 261–289.

Prince, C., & Beaver, G. (2001). Facilitating organizational change: The role and development of the corporate university. *Strategic Change, 10*(4), 189.

Prince, C., & Stewart, J. (2002). Corporate universities–an analytical framework. *Journal of Management Development, 21*(10), 794–811.

Ricardo, D. (1817). *On the principles of political economy and taxation*. John Murray, Albemarle-Street.

Ricardo, D. (2015). *On the principles of political economy, and taxation*. Cambridge University Press.

Romero, D., & Vernadat, F. (2016). Enterprise information systems state of the art: Past, present and future trends. *Computers in Industry, 79*, 3–13.

Shafiq, S. I., Sanin, C. T., & Szczerbicki, E. (2015). Virtual engineering object (VEO): toward experience-based design and manufacturing for Industry 4.0. *Cybernetics and Systems, 46*(1–2), 35–50.

Sraffa, P. (1951). *The works and correspondence of David Ricardo*. Cambridge University Press.

Sundmaeker, H., Guillemin, P., Friess, P., & Woelffl, E. S. (2010). Vision and challenges for realising the internet of things. In *The cluster of european research projects on the internet of things*. European Commission.

Thamesa, L., & Schaeferb, D. (2016). Software-defined cloud manufacturing for industry 4.0. *Procedia CIRP, 52*, 12–17.

Xing, E. P., Ho, Q., Xie, P., & Wei, D. (2016). Strategies and principles of distributed machine learning on big data. *Engineering, 2*(2), 179–195.

Zhong, R. Y., Xu, X., Klotz, E., & Newman, S. T. (2017). Intelligent manufacturing in the context of industry 4.0: A review. *Engineering, 3*(5), 616–630.

Zikopoulos, P., Parasuraman, K., Deutsch, T., Giles, J., & Corrigan, D. (2012). *Harness the power of big data. The IBM big data platform*. McGraw Hill Professional.

The Logic of Production in the Informal Enterprises: The Case of Bolivia and Its Implications for the Public Policy

Leon Dario Parra Bernal and Milenka Linneth Argote Cusi

Abstract The informal sector has been the subject of research and study of economic science for more than five decades since Hart defined it in 1973. In this sense, the logic of production of informal companies has been a subject of wide discussion due to the structure of productive heterogeneity in developing countries. Accordingly, the chapter investigates the production logic of informal companies, differentiating it from the production logic of traditional capitalist companies. According to this, a different form of production emerges against the capitalist one whose main objective is not the accumulation of capital, but the satisfaction of basic needs and recognition of members in the informal productive unit; thus showing itself as an antithesis of conventional capitalist accumulation logic. To achieve this objective, the chapter addresses the case of informal commerce and service companies in Bolivia, a country characterized by a strong presence of informal sector in its economy.

Keywords Entrepreneurship · Informal sector · Public policy · Labor markets · Capitalism · Productive heterogeneity

1 Introduction

According to the World Bank (2017), informal enterprises (i.e., the enterprises that do not pay taxes or do not have a business registry) and unskilled self-employed workers account for about 50% of the workforce in emerging countries. This fact, combined with the low productivity levels of informal enterprises and their association with narrow-based economies, means that informal enterprises are today one of the greatest challenges in terms of public economy and social policy in Latin America. However, some authors have been assumed that informal enterprises describe a linear trajectory toward formality (De Soto, 2004; Maloney, 2004; World

L. D. P. Bernal (✉)
EAN University, Bogotá, Colombia
e-mail: ldparra@universidadean.edu.co

M. L. A. Cusi
Business Intelligence and Demography, Bogotá, Colombia

N. Faghih, A. Forouharfar (eds.), *Strategic Entrepreneurship*, Contributions to Management Science, https://doi.org/10.1007/978-3-030-86032-5_4

Bank, 2008), which should be facilitated by a reduction in the institutional barriers, the simplification of regulations and the reduction of the tax burden (Freije, 2001; Hernandéz Licona, 2004; Siqueira et al., 2016).

Nonetheless, this position takes into account the assumption that informal enterprises manifest the same logic of production and accumulation process of a capitalist company, and as a result, these productive units could move toward formality, if the legal and regulatory system becomes more flexible, allowing greater freedom in the entry and exit of the new enterprises.

Therefore, in this chapter, we are going to analyze the logic of production and accumulation of informal enterprises in contrast to the enterprises of formal sector, in which their main objective is the maximization of the benefit and creation of capital. In contrary, the informal companies are oriented by the satisfaction of subsistence needs for the members of the informal productive unit. This implies a change in the direction of public policies aimed at the formalization of economy and the productive transformation, given that as informal enterprises do not manifest the same logic of production and accumulation of a formal enterprise; thus, they require support mechanisms, sources of financing and productive development strategies, different from those traditionally used for the formal sector of the economy.

On the other hand, we support the findings using the case of informal business in La Paz and El Alto cities in Bolivia while taking into account the testimony of 20 informal entrepreneurs in the textile sector who participated in this case study. It will be observed how the logic of these entrepreneurs behaves differently from a formal enterprise, highlighting aspects such as: the autonomy in the management of time, the differential in salary levels, the use of social and economic networks of informal companies as a way for leverage their business growth. In this regard, we analyzed how the informal enterprises whose productivity levels were higher than the average of the sector could motivate growth and development in the same way by integrating units with lower productivity levels. Thus, the research question is:

How integrated are the productive units of the informal sector among themselves?

2 Literature Review

Different studies carried out on the informal sector have revealed that this sector manifests a different dynamics of production and accumulation to what is presented by the formal capitalist sector of economy. The WLO (World Labor Organization) and the PREALC (Regional Employment Programme for Latin America and the Caribbean),[1] for example, indicates that informality is understood as a form of production that is tied to the structural heterogeneity of the economy in developing countries, whose productive characteristics differ from modern economy (Tokman, 1991; PREALC, 1985). This implies that informal sector's structure and logic of

[1] https://digitallibrary.un.org/record/90910?ln=en

production differs from what is represented in the formal capitalist system. Other studies have also had the same opinion, as they observed that the informal sector has had the typical behavior of traditional subsistence economies, with some elements such as the self-exploiting of the labor force of their members to generate the income that will allow them the minimum basic needs (Harris & Todaro, 1970; Cortes, 2001; Urbina & Viianto, 2015; Parra, 2016, 2019).

On the other hand, some authors had said that the concept of informal sector should be replaced for the concept of popular economy or family production sector, due to the interrelationship between the logic of production of the informal sector and its cultural and social behaviors associated to the traditional and family production unit (Boza-Valle & Manjarez-Fuentes, 2016; Gray et al., 2006; Escobar, 1990).

In this regard, the logic of production and accumulation process of informal enterprises differ substantially from the logic of formal enterprises in different aspects that have been widely discussed in the related literature. However, we could add, the scarce or null division between capital and labor force in the informal companies, the structure of social and economic networks that support informality, and the incentives to increase the level of productivity. In this sense, the approach of Chayanov's thesis (1974) about the organization of the peasant economy unit is very close to the productive dynamics of informal enterprises. The theoretical approach that he formulated on the peasant economic unit *"doesn't only belong to the peasant unit. It's present in all the economic units of family labor, in which work is related to the exertion of physical effort and the gains are proportional to this attrition"* (Ibid p. 96). In this regard, the logic of production and accumulation processes of the informal sector could be analyzed as an alternative from the perspective of Chayanov (1974), due to the productive and commercial characteristics that the sector present in relation to the exploitation of the labor force in this sector.

Furthermore, in the economic unit of family exploitation proposed by Chayanov (1974), the relationship between production and accumulation process that occurs in traditional capitalist enterprises changes its behavior toward a relationship between productivity and maximization of the required labor effort. In other words, while in the capitalist production enterprises the main incentive for the increase of levels of productivity and levels of returns is the accumulation of profits, in the family production unit the increase of productivity is associated with the optimization of the labor effort which is required to achieve the necessary income that replaces the reinvestment in the work capital, plus the needs of the self-exploited family.

Relying on Chayanov's study (1974), in a capitalist enterprise, the capital circulation process presents the circularity that *Marx* previously raised in his theory on capital: Initial investment capital—production process—and return of capital with a profit. In this scheme, the entrepreneur invests a given amount to acquire factors of production, once the productive cycle is completed and sold, the entrepreneur obtain a gross income with its respective profit, the sum which is needed for a new production phase is reinvested, and the surplus is accumulated as profits from the period (Ibid, p. 231). In contrast, in the family business, the family provides both necessary capital and labor for a productive process that will give them a gross income. Part of this gross income, according to Chayanov (1974), is reinvested in the factors that

are needed to maintain the productive activity, and the surplus is oriented to meet the basic needs for the family members, or in other words, *"to reproduce the labor force"* (Ibid, p. 232). This implies that since the productive family unit spends all its income on the family's own consumption and the reinvestment needed for work capital, it can be assumed that the total production of each unit is equal to the total gross income perceived by the family. In this order of ideas, the labor force available to each productive unit will determine in equal measure the volume of its production, and the intensity of work required to achieve the minimum income necessary for the survival of family members. In this regard, the production dynamics of enterprises in the informal sector, as well as in the family exploitation unit, break with the subject of traditional capitalist accumulation process, given that the intensity of the work needed to cover *self-consumption* and *reinvestment* in work capital, are the determinants of the level of production needed in each unit, and not for the interest of obtaining a surplus value or profit to be accumulated period after period.

Following this approach, we understand that the family businesses that Chayanov (1974), talks about are not the same segment that *Schumpeter* analyzes with his "*social group optimally selected and oriented towards the end of maximum individual benefit"* (Schumpeter, 1934). Reflecting on his approach, the productive unit to which Chayanov (1974) refers is that which uses the labor force available in its members in order to obtain a gain that is proportional to the physical wear required for the production of certain goods (Ibid, p. 96).

In our case, the family and the informal exploitation enterprises are different types of entrepreneurship that differ strongly from the capitalist production unit, absorbing predominantly the unskilled labor force of the population, involving small free owners and encouraging the exchange between sectors though the specialization of work (Amin & Vergopoulus, 1975). However, this informal productive segment, as well as the informal economy in general, is not homogeneous, given the differential in the levels of productivity among enterprises, the social and commercial networks that informal entrepreneurs have, and the level of division between capital and labor in each enterprise.

This heterogeneity within the informal sector is the key factor to establish that has greater potential for productive growth and connectivity with the modern economy, and both of them are immersed in a subsistence economy. That is, heterogeneity, instead of being seen as an obstacle that makes the development of informal entrepreneurship impossible, it can contribute to the generation of productive units between the most backward of the sector with its most organized and modern ones.

According to the abovementioned literature, the central axis of the productive dynamics of informal enterprises is not the accumulation of capital through higher productivity as in the formal sector of the economy, but the *reproduction* of its productive cycle as a means of survival for family members that partially form part of informal enterprises' workforce. We could also claim that increasing productivity in the informal units would increase the family's available income to satisfy needs that were not previously met with inferior incomes. This situation has an impact on a better quality of life for the members of each single enterprise of the informal sector accompanied with increases in the level of their production.

3 Discussions

3.1 Differential Factors in the Forms of Informal Business Insertion

In different studies on the informal sector it is indicated that a large part of the labor and productive insertion in the sector occur in self-employed and non-salaried worker occupations, leaving scarce participation to sponsors or owners who occupies paid workers in their businesses (Pacheco, 2004; Tokman, 1991, 2004; Maloney, 2004; Friedmann, 2018). Similarly, the literature on the informal sector argues that there is a certain precariousness on the working conditions of the vast majority of informal workers, which does not differ significantly between the types of productive units of microenterprises. In turn, the analysis made to different groups of informal companies in Latin America made it possible to find certain repetitive patterns among these enterprises.

First, the methods of business insertion in the informal sector depend not only on the type of occupation in which individuals are inserted, but also on the experience that they have in a certain sector, and the social and family networks that they have for to start their own business.

Second, the number of persons that participate in the same productive unit, and the division of work to carry out the activities vary according to the conjectural need of the market and the proper needs of each business. Thus, it is evident that the logic of production of informal enterprises is largely oriented toward maximizing the labor effort invested in a certain productive activity in exchange to the economic benefit that is obtained to meet certain needs for personal recognition. An entrepreneur in textiles industry at *El Alto* city in Bolivia expresses this logic as the following:

> "*At the beginning I did everything, ,weaved, remeshed, washed, ironed, controlled quality but I did not want that forever, so I started delegating the tasks, then I needed a weaver, I trained him and they have responded, then I remeshed and later delegated the task to another person step by step*" [2]

Third, the income received by the workers and micro-entrepreneurs in the informal sector, in spite of showing a similar situation for the vast majority of the non-salaried workers in Latin America, indicates the abysmal and low level of income in terms of minimum wages. The situation can vary according to the level of productivity that each business unit has, the commercial networks that each individual has, and their level of business development. In this sense, we found both productive systems whose level of sales income only covers the subsistence needs of its members, as established production units with sufficient levels of profitability to generate reinvestment in the business and manifest a potential for productive growth. (Gray et al., 2006; Parra, 2013; Parra & Argote, 2019).

[2] Sra. Carolina Rodríguez of CORALIA Textiles, entrepreneur of El Alto City in Bolivia (2018).

In summary, it can be observed that although the type of occupation facilitates the categorization of workers in the labor market, it still remains vague to define the productive and labor dynamics of the informal sector entrepreneurs. In this way, two individuals with the same type of occupation could manifest different patterns of behavior in relation to their labor insertion, income and form of production, while people with different types of occupation could resemble in their characteristics. In the same direction, the labor experience and the socioeconomic context have a differential influence on each individual and productive unit; thus defining the type of enterprise that they can generate according to the family and social networks. Finally, the level of business consolidation and potential for productive growth in the informal sector are affected by a variety of factors, among which are the availability of capital, the commercial networks with which the products are commercialized, the economic sector to which the subjects are dedicated, and the organization of the company or business, in terms of specialization of work (Parra, 2013, 2016, 2019; Parra & Argote, 2019).

In the following section, the analysis of the productive structure of informal enterprises is going to be oriented in terms of the commercial dynamics that micro-entrepreneurs have in the informal sector. In this way, we are going to accentuate two aspects: (1) The commercial networks that informal entrepreneurs have as a way to provide themselves with inputs and merchandise for the realization of their economic activity and (2) The forms of competition that exist within the informal sector in contrast to the forms of *associativity* used by the informal businesses to expand their niche market, strengthen their companies and also strengthen informal ties.

3.2 Socioeconomic Networks in Informal Entrepreneurship: Competing and Associating

The commercial dynamics of the urban informal sector in Latin America gives rise to two forms of relationship between the productive units that make up the sector. On the one hand, there is the extensive proliferation of productive or commercial units that fragment the market in an excessive way until it reaches its fragmentation and excessive competition. These units are regularly integrated by self-employed workers who either work individually or employ non-salaried labor. On the other hand, there are productive organizations that bring together a group of small producers or artisans in a single unit in order to market products manufactured by its members in a centralized manner. These organizations operate intermittently depending on the needs of the market, with which the permanence of their affiliates is not constant in all cases.

This dichotomy between *competition* and major *association* is an example of the various ways in which socioeconomic networks can be configured in the informal sector. Some examples of studies of the informal sector in Latin America help to show that the market projection of a company or informal productive unit varies

depending on whether or not it is associated with a network of producers, artisans or merchants pursuing the same purposes. In the following sections, we are going to analyze how the socioeconomic and commercial networks of microenterprises in the informal sector in Bolivia, both within and outside the sector, change constantly and their behavior varies depending on the type of unit observed.

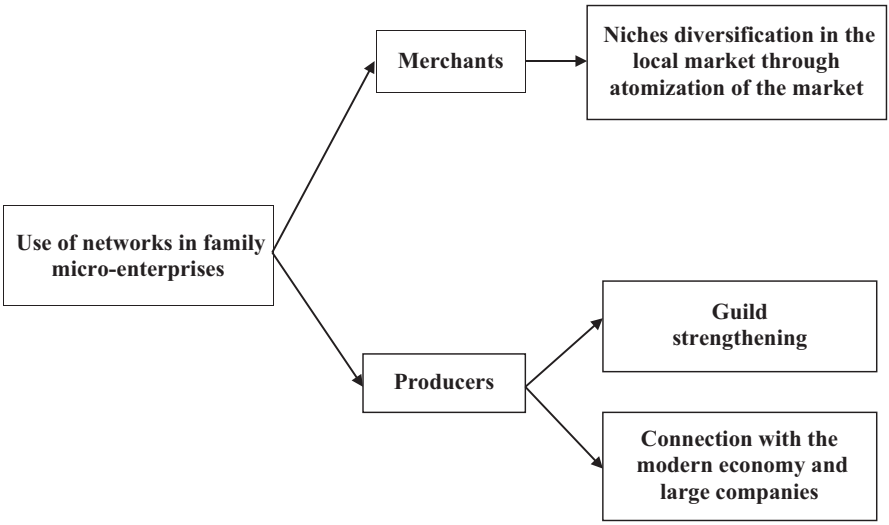
3.3 Marketing Networks and Provision of Goods in the Informal Sector

The theoretical and empirical discussion of the informal sector has advanced considerably in relation to the vision that the ILO had and the studies that were conducted in the 80s. Nowadays, the heterogeneity of the productive and labor dynamics of the sector is recognized openly, as well as the existence of new ways of informal work integrated in the modern economy, and with solid ties with large enterprises that participate in the market globalization (Peréz-Sáinz, 1995; Weller, 2003; Portes & Haller, 2004; Tokman, 2004; Siqueira et al., 2016). However, the typologies that some of these authors had made indicate a strong relationship between the informal and formal sectors of the market by the subordination of informal work to the organized private capital, either through subcontracting mechanisms of labor or through means of commercialization of the goods that large companies produce and are sold to informal businesses.

In the case of Bolivia, and particularly in the informal sector of the textile branch in the cities of *El Alto* and *La Paz*, it was found that the relationship of subordination between sectors, despite being present, is not generalized to the set of the commercial or productive relationships that occur between the two sectors. In turn, microentrepreneurs or informal businessmen make use of different marketing strategies for their products, combining commercial agreements for the distribution of goods and services with formal companies, with subcontracting agreements for the production and sale of certain products in *La Paz* and *El Alto*—Bolivia (Parra, 2013).

The economic and commercial networks that were perceived in the companies of the informal manufacturing sector in Bolivia, as well as the satellites dedicated to the sale of clothes, differ in a short term according to the needs that each unit had to place their product in the market. In a case which was studied 7 years ago by one of the authors of this chapter, the use of the commercial networks was differentiated as a strategy for merchants to sell their merchandise, from how producers use their commercial contacts to place their production in the domestic and foreign market (Ibid, p. 18).

In other studies, there has been the possibility to identify two marketing strategies and the use of networks by informal entrepreneurs. The first is the diversification of market niches, using a combination of direct sale of products to the final consumer, with the use of commercial networks formed by intermediaries of smaller or larger size with the purpose to expand the fraction market (Gray et al., 2006; Parra & Argote, 2014).



Source: Authors' own work

Fig. 1 Commercial dynamics in micro-entrepreneurship. (Source: Authors' own work)

Likewise, some of the studies cited above indicate that micro-entrepreneurs show a high degree of *adaptability* of their business concept in accordance with market trends, which allows them to "survive" more easily to the economic cycles than larger enterprises that have achieved a certain level of productive specialization (Weller, 2003; Parra, 2013; Siqueira et al., 2016). According to this adaptability, the commercial logic of micro-entrepreneurs and small informal producers can be seen in Fig. 1, and it is an example of how commercial networks operate in the segment with the greatest productive potential for the informal entrepreneurship.

The commercial dynamics of informal companies is more complex than it seems at first, due to there are logics of subordination to private capital and predominant orientation of sales toward the final consumer. At the same time, the commercial networks of informal entrepreneurs cover a large scope and the informal microenterprises use these networks with the intention that their products reach different market niches, as well as strengthen the social capital that allows them to secure certain segments of the market.

4 Public Policy Implications

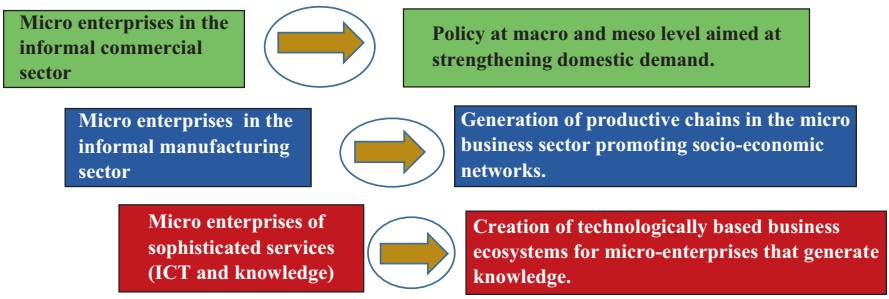
The case of the informal enterprises in Latin America, and hence in this case in Bolivia, is a clear example of the sets of interests involved in the formulation and implementation of the public policy aimed at strengthening business and the productive diversification. The interaction between the strength and the collective

action represented by the association of small merchants and informal producers, and the failures of the public administration, reflect a complex panorama for the administration regarding the execution of a plan to strengthen the microenterprise supported by formalization and productive reconversion programs.

In this context, the first element that stands out is the power of collective action over the success or failure of the public policy. For the particular case of informal entrepreneurship in Bolivia, we can see the need for organizing through the trade unions or syndicates to which they are affiliated, and thereby achieve a higher rate of coverage of public programs. Using the logic of Olson (2000), it could be argued that the collective interest of these large groups is aimed at maximizing their level of aggregate utility by remaining invisible as productive units, but obtaining the benefits of participating "marginally" in the governmental programs.

Moreover, it can be observed that the heterogeneous structure of informal enterprises, with a high predominance of productive units who deal with a logic of subsistence or necessity, and a small productive segment with potential for growth and development, require that the public policy guidelines to be *differentiated*, depending on the segment to which they are oriented. In this regard, considering that the logic of production and accumulation of informal sector is different from the traditional capitalism, the specific needs must be identified in each business sector to meet their specific demands. However, it is important to mention that the public policy guidelines that are being formulated for informal enterprises must take into account the differential segments that exist within the informal sector, and in this way, we propose that the next highlighted elements in Fig. 2 should be take into consideration:

According to Fig. 2, government should be oriented toward at least three different strategies for fulfilling the needs of the informal enterprises, depending on the segment involved. In this sense, the microenterprises in the commercial sector need the strengthening of the domestic demand; in contrast, the manufacturing segment in the informal sector requires a bigger support in the promotion of business networks.



Source: Authors' own work

Fig. 2 Public policy differentiated by the needs of the informal business sector. (Source: Authors' own work)

5 Conclusion

The chapter discussed the importance of companies and enterprises in the informal sector for the economies of Latin America. In this sense, the chapter clarified the difference between the logic of production and accumulation in the informal companies in contrast to the logic of the traditional capitalist sector. The incidence of *structural productive heterogeneity* in developing countries was indicated as the main factor in understanding the logic of production and accumulation among the informal companies.

On the other hand, it was discussed how the informal companies and therefore their entrepreneurs have as their main objective the satisfaction of basic survival needs and recognition of members or workers that integrate their families, and also how these objectives were prioritized over the capital accumulation by them. This situation gives the companies located in the informal sector a different connotation than companies of the traditional capitalism, taking into account the case of micro-enterprises in the informal commerce and services sector in Bolivia, a country whose employment rate in the informal sector has exceeded 60 percent of the current employed population.

Finally, some recommendations for public policymaking were made, with the aim of outlining the guidelines that should be taken into account when designing and implementing programs focused on the informal sector and its companies. These recommendations emphasize the consideration of the *productive heterogeneity* within a country like Bolivia, and then the necessity for focusing each program on special productive segments, depending on their specific needs. Thus:

- Given their production logic aimed at satisfying basic survival needs, informal companies that have been created out of necessity rather than opportunity require policies aimed at strengthening public and private investment that generate employment in key sectors for diversification productive capacity of the economy, as well as universal access to the social security systems, health services and education. On the other hand, the informal companies in the case of Bolivia, should be articulated with modern sectors of the national economy through structured public programs.
- Taking into account, that the motivation of self-employed workers to engage in an informal activity may be mediated both by the need for subsistence as well as by labor independence; informal companies that are in a more advanced stage of productive development than covering the survival needs of its members, require systems for their strengthening and productive reconversion. This could promote *associativism* for productive purposes among self-employed workers in the same branch of activity, in order to generate a better segmentation of the market and prevent its atomization.
- Finally, since the informal companies that employ paid workers for their production activities, are targeting the smallest market segment within the informal sector but with higher levels of productivity, require both the expansion of new markets to place their production and the provision of a seed capital to finance its

working capital during the first years of operation. In this segment, *associativism* is the key to uniting small producers in a single marketing unit, as different civil organizations are already doing in the cities of *La Paz* and *El Alto*. The public policy guidelines that are designed for this segment of informal entrepreneurship should strengthen the socioeconomic ties that exist between the informal micro-enterprises as well as the ties they have with the transnational economies, providing them with support in terms of protection of contractual rights and the financing of their production at zero interest rates.

In sum, policies at the microeconomic level must be accompanied by a comprehensive macroeconomic strategy. The State in this regard plays a central role in economy, and its intervention as arbitrator, regulator and promoter of the economy is evident through its intervention in the market, the definition of priority sectors, and the provision of social services to the poorest communities. All this should be without causing trauma in the market for goods and services or placing the guarantee of private property and incentives for investment.

References

Amin, S., & Vergopoulus, K. (1975). *La cuestión campesina y el capitalismo*. Ed. Nuestro Tiempo.

Boza-Valle, J. A., & Manjarez-Fuentes, N. (2016). Diagnóstico estratégico de emprendimientos de economía popular y solidaria en ecuador. *Ingeniería Industrial, 37*(2), 208–217.

Chayanov, A. (1974). *La organización de la unidad económica campesina*. Nueva Visión.

Cortes, F. (2001). La metamorfosis de los marginales: discisión sobre el sector informal en América Latina. In V. Brachet (Ed.), *Entre Polis y Mercado: el análisis sociológico de las grandes transformaciones políticas y laborales de América Latina*. El Colegio de México.

De Soto, H. (2004). *El Misterio del Capital*. Editorial Norma.

Escobar, S. (1990). *Crisis Política y dinámica de los sectores semiempresarial y familiar: La Paz, Cochabamba y Santa Cruz 1985–1989*. Ed. CEDLA.

Freije, S. (2001). El empleo informal en América Latina y el Caribe: Causas, consecuencias y recomendaciones de política. In *Serie Documento de Trabajo Mercado Laboral* (Vol. 2003). Banco Interamericano de Desarrollo – IESA.

Friedmann, J. (2018). The barrio economy and collective self-empowerment in Latin America. In *Life space and economic space* (pp. 120–156). Routledge.

Gray, G., Arze, A., Archondo, R., & Wanderley, F. (2006). *La economía más alla del gas*. PNUD.

Harris, H., & Todaro, M. (1970). Migration, unemployment and development: A two sector analysis. *American Economic Review, 40*, 126–142.

Hernandéz Licona, G. (2004). 25 años de empleo, ocupación e informalidad en México. In *Ponencia presentada en el seminario sobre Pobreza Moderada e Informalidad*. FLACSO—IBERGOB.

Maloney, W. (2004). Informality revisited. *World Development, 32*(7), 1159–1178.

Olson, M. (2000). *Power and prosperity: Outgrowing communist and capitalism dictatorships*. Basic Books.

Pacheco, E. (2004). *Ciudad de México, heterogenea y desigual: Un estudio sobre el mercado de trabajo*. Colegio de México.

Parra, L. (2013). La empresarialidad informal como un reto de política económica: el caso de La Paz y El Alto, Bolivia. *Estudios Gerenciales, 29*(129), 485–492.

Parra, L. (2016). *Análisis de brechas tecnológicas en el sector metalmecánico desde el estudio de caso*. Ed. Universidad EAN.

Parra, L. (2019). *Academia, Investigación y Emprendimiento. Homenaje a la Universidad EAN en sus 50 años*. Ed. Universidad EAN.

Parra, L., & Argote, M. (2014). Diversificación productivo y empresarial informal: América Latina en 2000 y 2010. *Perfil de Coyuntura Económica, 24*, 109–133.

Parra, L., & Argote, C. (2019). *Emprendimiento universitario: análisis de contraste entre la Universidad EAN*. Colombia y la Universidad Continental.

Peréz-Sáinz, J. P. (1995). Globalización y Neoinformalidad en América Latina en Nueva Sociedad N. 13, Enero – Febrero, 36–41.

Portes, A., & Haller, W. (2004). La economía informal. In *Políticas Sociales* (Vol. 100). CEPAL.

PREALC. (1985). *Mas allá de la Crisis*. Oficina Internacional del Trabajo.

Schumpeter, J. (1934). *The theory of economic development*. *Edited by* Cambridge University Press.

Siqueira, A. C. O., Webb, J. W., & Bruton, G. D. (2016). Informal entrepreneurship and industry conditions. *Entrepreneurship Theory and Practice, 40*(1), 177–200.

Tokman, V. (1991). El Enfoque PREALC. In V. Tokman (Ed.), *El Sector Informal en América Latina, dos décadas de análisis*. Consejo nacional para la cultura y las artes.

Tokman, V. (2004). *Una voz en el camino: Empleo y equidad en América Latina, 40 años de Busqueda*. Fondo de la Cultura Económica.

Urbina, J. M. F., & Viianto, L. A. (2015). Mercado Laboral Informal a través de Redes Sociales: un modelo basado en agentes. *Jóvenes en la Ciencia, 1*(2), 803–807.

Weller, J. (2003). La problemática inserción laboral de los y las jóvenes. In *Macroeconomía y Desarrollo N. 28*. CEPAL.

World Bank. (2008). *Informality in LAC – A barrier to growth and social welfare* (Vol. 2007). World Bank.

Part II
Strategic Entrepreneurship: Concepts and Theories

A Metaphorical Approach to the Fundamental Grounds in Strategic Timing: A Contribution to the Ontological Perception, Axiological Evaluation, and Epistemological Classification of Timing in Strategic Management

Amir Forouharfar

Abstract The chapter concisely focused on addressing the fundamental grounds of strategic timing. Since timing is the result of our cognitive faculty, the chapter has used cognitive metaphors with a philosophical approach to discuss the ontology (being), epistemology (knowledge), and axiology (evaluation) of strategic timing as its objectives. The ontologically cognitive perception of time provided the necessary grounds to attribute *contextual, contingent, comparative, directional, futuristic, optimal, progressive,* and *perspectival* characteristics to strategic timing. Moreover, the epistemological discussions of strategic timing with the intention to provide a solid classification for strategic timing led to the *5Ps of strategic timing: predictive timing, preventative timing, preemptive timing, proactive timing,* and *promotive timing*. All the 5Ps had an early but a futuristic orientation since all of them try to respond to the strategic time contingencies in advance; that is before its emergence on the ground. Additionally, the chapter analyzed and unfolded the axiological methods of strategists for evaluating the most optimal and fittest timing under either *intuitionist* or *positivist* approaches of timing evaluation. Finally, the chapter ended with the recommendation of a *Strategic Timekeeping System* (STS), analogous to the scientifically proved mechanism of the brain, for the timekeeping to benefit the pluralist and all-embracing knowledge of competent organizational strategists from different strategic backgrounds, contexts and expertise to be able to deal with not only ever-changing but also uncertainty-stricken temporal issues of the strategic management in our time. The intention behind STS was organizing the collective endeavor of the strategists within all the departments of an organization to acquire an insightful synergism that potentially leads to a *competitive timing* with the highest *harmony*, *adaptability*, and *decisiveness*, which could result in a maximum strategic *timeliness*, *flexibility* and *swiftness*, respectively.

A. Forouharfar (✉)
Independent Researcher, Shiraz, Iran

N. Faghih, A. Forouharfar (eds.), *Strategic Entrepreneurship*, Contributions to Management Science, https://doi.org/10.1007/978-3-030-86032-5_5

Keywords Strategic timing · Strategic timing perception (ontology) · Strategic timing evaluation (axiology) · Strategic timing knowledge (epistemology) · Strategic timing classification · Time in strategic management

1 Introduction

Time is a *cognitive* and hence an *attributive* entity. We grasp time through our cognition, i.e., via thinking, reasoning, or remembering. On the other hand, we attribute specific characteristics and metaphors to time in order to make a fundamentally abstract issue more concrete and comprehensible. However, it is extremely difficult to define what Time is. For presenting a definition of time, we should be conscious to avoid the pitfall of *circularity*, i.e., defining time by time. Thus, we have to use an entity other than time to help us present a noncircular definition of time. *Avicenna* (c. 980—1037), the Persian Philosopher, in *al-Šifā* (*The Book of Healing*), presented an Aristotelian spatial definition of time, that is defining time by using motion. However, in any attempt for avoiding definitional circularity and defining time by something other than time we may also fall into a *derivative* definition, i.e., defining time as a derived concept (such as defining time by motion). Nevertheless, in dealing with time we either have to accept circularity or derivativeness. Thus, the chapter's approach in using metaphor to shed light on the concept of strategic timing is also a derivative approach. Faghih et al. (2016: 3) believe "Metaphors efficiently simplify the most complex phenomena and issues by putting emphasis on their key qualities" and "they are used to enable and reinforce our understandings by referring to unfamiliar things in terms of familiar things." This approach is a mental modeling of a phenomenon. However, although "Like the model, the metaphor bridges two domains of reality, for it to be effective, those domains must clearly share some key and compelling traits" (Von Ghyczy, 2003: 86). By analogy, in this chapter the time metaphors were used to derive the key aspects of strategic timing, to illuminate the dark corners of the strategic timing ontology (strategic timing being), axiology (strategic timing evaluation), and epistemology (strategic timing knowledge, hence classification) in strategic timing management mainstream. The use of metaphor for clarifying the notion of strategic timing dates back to the antiquity. For example in one of the early books on strategy *The Art of War*, *Sun Tzu* (c 544–496 BC), the Chinese strategist of war, metaphorically resembled the quality of a strategic decision to "the well-timed swoop of a falcon which enables it to strike and destroy its victim." *Heraclitus* (c. sixth century BC), the Greek philosopher, applied the famous metaphor of the flow of river and impossibility of stepping twice into the same river for clarifying the constant flux of the universe and time. Nevertheless, the question, which could be raised, is why we should study time and timing in strategic studies and hence strategic management? The answer lies in the inevitability of strategic decision-making. Timing could not be omitted from a strategic decision. A strategic decision that neglects time loses its timeliness; that is its effectiveness and efficiency in the strategic application of time. Even the application of the best possible strategy at an ill-timed condition could lead to a tragic fiasco. On the other hand, there is not

any one-size-fits-all strategy. We cannot keep a single strategy; even the best ever formulated one for a long time. Metaphorically, if we assume a strategy as a sword, it echoes *Sun Tzu's* aphorism that "even the finest sword plunged into salt water will eventually rust." Thus, any strategy is inherently a time-bound issue.

To deal with the strategic timing's ontological, epistemological and axiological grounds, the chapter first starts with the clarification of the concept of metaphor in this chapter as a *cognitive metaphor* and continues with the metaphorical scenarios of time progress (e.g., *linear time, circular time, cyclical time,* and *sinuous time*). After that, it deduces the cognitive metaphors of strategic timing (e.g., *game metaphor, cyclical metaphor, window of opportunity metaphor* and *patience metaphor*) from mainstream strategic timing literature. Then it explores domains of strategic timing; here based on the relevant cited literature, expands the view of timing's *contextuality* (i.e., timing as a context-related issue, ranging from the world of politics to business). Later, the chapter discusses the ontological, epistemological and axiological binary approaches toward the study of time and timing (Fig. 1). Finally,

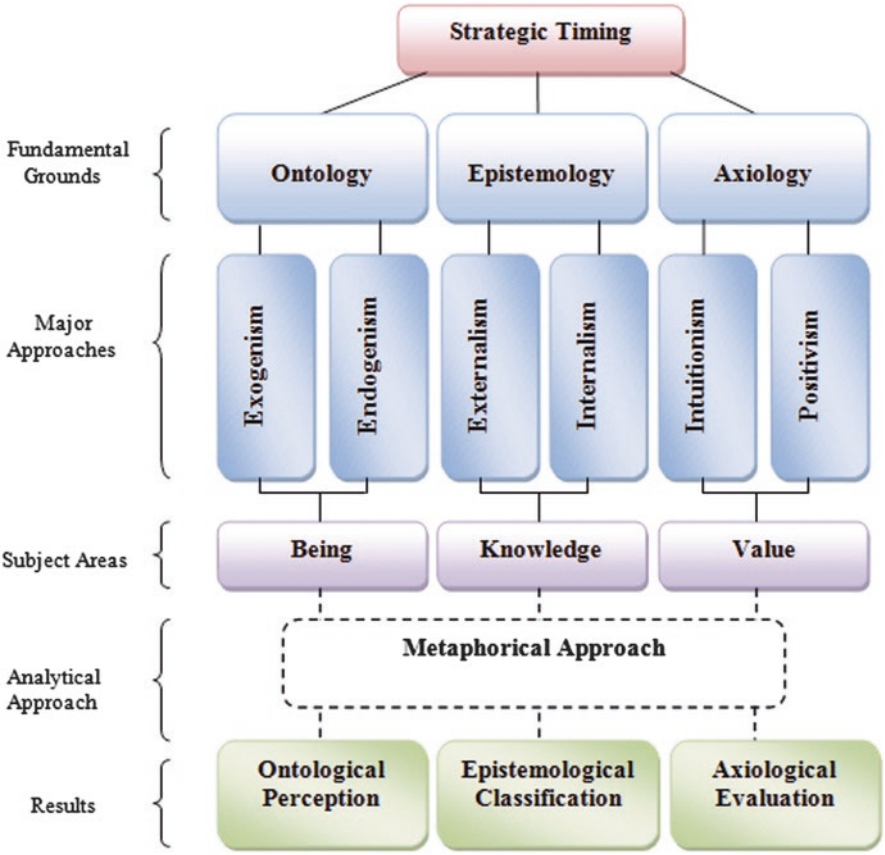


Fig. 1 The roadmap for the chapter discussions. (Source: Author's own work)

the chapter ends with recommending a *strategic timekeeping system* analogous to the brain timekeeping mechanism.

2 Clarification of the Concept of Metaphor in This Chapter and the Metaphorical Scenarios of Time Progress

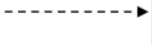
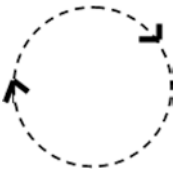
Metaphor has a Greek etymology (*meta*: across, *-phor*: to carry or bear) and they are used for "the transfer of images or ideas from one domain of reality to another" (Von Ghyczy, 2003: 86). Thus, according to Von Ghyczy (2003: 86): "Metaphors can be powerful catalysts for generating new business strategies. The problem is that, because of their very nature, metaphors are often improperly used, their potential left unrealized." Generally, we have two types of metaphors. *Rhetorical* metaphors mostly in the domain of literary works and *cognitive* metaphors mostly in the domain of teaching and philosophy. Etzold and Buswick (2008: 279) clarify the difference of these two metaphors as the following:

> Rhetorical metaphors are stale; everyone knows what they mean. They create recognition, but do not encourage further thinking. Cognitive metaphors, however, foster creativity. They are not immediately obvious and need an intellectual push to uncover potential insights.

Cognitive metaphors, widely known as conceptual metaphors, are the cognitive/mental understanding of one idea in terms of another. Studying these types of metaphors in language, through the mental and psychological grounds behind them, has been one of the main projects of cognitive linguists and philosophy of language. These linguists and philosophers of language study language as a mental phenomenon revealing human cognition, perception, conceptualization, realization, recognition; and in sum, how language sheds light on human mind and intelligence. Thus, in cognitive linguistics a metaphor is a block of thought needs mental and neuropsychological interpretation. This approach toward metaphors falls within the *Conceptual Metaphor Theory* (CMT) which claims that "metaphor is not just an aspect of language, but a fundamental part of human thought. Indeed, most metaphorical language arises from preexisting patterns of metaphorical thought or conceptual metaphors" (Gibbs, 2011: 529). To put it simply, numerous metaphors originate from these conceptual or cognitive metaphors, since they are the cognitive bedrock for the rest of the relevant metaphors. In other words, "they combine to serve as the foundation for new metaphors" (Ritchie, 2006: 31).

According to the theorists of *Conceptual Metaphor*, *George Lakoff* and *Mark Johnson* in the book *Metaphors We Live By* (1980a) we can observe a *"systematicity"* among metaphorical concepts. That is a conceptual network or system surrounds a conceptual metaphor that leads to a systematic way in talking about a concept. For example if we assume the metaphor: STRATEGY IS A WAR; then we can assume the concepts of defense, attack, coalition, competition, losing, wining, negotiation, etc. These entities also make our conceptual system that governs our

Table 1 Summary of time progress metaphors and their corresponding strategic timings

Time progress metaphors			
Time as a line	Time as a cycle	Time as a circle	Time as a wave
			
Linear time	Cyclical time	Circular time	Sinuous time
Strategic timing Linearity	Strategic timing cyclicality	Strategic timing circularity	Strategic timing sinuosity

(Source: Author's own work)

life. Thus, Lakoff and Johnson (1980b: 454) believe "on the basis of linguistic evidence [they] have found that most of our ordinary conceptual system is metaphorical in nature." Moreover, they believe we have *Orientational Metaphors*; hence some of the concepts of Time metaphors introduced in this chapter fall within this *orientationality*.

Furthermore, time is a perceived entity via human cognition, thus its being for human is cognitive:

P_1: Time for human is a cognitive entity.

The application of time metaphors in this chapter falls in the category of *cognitive* metaphors.

Thus, if we accept the following *Orientational* proposition:

P_2: Time is a progressive entity.

Then at least we could assume the following time progress cognitive metaphors, and hence the corresponding timing concepts (Table 1).

2.1 Time as a Line (Linear Time)

Time progresses forward in a *line*, without deviating right or lift and hence it will never move in a backward direction. Thus, accordingly we could assume, *strategic timing linearity*, i.e., we could have either *timing parallelism* (Fig. 2) or *timing non-parallelism* (Fig. 3).

Hence, strategic timing should take either the parallelism or the non-parallelism features into the strategic timing decision-making process.

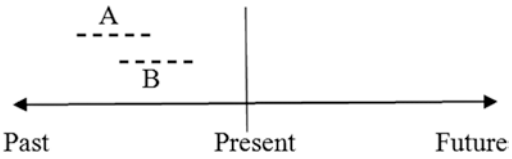


Fig. 2 *Timing parallelism*: Action A and B happened in parallel to each other, they could overlap some times. (Source: Author's own work)

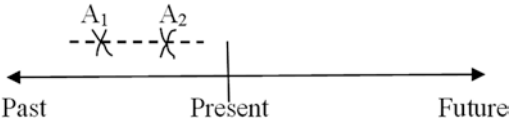


Fig. 3 *Timing non-parallelism*: Action 1 (A_1) and Action 2 (A_2) happened non-parallel but in-line to each other, they could be sequential or simultaneous. (Source: Author's own work)

2.2 Time as a Cycle (Cyclical Time)

Time progresses but in a cyclical route upward (i.e., ultimately *cylindrical*). Thus, first in strategic timing we should consider timing cycles (e.g., industry cycles, product cycles, business cycles, agricultural cycles, electoral cycles, etc.) and the *revocability* of time, i.e., the cycles would be repeated in specific cycles in the future. Furthermore, this revocability should not be considered as the exact time repetition since time moves upward and never downward or the path it has taken is cylindrically upward.

Such a condition leads to the concept of *strategic timing cyclicality*, i.e., in timing decision-makings the strategic cycles, which obey specific spirally resembling features (i.e., in each cycle some features could be identical), should be taken into the decision-making calculations and estimations.

2.3 Time as a Circle (Circular Time)

Time progresses in a circular route and it *repeats* itself. Thus, an old strategy could be reused for the same situation. This view to strategic timing is a historical sense of strategy, i.e., since time moves in a circular route, in a specific situation a superb military, economic, political or any historically used strategy could be re-implemented (i.e., *strategic timing circularity*). The only condition for reusing such a strategy is occurrence of the same strategic circumstances and grounds.

2.4 Time as a Wave (Sinuous Time)

Time progresses as a *wave*; thus it makes some alternations and ups and downs. The duty of a strategist is to understand these ups and downs and to customize its strategic timing according to such a sinuous progress forward. In this progress scenario always we presume a potential upward shift even at the most abysmal military, economic, political, or even business condition and vice versa, i.e., a downward trend in the most optimal condition. Therefore, a timing strategist ambushes for and pays attention to the *strategic timing sinuosity* (i.e., the timing of ups and the timing of downs).

3 Literature Review

3.1 Deduced Metaphors of Strategic Timing from Mainstream Strategic Timing Literature

Metaphors act as mental models. They are proto-models. Von Ghyczy (2003: 86) clarifies the complementary role of relevant metaphors beside related models:

> Models and metaphors do not compete with one another for relevance; they complement each other. Metaphorical thought may in fact lead to a successful model, as has so often been the case in scientific discovery. Indeed, revolutionary models are just as likely to begin as exploratory metaphors than as equations. Einstein's theory of special relativity grew out of a mental experiment in which he imagined how the world would appear to an observer riding a beam of light.

By reviewing the mainstream literature on strategic timing, the following cognitive metaphors are deducible:

3.1.1 Strategic Timing as a Game

The core concept in strategic timing is decision-making. *Game theory* which, "can be defined as the study of mathematical models of conflict and cooperation between intelligent rational decision makers," (Myerson, 1991: 1) is one of the domains of scientific study of decision-making processes either strategic or nonstrategic. However, the *timing effect* is a complicated issue, which needs to be unfolded in strategic decision studies. According to Abele et al. (2004: 28). "In strategic decision situations, as modeled in games, the outcome depends on all decision-makers involved. In such situations, people make different decisions when they move simultaneously as compared to when they move sequentially without knowledge of prior moves. This is called the timing effect, which is not predicted by classic game theory."

Strategic timing matters most for duopolies. Duopoly, "an oligopoly limited to two sellers" (Merriam-Webster, 2002: 359), arises strategic competition between

	Late	Early
Late	*simultaneous*	*sequential*
Early	*sequential*	*simultaneous*

Fig. 4 A duopolistic game timing: the simplest strategic timing in a game metaphor. (Source: Author's own work)

two rivals. In such a case, when two companies or parties control the entire or most of the product or service market, strategy is a determining factor for ultimate success. If the rivals reject cooperation, then the only scenario is competition. Hence, the competition timing could be either *simultaneous* or *sequential* (Fig. 4). These are two timing plays in a strategic duopolistic game. For example in a duopoly, "…firms [could] choose whether to set prices sequentially or simultaneously" (Bárcena-Ruiz, 2007: 263). Here, the researchers try to define these timings via mathematical equilibriums (e.g., see Hamilton & Slutsky, 1990; Gul & Lundholm, 1995; Van Damme & Hurkens, 1996; Huck et al., 2002; Kawasaki et al., 2020) and the discussions are imbued with the spirit of logic.

Moreover, the *simultaneousness* and *successiveness* of time is also accentuated in *Kant's Critique of Pure Reason* in section *Of Time* while he was discussing time as a priori (i.e., presupposition without examination or analysis). Kant (1922: 24) emphasizes:

> Time is not an empirical concept deduced from any experience, for neither coexistence nor succession would enter into our perception, if the representation of time were not given *a priori*. Only when this representation *a priori* is given, can we imagine that certain things happen at the same time (simultaneously) or at different times (successively).

3.1.2 Strategic Timing as a Cycle

Business cycles, industry cycles, product life cycles, and so forth could be used and should be used in strategic timing. The key issue in such a timing is choosing the right cycle for the implementation of a stagey. According to Chung (2011: 1) "… the phases of the [restaurant] industry cycle differently support a firm's strategy choice, so the use of the cycle allows firms to find the right time for a particular strategy choice," i.e., "industry cycle" could be used "as a tool for well-timed strategy choices."

Another familiar example in the context of business marketing is *calendar-led marketing*. "Calendar-led marketing (CLM) is the strategic and tactical consideration of recurring calendrical periods in the development of the content and timing of marketing practices" (Martin, 2017: 73).

3.1.3 Strategic Timing as the Window of Opportunity

Strategic timing is inherently for making the most of the possible opportunities. In the business context, strategic timing for market or industry entry is a recurring domain of timing for grabbing opportunities. Suarez et al. (2015: 437) assert, "The

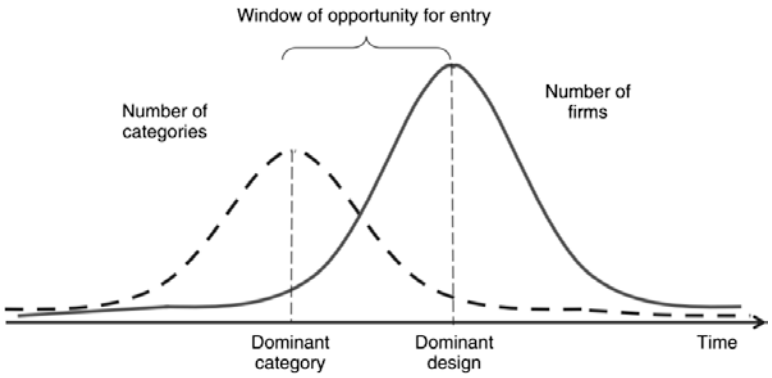


Fig. 5 Window of opportunity: Timing framework for entering an emerging market. (Source: Suarez et al., 2015)

optimal time to enter emerging industries is a key concern in strategy, yet scholars struggle to create a theoretical foundation that can integrate conflicting empirical findings." They propose a redefined "window of opportunity" for a firm to enter an emerging industry. "Dominant product design" plays a pivotal role in defining the timing of the opening of the opportunity window. Christensen et al. (1999: 213) specified the opening of the window of opportunity as "… the period just prior to the emergence of a dominant product design." Markides and Geroski (2005: 120) has also accentuated the timing for entering an industry "just when the dominant design is about to emerge." However, Suarez et al. (2015: 441) demarcated the opening and closing of the opportunity window by "dominant category and dominant design during the industry life cycle" (Fig. 5).

Suarez et al. (2015: 441) explain their theoretical framework for window of opportunity for entry as the following:

> During the industry life cycle, the number of categories will increase before the number of firms increases. The emergence of the dominant category occurs as the number of categories begins to decrease. This point in time marks the opening of the window of opportunity for entry, whereas the emergence of the dominant design marks the closing of the window of opportunity.

Nevertheless, the climaxes of the *dominant categories* and *dominant designs*, shown in Fig. 5, are intuitive and for further theorization, they need to be proved empirically.

3.1.4 Strategic Timing as Patience

Strategic delay or patience could be used in different contexts from military context (Ludvik, 2019) to business context, e.g., bargaining (Cramton, 1992). Furthermore, delaying an action could be a strategic move against overwhelming uncertainty. For example, "Delaying a project has long been recognized as an effective strategy to mitigate the risk of price uncertainty" (Helen et al., 2019: 5). This timing strategy

Table 2 Summary of the metaphors of strategic timing in the mainstream literature

Timing metaphors	Explanations	Examples
Game metaphor	Timing game	Negotiations
Cyclical metaphor	Timing cycles	Seasonal sales
Window of opportunity metaphor	Timing for opportunity hunting	Market entry
Patience metaphor	Timing passivism for gaining a better time	Stock market

(Source: Author's own work)

could be called *waiting strategy*. This strategy could be usually found in real estate businesses, oil market, etc. since the risk of price volatility and uncertainty is very high in such businesses and markets.

Table 2 has summarized the cognitive metaphors of strategic timing in the mainstream literature.

3.2 Domains of Strategic Timing

Strategic timing has been studied in numerous *contexts* from political to medical arenas (Table 3).

According to Table 3, the most predominant concept in studying *strategic timing* is its *contextualism*; i.e., it is an intensively context-related issue. Furthermore, all the above-mentioned studies have *optimum-seeking behavior*s in common, i.e., the intention behind any strategic timing is acquiring the most optimal and superlative results. That is the intention of strategic timing is either for the best or for the least (e.g., the fittest time, the most optimal time, the most efficient time, the most effective time, the most beneficial time, or the least loss, the least competition, the least risk, the least uncertainty, etc.)

On the other hand, each strategic timing in any context usually occurs within a specific *timing frame*. Thus "Companies typically have strategic options with only a limited time frame due to market factors, but companies may choose to act at any time within that constraint" (Sollars & Tuluca, 2012: 78). For example, in the case of strategic election timing, Schleiter (2019) classifies the election timing as "constitutionally fixed (exogenous)" and "constitutionally flexible (endogenous)" timings. Therefore, according to her the constitutionally strategic election timing plays within these extremes.

In the following, four familiar contexts of strategic timing in politics especially elections, public administration, negotiations and entrepreneurship are elaborated:

For example, *Political strategic timing* is chance timing, i.e., "To cope with chance; to grab an opportunity or to be thrown by the unexpected" (Miller, 1993: 179). Political strategic timings embrace from the "strategic timing of austerity reform measures" (Strobl et al., 2019) or "the strategic timing of austerity policies" (König & Wenzelburger, 2017) to the manipulation of the timing of "good news" or "bad news" for affecting their own or their rivals' electoral results and the overall lending rates. According to Gibson (1999: 471) "In relation to 'good news', …

Table 3 Strategic timing contexts, areas, categories, and intentions

Contexts	Areas	Timing categories	General intentions
Political	"parliamentary elections" (Lupia & Strøm, 1995), "position taking in Congress" (Box-Steffensmeier et al., 1997), "reform plans" (Han, 2012), "political timing" (Gibson, 1999), "the timing of war" (Sprecher, 2004) and "strategic timing of [military] intervention" (Rasler, 1983)	(a) Election timing (b) Position-taking timing (c) Reform timing (d) War timing (e) Intervention timing etc.	Superlative timing intentions: (a) The fittest time (b) The most optimal time (c) The most efficient time (d) The most effective time (e) The most beneficial time (f) The least loss (g) The least competition (h) The least risk (i) The least uncertainty
Corporate	"corporate disclosures" (Gennotte & Trueman, 1996; Zhu, 2015), "trade disputes" (Chaudoin, 2014), "mergers and acquisitions" (Thijssen, 2008), "group negotiations" (Kim, 1997), "management forecasts" (Doyle & Magilke, 2015), "R&D agreements" (Marini et al., 2014), "project leadership" (Thoms & Pinto, 1999), "IT security investments" (Xu et al., 2017)	(a) Disclosure timing (b) Disputes timing (c) Mergers timing (d) Acquisition timing (e) Negotiation timing (f) Agreement timing (g) Project timing (h) Investment timing etc.	
Media	"news releases" (Walsh & Austin, 2013), "social media uses [in politics]" (Kreiss et al., 2018), "information releases" (Demski & Sappington, 1986)	(a) News release timing (b) Information release timing (c) Media usage timing etc	
Marketing	"[time of market] entry" (Engelstätter & Ward, 2018) as well as "entering [a] foreign market" (Lin & Wu, 2004), "new-product releases" (Tian et al., 2016), "new brand introductions" (Chmielewski, 2009), "pricing in e-commerce" (Kauffman & Wood, 2007) as well as "pricing of a substitute" (Gallini et al., 1983), "sales" (Helen et al., 2019)	(a) Market entry timing (b) Product launch timing (c) Brand introduction timing (d) Pricing timing (e) Sales timing etc	
Economic	"economic developments" (Kwon et al., 2009), "financial decisions" (Rossetto, 2002), "internationalization" (Wood et al., 2011), "international expansion" (Delios et al., 2008)	(a) Development timing (b) Financial decision timing (c) Market expansion timing etc.	
Technological	"new technology adoptions" (Stenbacka & Tombak, 1994; Götz, 2000; Schmidt-Dengler, 2006), "B2B e-commerce technology efficiencies" (Bendoly & Kaefer, 2004), "adoption of multiproduct technologies" (Kim et al., 1994)	(a) Technology adoption timing (b) New technology usage timing etc.	
Administrative	"austerity policies" (König & Wenzelburger, 2017) and "austerity reform measures" (Strobl et al., 2019), "administrative laws" (Gersen & O'Connell, 2009), "tariff policies" (Toshimitsu, 2013), "legislations" (Kovats, 2009)	(a) Policy implementation timing (b) Reform timing (c) Law enforcement timing (d) Legislation timing etc.	

(continued)

Table 3 (continued)

Contexts	Areas	Timing categories	General intentions
Entrepreneurial	"decisions about new ventures" (Bakker et al., 2014), "investments over the business cycle" (McClelland & Rust, 2018), "entrepreneurial exit" (Arora et al., 2018), "entrepreneurial timing" (Forouharfar et al., 2014)	(a) New venture timing (b) Business cycle timing (c) Investment timing (d) Market exit timing (e) Market entry timing etc.	
Purely strategic	"strategic responses" (Pettus et al., 2018), "strategic actions" (Sollars & Tuluca, 2012), "strategic investments" (Marseguerra & Cortelezzi, 2010), "strategic partnerships" (Fujiwara, 2014), and "strategic alliances" (Bierly & Kessler, 1999)	(a) Response timing (b) Action timing (c) Investment timing (d) Partnership timing (e) Alliance-making timing etc.	
Medical	From treatment (Babiker et al., 2013) to the "timing of medical technology acquisition" (Friedman & Goes, 2000)	(a) Treatment timing (b) Medical technology adoption timing etc.	

(Source: Author's own work)

politicians will attempt to increase the public attention given to it or the positive impact felt by electors and to reduce public attention, or the impact on welfare, of 'bad news'." Gibson (1999: 471) believes "the way discretion will be exercised by politicians, according to whether the 'news' is, or is likely to be, good or bad, and the resulting patterns in the timing of events," politicians show one of the four behaviors of "packaging, splitting, highlighting, and phasing."

Furthermore, timing could affect the interest of the political rivals. For example in the occasions when there is a possibility of low or high turnout, there could be a great deviation toward the fulfillment of the interests of a special political party, faction or ideology. According to Berry and Gersen (Berry & Gersen, 2010: 37), "…the timing of local elections drives turnout and, ultimately, substantive policymaking." They believe:

> When local elections do not coincide with important federal or state contests, the marginal cost to voters of participating rises, and consequently only those voters with the greatest stake in the electoral outcome turn out, a phenomenon we label "selective participation." Selective participation is especially pronounced in local special purpose elections, such as those for school and special districts, where single-issue interest groups are especially influential. When there is selective participation in a low turnout election, policy outcomes will be more favorable to special interests than they would be if the same government were elected in a high turnout election. (ibid.)

Another example is in public administration. In administering the public sometimes the agencies try to hide bad news, thus the public usually believe these agencies use *news release timing* as a strategy to hide the effects of the news. Gersen and O'Connell (Gersen & O'Connell, 2009: 1157) believed, "The bureaucracy regularly is accused of announcing controversial policies on holidays and weekends when public attention is elsewhere." They show that "this controversial wisdom is wrong, at least significantly incomplete." However, "agency discretion to choose when to announce policy decisions can even allow agencies to influence which interest groups monitor the regulatory process and therefore whose preferences must be taken into account." They defend it as "a revised theory of strategic timing in administrative law."

On the other hand, temporal dimensions and strategic timing play a crucial role in the success or failure of strategic negotiations. Heldt (2019) has specified six dimensions of time by using negotiation analysis and international relations studies literature. These dimensions are *(1) time horizons, (2) time costs, (3) time rules, (4) time pressure, (5) time discourse,* and *(6) time as a resource*. She accentuates the importance of time in international organizations and believes, "Interactions among actors are embedded in a temporal dimension, and actors use formal and informal time rules, time discourses, and time pressure to obtain concessions from their counterparts."

Additionally strategic timing is also bedrock of strategic decision-making in strategic entrepreneurship. Except social entrepreneurship timing which seeks the social benefit of the target society or community, *entrepreneurial strategic timing* is partly for wealth creation (Hitt et al., 2001). Through literature distillation on timing in entrepreneurship, Forouharfar et al. (2014) has shown that entrepreneurial entry strategy, opportunity-seeking, contingency perception, innovation, environmental scanning, decision-making, risk-taking, and insight are all time-bound entrepreneurial concepts.

Finally, Time has had a pivotal and in some cases vital role in the strategy formulation in modern businesses. Two of the well-known reflections of this importance could be found in *Time-Based Competition* and *Just-in-Time Manufacturing*.

Time-Based Competition "is the use of speed to meet the needs of customers faster than can competitors and in ways that are difficult for competitors to match" (Stalk, 2016: 1). The core concept in *Time-Based Competition* is the use of time for gaining competitive advantage. The term was first introduced by *George Stalk* of *Boston Consulting Group* in 1988. Speed plays a leading role for reaching the pinnacle of competitive advantage. Thus, Stalk (2016: 1) believes, "Speed can be used in the order-to-cash cycle, the innovation-to-cash cycle, the service-to-cash cycle and many more. Speed can also be used in capital investment programs to build a business faster or alter business model, the more quickly than can competitors." In sum, Stalk (2016: 1) calls *Time-Based Competition* as a "re-engineering for speed" as well as "a strategy for using the speed advantages" in the domain of business world. Moreover, *Just-in-Time Manufacturing* as the second abovementioned time-related strategic philosophy in business is simply "a manufacturing strategy wherein parts are produced or delivered only as needed" (Merriam-Webster, 2002: 636). It has initially been a Japanese philosophy of how to strategically use time in production. Therefore, "Cutting-edge Japanese companies today are capitalizing on time as a critical source of competitive advantage: shortening the planning loop in the product development cycle and trimming process time in the factory—managing time the way most companies manage costs, quality, or inventory" Stalk (1988: 1).

Strategic timing is also a prerequisite for successful competition. The first who occupies the market segment usually gains the upper hand in the strategic competition. Henderson (1989: 139) believed, "Strategic competition compresses time" and thus "Competitive shifts that might take generations to evolve instead occur in a few short years." Therefore he hypothesized, "Pure chance provides an initial advantage to the first competitor to enter or define a competitive segment. The initial competitor becomes a part of the environment to be coped with by the next competitor who chooses to enter that specific arena" (Henderson, 1981: 1).

Table 4 has summarized the main domain and intention of strategic timing in the mainstream.

Table 4 Summary of the main characteristic for the domain and intention of strategic timing in the mainstream

	Domain	Intention
Characteristics	Context-related	Optimum-seeking
Mainstream study approaches	Contextual	Optimal
Main orientations	Contextualism: Time in each context (e.g., political, social, military, economic, etc.) show idiosyncratic characteristics relevant to the context.	Optimalism: Choosing the best alternative or the propensity in strategic timing to think that the selected alternative is the best possible alternative

(Source: Author's own work)

4 Discussions

Time is superficially a simple clockwise concept but the nature of time is one of those complicated issues for human cognition. Time as an entity is different things to different people. The way a physicist looks at time is definitely different from the meaning of time to a philosopher, historian, sociologist or a stressed CEO who set a tight deadline for a project accomplishment. Time to a physicist is a fundamental scalar quantity, to a philosopher an intuitive abstract entity, to a historian a periodical phase defined by the past, the present and the future, to a sociologist is a social change, and to a manager who feels excessive mental strain is the calendar time before the due time. Such *perspectivism* in viewing time shows its simultaneously *infinite* (i.e., plethora of perspectives, views and ideas) and *indefinite* (i.e., vague) nature. Nevertheless, what is *perspectivism* and what is its relation to the questions of time and strategic timing?

Perspectivism discusses that each human being could not be free from the influence of his own perspectives and thus in his views he cannot escape *perspectival effects* which distort, control and ultimately form his comprehension of a reality. In other words, "Perspectivism is the view that any claim to knowledge is bound to the perspective formed by the contingent 'interests' of the knower" (Reginster, 2001: 217). The conceptual schemes of the formulators of strategies define the appropriate time for devising a new or reusing an old strategy. Their perception, reason, experience, knowledge, culture, etc. determine their conceptual schemes. This concept of strategic *perspectivism* falls within *contingency theory* in organizational studies; i.e., there is no best way and hence management, leadership and administration of an organization depend on the ever-changing contingences. Additionally, time in strategic studies is a determining factor, i.e., the adoption, development, formulation, implementation, planning and setting a strategy are contingent on the fulfillment of certain conditions.

On the other hand, *strategic timing* is the art of grasping the appropriate time for implementing a specific strategy for a specific *context*. Hence, timing is *contextual*. For example, the timing in product investment context is different from the timing in political campaigning context. Moreover, each strategic context has its own idiosyncratic characteristics and exclusive research approaches. However, any strategic timing intends for producing the most *optimal* results (Table 5).

Table 5 Summary of basic ontological characteristics of time/timing

Entities	Time	Timing	Strategic timing
Natures	Perspectival	Contextual and contingent	Optimal
Results	Infinite perspectives (ideas)	Infinite contexts and contingencies	Optimum-seeking behavior

(Source: Author's own work)

4.1 Strategic Timing Ontology

Ontology is a field of philosophy that studies *Being*. Any understanding of timing is conditioned to the understanding of the ontological characteristics of time. Hence, the ontology of time is the answer to what time is.

In studying the ontology (being) of time, we could take either an *exogenous approach* (time as an external being or entity) or an *endogenous approach* (time is inherently part of any entity and could not be detached and studied separately). However, what is time?

4.1.1 Strategic Timing Exogenism

Exogenous is a word formed from *exo-* (*outside*) + −*gène* (from Greek -*genēs* which means *born*). An exogenist approach to the study of time, assumes that time is an *external*, *complete* and *detached* entity from the time study for any activity, action, etc.

In the antiquity, *Aristotle*, *Plato,* and *Avicenna* believed the core concept in time is *motion*. *The motion before* and *the motion after* and the comparison between them makes the concept of time. However, the author of the chapter believes the most fundamental concept in time is *change*. Both approaches, either viewing time as *motion* or *change* are exogenous approaches to the ontology of time.

Time is fundamentally a change-related concept, that is human cognition perceives time via the concept of change and the change quantity, quality and severity. Such an approach to defining time is a *derivative approach*. That is time is a *derived* concept from change or proposing that if there were not any *change* in our world, there were not any entity as *time*. Although such a view to time as an entity is derivative, it is external and exogenous since it is not considered as part of any entities:

P_3: Time and Change are interchangeable concepts.

Furthermore, *time* and *change* move in the opposite directions. The more is the change, the less is the conceived time, and vice versa. Therefore, we say a condition has fundamentally changed in a flash of light or change for a condition needs a long time, because it changes very slowly. Thus, theoretically the more *change* move toward the positive extreme, the same *time* moves toward the negative extreme (Figs. 6 and 7).

Nevertheless, time is an enigma "No two men living *at* the same time live *in* the same time. Each one, living at the same moment, has his own personal time

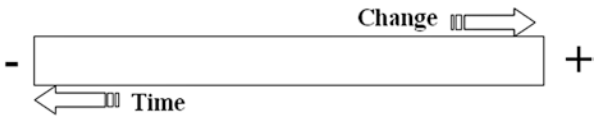


Fig. 6 Time/Change relationship for an abrupt alteration. (Source: Author's own work)

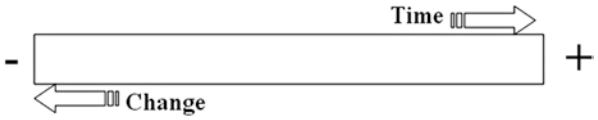


Fig. 7 Time/Change relationship for a gradual alteration: the perception of time for very gradual and time-consuming changes. (Source: Author's own work)

perspective, his own living linkage with past and future, the content of which, and the scale of which, are as different between one person and another as are their appearance, their fingerprints, their characters, their desires, their very being" (Jaques, 1990: 21). Thus, time is *perspectival* and *relatival*. *Perspectival* since every man comprehends and feels it from their own perspective and *relatival* since its interpretation relates to the contexts, events, processes, consequences and the outcomes. In other words, it is the structure, which helps us to designate the sequence of events and to form a mental plot of what has happened in the real world (metaphorically, *time* is the string and the *events* are the beads of a rosary). Without this mental plot, we were not able to designate causes and correlations. Table 6 has summarized some of the general characteristics of time as an ontological entity and their relations to the time metaphors in history, mythology, tradition, science, and philosophy.

Considering Time as an absolute entity by Isaac Newton, or as wind in constant flux of change, or numerical entity in Aristotle's view, or inherently a motional being as stated by Plato, in the Timaeus, Aristotle, in Book IV of his Physics, and Avicenna, in al-Šifā, The Book of Healing, or in the old religions and mythologies as Zurvan, pre-existent god before the creation of goodness (God) and badness (Satan) or as Chronos the Time god in Greek mythology as well as Time as a wheel in Hinduism, water in Chinese tradition, a vessel or container of events and a pendulum all reflect and accentuate the ontological conceptualization of Time as an exogenous entity, in other words a detached existence and complete being in itself: a self-existent reality

4.1.2 Strategic Timing Endogenism

Endogenous is a word formed from *Endo-* (*inward*) + *−gène* (from Greek *-genēs* which means *born*). An *endogenist approach* to study of time, assumes that *time* is an internal, incomplete and attached entity with the activity, action, or any entity under investigation or study. In such an approach to the study of time, it is considered as a bound entity to the condition, situation and the object.

In this approach, we assume *stream of consciousness*, i.e., human comprehends time via consciousness of time. Therefore, time within our perception is deeply a *subjective* experience, which is usually studied under "consciousness of time" within "individual consciousness" (Gurvitch, 1990: 35). However, the strategic studies of time try to change this subjective perception of time to a more objective one, which could be presented as some rules for strategic timing in a wide range from the world of politics (e.g., Brace & Hinckley, 1993) to the world of business and entrepreneurship (e.g., Engelstätter & Ward, 2018).

Table 6 Some general ontological characteristics of time cognition and their relevant recurring cognitive metaphors

Time/timing ontological characteristics	Explanations	Metaphors	Ontological approach
Being	Human perceives an external entity/being, which measures their tasks, actions, etc. with	Time as an absolute entity (*Isaac Newton's* view)	Exogenous
Change	Human cognition grasps *time*, according to change, i.e., if there were no *change* (zero change), there would be no grasp of *time*	Time as wind	Exogenous
Quantifiable	Since *time* is a type of change, it could be quantified and then measured, e.g., via clocks, sundials, metronomes, etc	Time as number[a] (*Aristotle's* view)	Exogenous
Estimation	The *time* for some actions could be approximately calculated via man-made units of measurement		
Transitional	*Time* is in constant flux and dynamism	Time as thief	Exogenous
Simultaneous	For each action, there could be an exclusive time. These *times* could partially or completely overlap, i.e., two actions could happen simultaneously		Endogenous
Cognitive	*Time* is a perceived entity, thus it is always defined according to human cognition and how they conceive it	Time as memory	Endogenous
Intuitional	First we understood *time* via intuition then we tried to make time systems in industry, sailing, physics, etc		
Abstract	*Time* is not a concrete, observable entity, thus we use a time unit to make it more tangible, e.g., seconds, minutes, days, weeks, months, years, centuries, or even a light year		
Conceptual	*Time* is completely a conceptual entity, i.e., it forms and finds its meaning in our mind and hence our cognition		
Subjective/objective	*Time* as a perception or as an entity, which could be felt differently by various people, is a subjective experience. However, *time* as a study project in science, e.g., physics is an objective entity	Time as an existed life (subjective time) Time as fate (objective time)	Subjective: Endogenous Objective: Exogenous

Motional	*Time* is not static but it is an entity in action	Time as motion (*Plato*, in the *Timaeus*, *Aristotle*, in *book IV* of his *physics, Avicenna*, in *al-Šifā*, *the book of healing*)	Exogenous
Spatial	*Time* in human cognition is strongly attached to space, i.e., time-space relation		
Past-present-future	*Time* is a triple entity, i.e., it is not less than three or more than three	Time as flying time machine	Exogenous
Sequential	We place *time* in a sequence of past-present-future		
Comparative	The triple entities of past-present-future is defined through comparison by a negation cognitive approach, i.e., the past is understood by its comparison to the present and future and defining it by not being the other two other entities (that is the past is an entity which is not present and could not be future)		
Circular	One view to *time* is time as a circle, i.e., there is no start and no end, and it repeats eternally	Time as a wheel. (wheel of time in *Hinduism*)	Exogenous
Cyclical	Viewing *time* as a cycle, assumes that some characteristics of time could repeat in rhythmic cycles in the future	Time as "father time". (a renaissance personification of a harvest god with a scythe in his hand)	Exogenous
Durational	For the accomplishment of each task we spend *time*, i.e., it takes *time* to do an action either physical or mental		Endogenous
Interval	Two concepts of stopping and resuming leads to the emergence and grasp of *time* intervals		Exogenous
Linear	Viewing *time* as a line is assuming time progress as an entity in continuous development which could not have researchable cycles or specific structures and thus every moment is entirely irrevocable and idiosyncratic	Time as an arrow. (arrow of time, a conceptualization by Arthur Eddington, British astrophysicist and philosopher)	Exogenous
Directional	Human cognition assumes the past, behind and the future forward, thus cognitively it is a directional entity, i.e., human consciously or unconsciously attributes direction to *time*		Endogenous
Progressive	*Time* does not stop, it progresses forward		Exogenous
Irreversible	*Time* does not recede, i.e., it does not move back		Exogenous

(continued)

Table 6 (continued)

Time/timing ontological characteristics	Explanations	Metaphors	Ontological approach
Infinite	*Time* is infinite and pre-existent at both extremes (i.e., before or the past and after or the future)	Time as *Zurvan*. (time considered as an eternal pre-existent god before creation in *Zurvanism*, a *Zoroastrian* sect in old Persia) Time as *Chronos* (the personification of time as a god in old Greek mythology)	Exogenous
Fluid	*Time* continues so we assume a stream of *time*	Time is water (Chinese recurring metaphor)	Exogenous
Nonstop	*Time* never stops	Time as river	Exogenous
Momentary	*Time* is a fleeting and perishable entity		
Co-existential	Each entity exists in a specific *time*, i.e., always there is a *time* that coexists with at least an action	Time as the inner core of each entity	Endogenous
Relative	Although we try to make measurement units for measuring *time*, it is not a fixed entity, that is *time* has relativity		
Relational	Each entity could have its own idiosyncratic *time*, e.g., the time of life, the time of a historical period, the time for a chemical reaction, etc		
Container	Actions and reactions happen within *time frames*	Time as a vessel for events	Exogenous
Rhythmic	*Time* has rhythm and pace	Time as pendulum	Exogenous
Increasing/decreasing/stable	*Time* has a tempo and momentum, its speed (velocity) increases, decreases, or it could be monotonous		

(Source: Author's own work)

[a]*Aristotle*, in his *Physics, 219b–3–5*, has mentioned, "…we judge more and less by number, and more and less motion by time; so time is a kind of number." However, according to Annas (1975: 97), *Aristotle* in this work "adds that 'number' has two senses, and time is a number in the sense of what is counted or countable, not in the sense of what we count with"

Thus, such cognitive metaphors such as Time as memory, existed life or an inner core of each entity accentuate the intuitive, subjective and idiosyncratic attributions of meaning to Time, i.e., the subject defines and gives meaning to the question of what Time is. Such an endogenous conceptualization of the ontology of Time is fundamentally an existentialist view of Time (i.e., we give Time its meanings and attributions and there are not necessarily its own attributions in reality).

Finally, either to use the exogenous approach to the study of time/timing or the endogenous approach, *time* in any progressive scenario (linear, cyclical, circular, and sinuous) is a *directional* entity, i.e., it directs and moves toward the future:

P_4: Time is a directional entity.
&
P_5: Time tends toward the future.

Hence, strategic timing is inherently a *futuristic* activity and the main intention behind any scenarios of strategic timing is the most *optimal* gain (Fig. 8.)

4.2 Strategic Timing Epistemology

Epistemology is a branch of philosophy with deals with the fundamental questions on *knowledge*.

4.2.1 Strategic Timing Externalism

Here, the epistemological classification of strategic timing is presented via the *externalist approach*, i.e., strategic timing as an external issue. The incidents and events in the outside, in other words, the contingencies call for a specific timing. Furthermore, since strategic timing applies to the future, i.e., the imposer of such

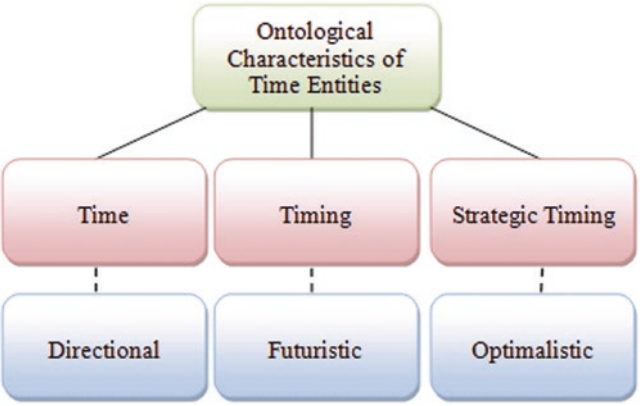


Fig. 8 Comparing three ontological entities of time. (Source: Author's own work)

Table 7 Five externalist strategic timing scenarios or *5Ps of strategic timing*

Strategic timing Classifications	Intentions	Examples
Predictive timing	Timing based on the prediction of an incident in the future	Product development before the emergence of new needs or demands
Preventative timing	Timing for the prevention of an occurrence or incident in the future	Preventative maintenance before any shutdown
Preemptive timing	Timing based an initiative to seize and shape the future emerging strategic moves and opportunities	Military deployments before any conflicts
Proactive timing	Timing based on an active anticipation of the future and acquisition of early competitive strategic control	Company mergers for the acquisition of a larger market share and control
Promotive timing	Timing for the promotion and nudging a special intention, propaganda, news, etc. and paving the ground for its strategic growth, development or acceptance	Election campaigns before the formation of any meaningful mind maps

(Source: Author's own work)

timing intends to gain or influence an issue or a group of issues or entities in the future; that is its *directionality* is toward the future. Thus, we could potentially have at least five externalist strategic timing scenarios or *5Ps of strategic timing* (Table 7):

(a) Predictive timing scenario.
(b) Preventative timing scenario.
(c) Preemptive timing scenario.
(d) Proactive timing scenario.
(e) Promotive timing scenario.

Thus, in strategic timing *epistemological externalism*, the military, political, economic, or social environments, missions, visions, contingencies, information, threats and opportunities, toward any entity (e.g., polity, organization, military force, department, etc.) have seen as an external issue. That is the externalities influence the timing scenarios.

4.2.2 Strategic Timing Internalism

The *internalist strategic timing* puts the emphasis on the internal capabilities, strengths and weaknesses. Thus, in this approach not the externalities but the internal potential, toughness, vigor, stability and responsiveness determine and affect the scenarios of strategic timing either choosing a *passive timing*, i.e., strategic patience or an *active timing*, i.e., acting at the time of the pinnacle of internal potential and vigor.

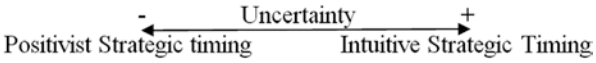


Fig. 9 The impact of uncertainty on the strategic choice of either *intuitive* or *positivist* approaches: Strategic timing decision-making spectrum. (Source: Author's own work)

4.3 Strategic Timing Axiology

Axiology is a branch of philosophy that studies the nature of *value*, *ethics*, and *aesthetics*. Here, the strategists' *evaluations* of the right time for the implementation of strategy were discussed.

The strategic evaluation of the time for strategy implementation or strategic move, action or reaction could be done either via intuition and *qualitative* methods or via numerical and *quantitative* methods. The former approach in the evaluation of strategic timing is broadly called an *intuitive approach* and the latter a *positivist approach*.

If we accept the following proposition:

P_6: Time bears uncertainty.

Then, the degree of *uncertainty* plays a crucial role in selecting each of the *intuitive* or *positivist* approaches.

Figure 9 schematically shows as the degree of uncertainty decreases and we have fewer variables and complexities the strategists could evaluate the proper timing via positivist methods such as mathematical equations (e.g., in Game Theory), statistical methods, operational researches, etc. On the other hand, by the increase in the uncertainty and complexities of the situation strategic timing shifts more toward an intuitive task.

4.3.1 Strategic Timing Evaluation Via Intuitionism

Kant (1922: 24–25) *in the section Of Time, in Critique of Pure Reason* has mentioned:

> Time is a necessary representation on which all intuitions depend. We cannot take away time from phenomena in general, though we can well take away phenomena out of time. Time therefore is given *a priori*. In time alone is reality of phenomena possible. All phenomena may vanish, but time itself (as the general condition of their possibility) cannot be done away with.

Such an approach is an example of *Intuitionism* to the evaluation of *time*. In such an approach *time* is a "necessary representation," the representation that takes its form in our intuition. Furthermore, the reality of phenomena in this approach is defined by its *time*.

"Insight" and "cognitive ability" play crucial roles in the evaluation of strategic timing (Forouharfar et al., 2014: 12) .They believe "Insight and cognitive ability make ET [Entrepreneurial Timing] more efficient, since the strategist as the principal

agent who finally analyzes the complicated concept of timing, deals with their own mental abilities and sharp mindedness to grasp and define new settings, opportunities, innovations, decisions, etc." On the other hand, Wally and Baum are two researchers of strategic decision-making who has studied the concepts of "pace" (Wally & Baum, 1994), "speed" (Wally & Baum, 1996), and "timing and intuition" (Wally & Baum, 1997) in the process of *strategic decision-making* (SDM). They also draw attention to the cognitive ability of the strategists in the process of strategic timing. Furthermore, cognitive ability in combination with other determining factors such as the intuition of the strategic decision-makers affect the speed, timeliness, or the laggard of decisions. Wally and Baum (1994) in an empirical study on 151 firms showed that the "cognitive ability" of the CEOs such as their tolerance of risk, propensity to act, and use of their intuition were associated with speedy strategic decision-making. These two researchers in 1996 revealed that the executives who work in growth-oriented firms instead of formal rules of SDM used more "intuition" (Wally & Baum, 1996). They even found "In addition to intuition, heuristics or rules-of-thumb sometimes replaced formal SDM procedures" (Wally & Baum, 1997: 103).

Strategic timing estimation via an *intuitive approach* could happen within one of the following approaches:

(a) Heuristics.
(b) Experienced Trial and Error.
(c) Educated Guess.
(d) Rule of Thumb.
(e) Ansatz.

Table 8 has summarized the intuitive approaches to the estimation of strategic timing.

Moreover, *framing bias* is one of the significant and affecting factors in SDM (Hodgkinson et al., 1999) which potentially could affect the strategists' cognitive process. The *framing bias* or *effect* is the cognitive condition of making a decision based on the negative or positive mental value attribution or connotations to the

Table 8 Summary of the intuitive approaches to strategic timing

Intuitive strategic timing	Explanations
Timing via heuristics	Applying previously experienced solutions for discovering new or emerging but relevant timing of issues, problems, and cases
Timing via experienced trial and error	Determining the best and the most optimal timing based on many previously experienced timing cases and scenarios
Timing via educated guess	Guessing the likely timing based on the learned knowledge via cognitive estimations (timing guesstimates)
Timing via rule of thumb	Applying generally accepted principles for determining a prudent time, which avoids major risks
Timing via ansatz	Putting the initial bedrock for solving timing problems in a very complicated condition via defining significant values, factors, variables, concepts, boundaries and limitations for a case

(Source: Author's own work)

options, for example most strategists usually avoid the strategic options, which decrease the gains, or lead to losses. However, maybe such a move is necessary in the short term to gain more important strategic results.

4.3.2 Strategic Timing Evaluation Via Positivism

The strategic time evaluations in the *positivist approaches* are set on mathematical and specifically statistical methods. The positivist methods of timing in strategic management take into consideration only verifiable and numerically supported data. Hence, strategically quantitative as well as quantifiable timing variables are significantly considered. An example for the positivist evaluation of the exact strategic timing is the *break-even point* (BEP) in production. This is the point that the total cost of the production is equal to the total revenues or incomes, in other words they will be *even*. The strategic importance of BEP determination and the time that a production company reaches to this point is so vital for production decision-makings as well as for the estimation of the exact time for *return on investment* (ROI).

Table 9 has presented the complete summary of the discussions section in this chapter.

5 Recommendations

5.1 Strategic Timekeeping System (STS)

Timing should be a *distributed* process within strategic organizations that is although there should be an ultimate imposer of the strategy at the most optimal and fittest time, it is recommendable that the estimation of the precise timing of strategic action begets from the *accumulation* and then *summation* of the ideas and *perspectives* of each department's strategist. It gives flexibility and dynamism to the timing control. This system is analogous to the timekeeping system in the brain to deal with the timing flexibility and control (see, Wang et al., 2018; MIT News, 2017).

Hence, there should be no single master timing. In other words, the estimation of strategic timing should not be the duty of only one person. Why? Since based on the aforementioned discussions of the chapter strategic timing is *perspectival* (embraces numerous subjective perspectives and ideas) and *contextual* (could emerge itself in numerous contexts). Thus, nobody could have an encircling knowledge of all ever-changing and uncertainty-stricken perspectives and contexts, which call for strategic actions at the right time.

In an STS, in each department, we need a daft strategist familiar with the strategic *contexts* of its department (since e.g., a strategist in the financial department deals with different issues in comparison to a strategist in the HRM department). Each of the members in the "strategic timing network" within the organization must

Table 9 Summary of the discussions

Strategic timing									
Ontology				Epistemology			Axiology		
Perception				Classification			Evaluation		
Exogenism	*Change as a Core concept*	Contextual		**Externalism**	*5Ps of strategic timing*	Predictive timing	**Intuitionism**	*Estimation*	Timing via heuristics
		Contingent							Timing via experienced trial and error
		Comparative (past–present–future)				Preventative timing			Timing via educated guess
		Directional				Preemptive timing			Timing via rule of thumb
		Futuristic				Proactive timing			Timing via ansatz
		Relative				Promotive timing	**Positivism**	*Calculation*	Timing via mathematics
		Perspectival							
Endogenism	*Consciousness*	Progressive	Linear	**Internalism**	*Internal potentials*	Active timing			Timing via statistics
			Circular			Passive timing			Timing via logic
			Sinuous						

(Source: Author's own work)

Table 10 STS competitive timing factors and their results

Harmony	Adaptability	Decisiveness
Timeliness	Flexibility	Swiftness

(Source: Author's own work)

have a precise estimation of their own department's estimation of exclusive strategic timing for a specific issue but from their own points of view. Such a system/network acts as the "internal organizational clock" which will be ready to act at any "contingency state." However, the system does not wait passively until the emergence of the "contingency state" but they should be a proactive, fast-mover and preemptive striker.

Moreover, "organizational structure" affects "response time." Although STS is a decentralized strategic timing decision-making system (i.e., reliance on multiple departments), in the strategic contingencies which demand prompt decisions, the STS should have a core of few but experienced time strategists. They could be organized within a highly centralized committee or task force. Previous researches that have verified *centralization* leads to speedy response time and *decentralization* leads to dilatory response time as well as because of less reliance on consultation autocratic organizational decision-makers make faster decisions (Eisenhardt, 1989) justify such a strategic timing committee/task force. On the other hand, STS should be less formalized, since *formalization* slows the speed of strategic decision-making. The reason is highly centralized organizations encourage more data collection and more analyses of the strategic alternatives (Fredrickson & Mitchell, 1984). This could be an Achilles heel for the situation that demands agility.

Finally, the STS acts as a unit for acquiring competitive timing via its *harmony* with the realities, *adaptability* with the emerged contingencies and *decisiveness* as a pre-organized and ready organizational entity (Table 10).

6 Conclusion

Based on the mainstream literature on strategic timing, four major strategic timing metaphors were deduced. These metaphors were strategic timing as *game metaphor*, *cyclical metaphor*, *window of opportunity metaphor* and *patience metaphor*. These metaphors implied *timing game*, *timing cycles*, *opportunity hunting,* and *timing passivism* for gaining a better time, respectively. Additionally, these metaphors in combination with the metaphors of time accentuated the ontological conceptualization of time as an *exogenous entity*. Thus, the metaphorically exogenous approach in the study of time and timing in the realm of human cognition was cognitively justifiable. The exogenous approach in conceptualizing the ontological perception of time provided the necessary grounds to attribute *contextual*, *contingent*, *comparative*, *directional*, *futuristic*, *optimal,* and *perspectival* characteristics to strategic timing. On the other hand, the historical metaphors of time as memory, existed life

or an inner core of each entity shed light on the *intuitive, subjective,* and *idiosyncratic* attribution of meaning to time, i.e., each subject defines and gives meaning to the question of what time is. Such an endogenous conceptualization of the ontology of time is fundamentally an *existentialist* view of time. Then it was discussed that time and hence the strategic timing models are *progressive*, i.e., time and consequently timing progresses in one of the *linear*, *cyclical*, *circular,* and *sinuous* developments.

On the other hand, the epistemological discussions of strategic timing with the externalist approach for the intention to provide a solid classification for strategic timing led to the five scenarios of strategic timing or the *5Ps of strategic timing* (*predictive timing, preventative timing, preemptive timing, proactive timing* and *promotive timing*). All the *5Ps* had a *futuristic* orientation since all of them try to emerge strategic timing in advance that is before its emergence on the ground. Furthermore, the internalist classification of the epistemology of strategic timing led to the two categories of *active timing* and *passive timing*, which relied on strategic patience and acting at the highest climax for the internal potential, respectively.

Finally, the chapter discussed that the axiological evaluation of strategists by intuitionist approach was based on the cognitive estimation of the most optimal timing via one of the *heuristics*, *experienced trial and error, educated guess, rule of thumb,* and *ansatz* methods. Besides, the positivist approach for the timing evaluation by strategists ranged from *mathematical* to the *statistical* and *logical* methods.

References

Abele, S., Bless, H., & Ehrhart, K. M. (2004). Social information processing in strategic decision-making: Why timing matters. *Organizational Behavior and Human Decision Processes, 93*(1), 28–46.

Annas, J. (1975). Aristotle, number and time. *The Philosophical Quarterly, 25*(99), 97–113. https://doi.org/10.2307/2217626

Arora, A., Fosfuri, A., & Rønde, T. (2018). *Waiting for the payday? The market for startups and the timing of entrepreneurial exit (no. w24350)*. National Bureau of Economic Research.

Babiker, A. G., Emery, S., Fätkenheuer, G., Gordin, F. M., Grund, B., Lundgren, J. D., et al. (2013). Considerations in the rationale, design and methods of the Strategic Timing of AntiRetroviral Treatment (START) study. *Clinical Trials, 10*(1_suppl), S5–S36.

Bakker, R. M., Shepherd, D. A., & Davidsson, P. (2014). When to pull the plug and when to take the plunge: Timing strategic decisions about new ventures. In *Academy of management proceedings* (Vol. 2014, p. 10165). Academy of Management.

Bárcena-Ruiz, J. C. (2007). Endogenous timing in a mixed duopoly: Price competition. *Journal of Econometrics, 91*, 263–272. https://doi.org/10.1007/s00712-007-0255-5

Bendoly, E., & Kaefer, F. (2004). Business technology complementarities: Impacts of the presence and strategic timing of ERP on B2B e-commerce technology efficiencies. *Omega, 32*(5), 395–405.

Berry, C., & Gersen, J. (2010). The timing of elections. *The University of Chicago Law Review, 77*(1), 37–64.

Bierly, P. E., & Kessler, E. H. (1999). The timing of strategic alliances. In *Dynamic strategic resources*. Wiley.

Box-Steffensmeier, J. M., Arnold, L. W., & Zorn, C. J. (1997). The strategic timing of position taking in congress: A study of the north American free trade agreement. *American Political Science Review, 91*(2), 324–338.

Brace, P., & Hinckley, B. (1993). Presidential activities from Truman through Reagan: Timing and impact. *The Journal of Politics, 55*(2), 382–398.

Chaudoin, S. (2014). Audience features and the strategic timing of trade disputes. *International Organization, 68*(4), 877–911.

Chmielewski, D. A. (2009). *An empirical investigation of the antecedents to the timing of new brand introduction decision* (pp. 1000–1022). Firenze University Press.

Christensen, C. M., Suarez, F. F., & Utterback, J. M. (1999). Strategies for survival in fast-changing industries. *Management Science, 44*, 207–220.

Chung, Y. S. (2011). *Timing of strategy choice: An exploration of industry cycle, strategy choice, and performance* (Doctoral dissertation, Virginia Tech).

Cramton, P. C. (1992). Strategic delay in bargaining with two-sided uncertainty. *The Review of Economic Studies, 59*(1), 205–225.

Delios, A., Gaur, A. S., & Makino, S. (2008). The timing of international expansion: Information, rivalry and imitation among Japanese firms, 1980–2002. *Journal of Management Studies, 45*(1), 169–195.

Demski, J. S., & Sappington, D. E. (1986). On the timing of information release. *Information Economics and Policy, 2*(4), 307–316.

Doyle, J. T., & Magilke, M. J. (2015). *The strategic timing of management forecasts*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1479867.

Eisenhardt, K. M. (1989). Making fast strategic decisions in high-velocity environments. *Academy of Management Journal, 32*(3), 543–576.

Engelstätter, B., & Ward, M. R. (2018). Strategic timing of entry: Evidence from video games. *Journal of Cultural Economics, 42*(1), 1–22. https://doi.org/10.1007/s10824-016-9276-7

Etzold, V., & Buswick, T. (2008). Metaphors in strategy. *Business Strategy Series, 9*(5), 279–284. https://doi.org/10.1108/17515630810906783

Faghih, N., Bavandpour, M., & Forouharfar, A. (2016). Biological metaphor and analogy upon organizational management research within the development of clinical organizational pathology. *QScience Connect, 2016*(2), 4. https://doi.org/10.5339/connect.2016.4

Forouharfar, A., Yaghoubi, N., & Motamedifar, M. (2014). Entrepreneurial timing theory: Time entrepreneurship and time strategy. *Asian Journal of Research in Business Economics and Management, 4*(11), 1–27.

Fredrickson, J. W., & Mitchell, T. R. (1984). Strategic decision processes: Comprehensiveness and performance in an industry with an unstable environment. *Academy of Management Journal, 27*(2), 399–423.

Friedman, L. H., & Goes, J. B. (2000). The timing of medical technology acquisition: Strategic decision making in turbulent environments. *Journal of Healthcare Management, 45*(5), 317–330.

Fujiwara, T. (2014, June). Optimal timing of strategic partnership for biotechnology start-ups. In *2014 International conference on engineering, technology and innovation (ICE)* (pp. 1–7). IEEE.

Gallini, N., Lewis, T., & Ware, R. (1983). Strategic timing and pricing of a substitute in a cartelized resource market. *Canadian Journal of Economics, 16*, 429–446.

Gennotte, G., & Trueman, B. (1996). The strategic timing of corporate disclosures. *The Review of Financial Studies, 9*(2), 665–690.

Gersen, J. E., & O'Connell, A. J. (2009). Hiding in plain sight? Timing and transparency in the administrative state. *The University of Chicago Law Review, 76*, 1157–1214.

Gibbs, R. W., Jr. (2011). Evaluating conceptual metaphor theory. *Discourse Processes, 48*(8), 529–562. https://doi.org/10.1080/0163853X.2011.606103

Gibson, J. (1999). Political timing: A theory of politicians' timing of events. *Journal of Theoretical Politics, 11*(4), 471–496.

Götz, G. (2000). Strategic timing of adoption of new technologies under uncertainty: A note. *International Journal of Industrial Organization, 18*(2), 369–379.

Gul, F., & Lundholm, R. (1995). Endogenous timing and the clustering of agents' decisions. *Journal of Political Economy, 103*(5), 1039–1066.

Gurvitch, G. (1990). The problem of time. In J. Hassard (Ed.), *The sociology of time* (pp. 35–44). Palgrave Macmillan. https://doi.org/10.1007/978-1-349-20869-2_3

Hamilton, J. H., & Slutsky, S. M. (1990). Endogenous timing in duopoly games: Stackelberg or Cournot equilibria. *Games and Economic Behavior, 2*(1), 29–46.

Han, N. H. (2012). *South Korea's defence reform plan: A case of bad timing? (RSIS commentaries, no. 193). RSIS commentaries*. Nanyang Technological University.

Heldt, E. C. (2019). Time in international organizations and international organizations in time. In K. H. Goetz (Ed.), *The Oxford handbook of time and politics*. https://doi.org/10.1093/oxfordhb/9780190862084.013.12

Helen, X. H. B., Lib, L., & Chauc, K. W. (2019). On the strategic timing of sales by real estate developers: To wait or to presell? In *Working paper series no. 2019-04*. https://www.crerc.landecon.cam.ac.uk/files-and-documents/rerc-wp-19-04-bao.pdf

Henderson, B. D. (1981). The concept of strategy. *Boston Consulting Group* website. https://www.bcg.com/publications/1981/concept-of-strategy.

Henderson, B. D. (1989). The origin of strategy. *Harvard Business Review, 67*(6), 139–143.

Hitt, M. A., Ireland, R. D., Camp, S. M., & Sexton, D. L. (2001). Strategic entrepreneurship: Entrepreneurial strategies for wealth creation. *Strategic Management Journal, 22*(6–7), 479–491.

Hodgkinson, G. P., Bown, N. J., Maule, A. J., Glaister, K. W., & Pearman, A. D. (1999). Breaking the frame: An analysis of strategic cognition and decision making under uncertainty. *Strategic Management Journal, 20*(10), 977–985.

Huck, S., Müller, W., & Normann, H. T. (2002). To commit or not to commit: Endogenous timing in experimental duopoly markets. *Games and Economic Behavior, 38*(2), 240–264.

Jaques, E. (1990). The enigma of time. In J. Hassard (Ed.), *The sociology of time* (pp. 21–34). Palgrave Macmillan. https://doi.org/10.1007/978-1-349-20869-2_2

Kant, I. (1922). *Critique of pure reason, translated by F. Max Müller* (2nd ed.). The MacMillan.

Kauffman, R. J., & Wood, C. A. (2007). Follow the leader: Price change timing and strategic pricing in e-commerce. *Managerial and Decision Economics, 28*(7), 679–700.

Kawasaki, A., Ohkawa, T., & Okamura, M. (2020). Endogenous timing game in a mixed duopoly with partial foreign ownership and asymmetric increasing marginal costs. *Australian Economic Papers, 59*(2), 71–87.

Kim, P. H. (1997). Strategic timing in group negotiations: The implications of forced entry and forced exit for negotiators with unequal power. *Organizational Behavior and Human Decision Processes, 71*(3), 263–286.

Kim, T., Röller, L. H., & Tombak, M. M. (1994). On the timing of adoption of multiproduct technologies. *Naval Research Logistics (NRL), 41*(3), 377–394.

König, P. D., & Wenzelburger, G. (2017). Honeymoon in the crisis: A comparative analysis of the strategic timing of austerity policies and their effect on government popularity in three countries. *Comparative European Politics, 15*(6), 991–1015.

Kovats, L. (2009). Do elections set the pace? A quantitative assessment of the timing of European legislation. *Journal of European Public Policy, 16*(2), 239–255.

Kreiss, D., Lawrence, R. G., & McGregor, S. C. (2018). In their own words: Political practitioner accounts of candidates, audiences, affordances, genres, and timing in strategic social media use. *Political Communication, 35*(1), 8–31.

Kwon, M., Berry, F. S., & Feiock, R. C. (2009). Understanding the adoption and timing of economic development strategies in US cities using innovation and institutional analysis. *Journal of Public Administration Research and Theory, 19*(4), 967–988.

Lakoff, G., & Johnson, M. (1980a). *Metaphor we live by*. University of Chicago Press.

Lakoff, G., & Johnson, M. (1980b). Conceptual metaphor in everyday language. *The Journal of Philosophy, 77*(8), 453–486.
Lin, C. T., & Wu, C. R. (2004). Strategic timing decision for entering foreign market: A real options approach. *International Journal of Operations Research, 1*, 23–28.
Ludvik, J. (2019). Strategic patience revisited: The counterforce effect. *The Washington Quarterly, 42*(4), 91–106.
Lupia, A., & Strøm, K. (1995). Coalition termination and the strategic timing of parliamentary elections. *American Political Science Review, 89*(3), 648–665.
Marini, M. A., Petit, M. L., & Sestini, R. (2014). Strategic timing in R&D agreements. *Economics of Innovation and New Technology, 23*(3), 274–303.
Markides, C., & Geroski, P. A. (2005). *Fast second: How smart companies bypass radical innovation to enter and dominate new markets*. Jossey-Bass.
Marseguerra, G., & Cortelezzi, F. (2010). Strategic investment timing under profit complementarities. *Economia Politica, 27*(3), 473–496.
Martin, C. L. (2017). Calendar-led marketing: Strategic synchronisation of timing. *The Marketing Review, 17*(1), 73–86.
McClelland, J., & Rust, J. (2018). Strategic timing of investment over the business cycle: Machine replacement in the US rental industry. *Jahrbücher für Nationalökonomie und Statistik, 238*(3–4), 295–351.
Merriam-Webster. (2002). *Merriam-Webster's Collegiate Dictionary*.
Miller, D. F. (1993). Political time: The problem of timing and chance. *Time & Society, 2*(2), 179–197.
MIT News. (2017). *How the brain keeps time*. http://news.mit.edu/2017/networks-neurons-stretch-compress-control-timing-1204
Myerson, R. (1991). *Game theory: Analysis of conflict*. Harvard University Press.
Pettus, M. L., Kor, Y. Y., Mahoney, J. T., & Michael, S. C. (2018). Sequencing and timing of strategic responses after industry disruption: Evidence from post-deregulation competition in the US railroad industry. *Strategic Organization, 16*(4), 373–400.
Rasler, K. (1983). Internationalized civil war: A dynamic analysis of the Syrian intervention in Lebanon. *Journal of Conflict Resolution, 27*(3), 421–456.
Reginster, B. (2001). The paradox of perspectivism. *Philosophy and Phenomenological Research, 62*(1), 217–233. https://doi.org/10.2307/2653601
Ritchie, L. D. (2006). Conceptual metaphor theory. In *Context and connection in metaphor*. Palgrave Macmillan. https://doi.org/10.1057/9780230286825_3
Rossetto, S. (2002). *Optimal strategic timing of financial decisions*. AmsterdamThela Thesis.
Schleiter, P. (2019). Endogenous and exogenous election timing. In K. H. Goetz (Ed.), *The Oxford handbook of time and politics*. https://doi.org/10.1093/oxfordhb/9780190862084.013.3
Schmidt-Dengler, P. (2006). *The timing of new technology adoption: The case of MRI*. London School of Economics. Unpublished Manuscript.
Sollars, G. G., & Tuluca, S. (2012). The optimal timing of strategic action–a real options approach. *Journal of Entrepreneurship, Management and Innovation, 8*(2), 78–95.
Sprecher, C. (2004). Alliance formation and the timing of war involvement. *International Interactions, 30*(4), 331–347.
Stalk, G. (1988). *Time-the next source of competitive advantage*. Harvard Business Review. https://hbr.org/1988/07/time-the-next-source-of-competitiveadvantage
Stalk, G. (2016). Time-based competition. In M. Augier & D. Teece (Eds.), *The Palgrave encyclopedia of strategic management*. Palgrave Macmillan. https://doi.org/10.1057/978-1-349-94848-2_294-1
Stenbacka, R., & Tombak, M. M. (1994). Strategic timing of adoption of new technologies under uncertainty. *International Journal of Industrial Organization, 12*(3), 387–411.
Strobl, D., Bäck, H., Müller, W. C., & Angelova, M. (2019). Electoral cycles in government policy making: Strategic timing of austerity reform measures in Western Europe. *British Journal of Political Science*, 1–22.

Suarez, F. F., Grodal, S., & Gotsopoulos, A. (2015). Perfect timing? Dominant category, dominant design, and the window of opportunity for firm entry. *Strategic Management Journal, 36*(3), 437–448.

Thijssen, J. J. (2008). Optimal and strategic timing of mergers and acquisitions motivated by synergies and risk diversification. *Journal of Economic Dynamics and Control, 32*(5), 1701–1720.

Thoms, P., & Pinto, J. K. (1999). Project leadership: A question of timing. *Project Management Journal, 30*(1), 19–26.

Tian, L. I., Huajiang, L. U. O., & Shang, W. (2016, June). Strategic timing of new-product release with information leakage under competition. In *Manufacturing and service operations management (MSOM) 2016 conference*.

Toshimitsu, T. (2013). A note on the endogenous timing of tariff policy in the presence of a time lag between production and trade decisions. *Open Economies Review, 24*(2), 361–369.

Van Damme, E., & Hurkens, S. (1996). Commitment robust equilibria and endogenous timing. *Games and Economic Behavior, 15*(2), 290–311.

Von Ghyczy, T. (2003). The fruitful flaws of strategy metaphors. *Harvard Business Review, 81*(9), 86.

Wally, S., & Baum, J. R. (1994). Personal and structural determinants of the pace of strategic decision making. *Academy of Management Journal, 37*(4), 932–956.

Wally, S., & Baum, J. R. (1996). Growth orientation and strategic decision-making speed. In *Working Paper*. University of Maryland at College Park.

Wally, S., & Baum, J. R. (1997). Timing and intuition in strategic decision making. In V. Papadakis & P. Barwise (Eds.), *Strategic decisions* (pp. 95–106). Springer.

Walsh, J., & Austin, G. P. (2013). *Taking out the trash: An empirical investigation of strategic timing of news releases*. London School of Economics.

Wang, J., Narain, D., Hosseini, E. A., & Jazayeri, M. (2018). Flexible timing by temporal scaling of cortical responses. *Nature Neuroscience, 21*(1), 102–110.

Wood, E., Khavul, S., Perez-Nordtvedt, L., Prakhya, S., Velarde Dabrowski, R., & Zheng, C. (2011). Strategic commitment and timing of internationalization from emerging markets: Evidence from China, India, Mexico, and South Africa. *Journal of Small Business Management, 49*(2), 252–282.

Xu, F., Luo, X. R., Zhang, H., Liu, S., & Huang, W. W. (2017). Do strategy and timing in IT security investments matter? An empirical investigation of the alignment effect. *Information Systems Frontiers*, 1–15.

Zhu, D. (2015). *Strategic timing of corporate disclosures: Evidence from China* (Doctoral dissertation, Bangor University).

Going on a Quest for Social and Humane Intentions Within Strategic Entrepreneurship: A Systematic Literature Review Approach

Canestrino Rossella, Magliocca Pierpaolo, Bonfanti Angelo, and Castellani Paola

Abstract This chapter proposes a systematic literature review of Strategic Entrepreneurship (SE), aiming to improve the existing understanding of the issue, with reference both to the development of the notion over the time and the way it relates to other fields of study, like Social and Humane Entrepreneurship. For the purpose of this investigation, *Scopus* and *Web of Science (WoS)* were used as databases. 183 articles (93 full papers and 90 abstracts) were finally selected and examined according to the following analytical categories: (1) Years in which the articles were published; (2) Countries where authors have published research on strategic entrepreneurship; (3) Journals in which authors have published their research; and (4) Type of adopted methodology. A thematic analysis of the literature was subsequently performed in order to answer the following research questions: How has the concept of SE evolved since its first appearance in management research? In what areas of knowledge was SE more extensively investigated so far? How does SE relate to other concepts like Social and Humane Entrepreneurship?

According to the research findings, a growing interest in strategic entrepreneurship has been developing for the last 20 years, especially with reference to the two main areas of knowledge: *Innovation* and *Knowledge Spillover.* By contrast, SE was never examined in the field of humanistic management, and never referred to firms' simultaneous pursuing of both economic and social aims. In order to fill the existing gap, an integrative framework for further research was finally proposed.

C. Rossella (✉)
Department of Management and Quantitative Studies, Parthenope University of Naples, Naples, Italy
e-mail: rossella.canestrino@uniparthenope.it

M. Pierpaolo
Department of Humanities. Literature, Cultural Heritage, Education Science, University of Foggia, Foggia, Italy
e-mail: pierpaolo.magliocca@unifg.it

B. Angelo · C. Paola
Department of Business Administration, University of Verona, Verona, Italy
e-mail: angelo.bonfanti@univr.it; paola.castellani@univr.it

N. Faghih, A. Forouharfar (eds.), *Strategic Entrepreneurship*, Contributions to Management Science, https://doi.org/10.1007/978-3-030-86032-5_6

Keywords Strategic entrepreneurship · Social entrepreneurship · Humane entrepreneurship · Literature review

1 Introduction

Strategic Entrepreneurship (SE) is "*the integration of entrepreneurial (i.e., opportunity-seeking behavior) and strategic (i.e., advantage-seeking) perspectives in developing and taking actions designed to create wealth*" (Hitt et al., 2001, p. 481). Both entrepreneurial and strategic perspectives combine in the notion of SE in the attempt to simultaneously exploit current business opportunities and explore new ones (Hitt et al., 2001; Venkataraman & Sarasvathy, 2001; Meyer & Heppard, 2000). Therefore, opportunity-seeking and advantage-seeking activities are necessary for value creation. As advocated by several scholars (Venkataraman & Sarasvathy, 2001; McGrath & MacMillan, 2000; Meyer & Heppard, 2000), an entrepreneurial mindset cannot be separated from strategic thinking, since these are closely linked in the process of wealth creation (Mazzei, 2018; Hitt et al., 2001, 2011). Firms that lack the ability to identify entrepreneurial opportunities fail to explore emerging and sometimes fleeting market demands. Conversely, firms that identify valuable opportunities but are not able to exploit them do not develop a valuable competitive advantage, nor ultimately realize value creation.

Since the current competitive environment is facing increasing ambiguity, SE claims the propensity to capture the benefits of uncertainty (McGrath & MacMillan, 2000), as well as anticipating and then properly responding to emerging environmental changes (Ireland & Webb, 2007) . Given that very few firms are able to develop a wide range of knowledge internally, belonging to external networks allows firms to access new and broader resources for innovation (Tsai & Ghoshal, 1998): thanks to proximity, both individuals and organizations come in contact with each other, sharing resources, knowledge and capabilities. Emerging *spillover* promotes organizational learning, entrepreneurship, and the actors' capacities to employ and leverage strategies (Canestrino & Magliocca, 2019; Calza et al., 2015). Not surprisingly, external networks, resources and organizational learning and innovation have been the main domains of investigation of SE since the publication of the first special issue of the *Strategic Management Journal* in 2001. Most research arose after the call in a series of papers by Hitt and Ireland and their associates (Hitt et al., 2001; Ireland et al., 2003).

In 2007, Ketchen et al. suggested that collaborative innovation can enable both large and small firms to overcome their respective challenges. Sharing ideas, knowledge and expertise allows large firms to exploit their advantage-creating skills and simultaneously explore new opportunities. Similarly, collaboration lets small firms overcome the inherent limits of smallness, while acquiring creativity and flexibility. In more recent years, Tavassoli et al. (2017) have analyzed the role of knowledge spillovers for SE. In so doing, the authors combine two theoretical perspectives about knowledge spillovers (spatial vs. aspatial) with the three dimensions of SE

(inputs, resource orchestration processes, and output of SE) (Hitt et al., 2011), widening the interpretative repertoire about the issues that is actually available. Despite this, SE is still a young and developing research field (Zhao et al., 2020; Tavassoli et al., 2017; Simsek et al., 2017).

As the notion of entrepreneurship was investigated in depth within several fields of research—social economy, human resource management, and sustainability—novel concepts require further investigation. In particular, the emerging concepts of Social Entrepreneurship (SocEntr) (Canestrino et al., 2020; Bosma & Levie, 2010; Zahra et al., 2009) and Humane Entrepreneurship (HumEntr) (Parente et al., 2018, 2020; Kim et al., 2018) open up new research opportunities, the latter mainly referring to the role that SE may have within the fields mentioned.

In accordance with the above, this chapter aims to detect the areas of investigation that prevail in management studies, and to identify new research directions, mainly referring to the emerging field of SocEntr and HumEntr. In so doing, the following research questions will be answered: How has the concept of SE evolved? Which are the main areas of knowledge within which SE was investigated? How does SE relate to other concepts like SocEntr and HumEntr?

In order to realize the research goal, this chapter proposes a systematic literature review. The latter is a type of secondary data analysis "*that locates existing studies, selects and evaluates contributions, analyses and synthesizes data, and reports the evidence in such a way that allows reasonably clean conclusions to be reached*" (Denyer & Tranfield, 2009, p. 671). Since no systematic literature review was published about SE in the field of SocEntr and HumEntr until now, this study will provide a more comprehensive analysis of the topic, enabling researchers to understand and deal with the complexities of SE in different areas of knowledge.

The remainder of the chapter is organized as follows. First, Sect. 2 describes the methodology employed in the study; Sect. 3 presents the descriptive results of the analysis; Sect. 4 describes the thematic analysis; discussions and a proposal for future research directions are presented in Sect. 5. Conclusions are finally presented in Sect. 6.

2 Method

A systematic literary review methodology includes several steps. First, the research questions were stated and guidelines developed for collecting the literature. Second, a plan for classifying, describing, and coding the literature was elaborated. As a final step, the literature was synthesized (Merli et al., 2018; Denyer et al., 2009; Tranfield et al., 2003).

Scopus and the *Web of Science* were used as databases, since both of these are regarded as among the most comprehensive and authoritative scientific databases (Merli et al., 2018; Aghaei Chadegani et al., 2013; Guz & Rushchitsky, 2009), featuring full texts and searchable cited references for top journals covering a variety of business disciplines. Many scholars (Bakkalbasi et al., 2006; Burnham, 2006;

LaGuardia, 2005; Deis & Goodman, 2005; Dess, 2006; Li et al., 2010) have compared the coverage, features and citation analysis capabilities of WOS and Scopus, concluding that these two databases are permanently improving their potentiality. Depending on the above, the use of both *Scopus* and the *Web of Science* is in line with the research purposes of this chapter.

In order to collect as many papers as possible, covering the variety of all the issues examined within strategic and management fields of study, the keyword "strategic entrepreneurship" was adopted as the research criteria. According to the database research functionalities, the chosen keyword was searched in "Topic" (covering Title, Author Keywords, Abstract, Keyword Plus®) in the *WoS*, and in "Title, Author Keywords, Abstract" in *Scopus*. As recommended in the literature, only journal articles were selected, which improves the rigor and quality of a literature review (Vigolo et al., 2018; Orzes et al., 2018; Jia & Jiang, 2018). This means that conference proceedings, book chapters, books and reviews were not considered in the sample. Moreover, since most academic journals are English based, with English as the most used language by researchers in the modern global academic community (Snyder et al., 2016), the research was focused only on English papers. All the papers written in English and belonging to one of the scientific journals collected in *Scopus* and *WoS* were considered for the review. Moreover, no chronological restriction was employed.

As a result, *WoS* returned 157 papers and Scopus 233, giving a total of 390 documents.

After having defined the type and the language of the papers, additional inclusion and exclusion criteria were adopted in order to screen them for the systematic review, as suggested by De La-Torre-Ugarte-Guanilo et al. (2011). In particular, all the papers published in academic journals and dealing with management were considered for further investigation. Among them, papers not mentioning the term "strategic entrepreneurship" in at least one research field (Title, keywords, abstract) were excluded from the sample. 390 papers were therefore selected. After removal of duplicates, a final sample of 183 papers remained (93 full papers and 90 abstracts).

Figure 1 synthesizes the research strategy adopted to develop the systematic literature review.

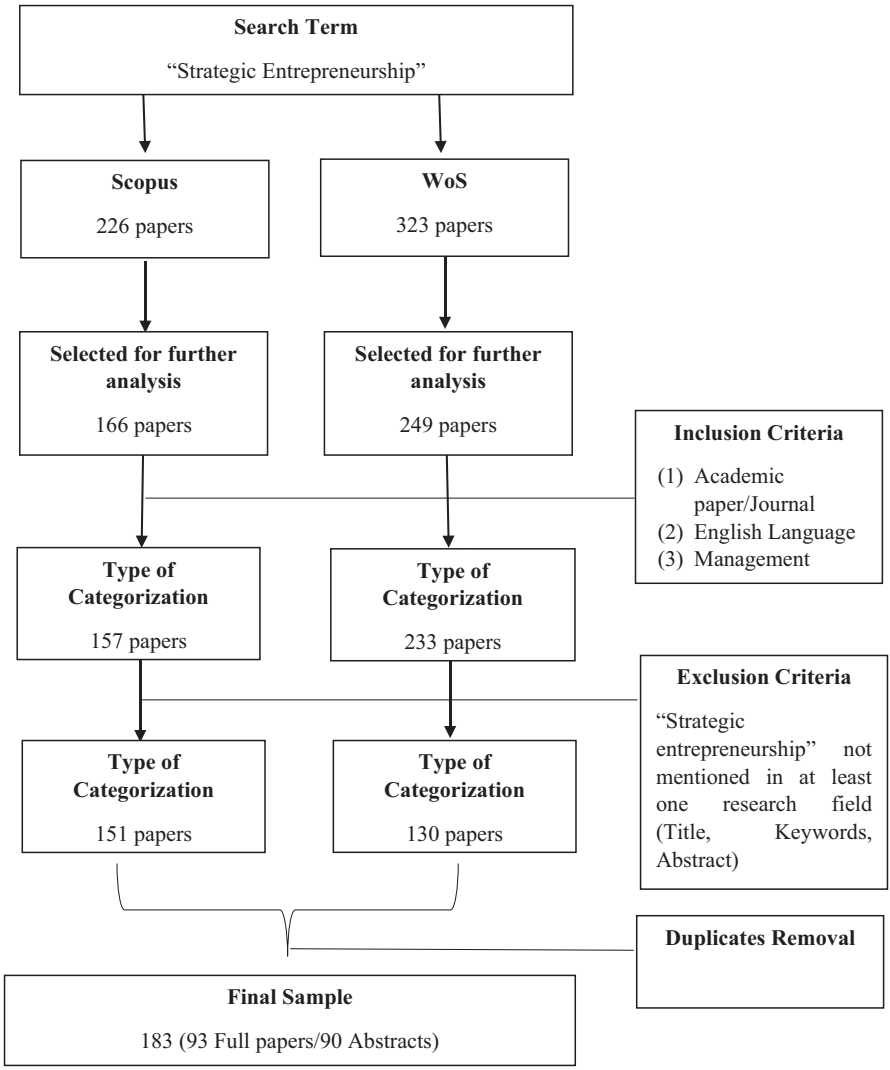
Following the literature review approach designed by Rey-Martí et al. (2016), we established the following analytical categories:

- Years in which the articles were published.
- Countries where authors have published research on strategic entrepreneurship.
- Journals in which authors have published research.
- Adopted methodology (qualitative or quantitative).

3 Descriptive Analysis

3.1 Years in Which the Articles Were Published

Articles were categorized according to the publication year.



Source: *authors' own figure*

Fig. 1 Search strategy to identify a paper for the systematic literary review. (Source: authors' own figure)

One relevant remark about the issue should be reported: because of the adopted research criteria (academic paper/journal) both *Scopus* and *WoS* returned no articles before 2003, excluding the special issue "*Strategic Entrepreneurship: Entrepreneurial Strategies for Wealth Creation*" published by the *Strategic Management Journal* in 2011. This special issue may be considered a key turning point in the development of studies concerning SE. Despite this, however, papers drew on theory from multiple fields, including entrepreneurship, strategic

Table 1 Number of papers published between 2003 and 2020

Period of time	Year	No. of publications
First Period	2003	2
	2004	2
	2005	1
	2006	1
	2007	6
	2008	4
Second Period	2009	13
	2010	8
	2011	10
	2012	6
	2013	11
	2014	10
Third Period	2015	19
	2016	18
	2017	19
	2018	19
	2019	20
	2020	14
	Total	183

Source: authors' own table

management, organization theory, and economics, but they never directly dealt with strategic entrepreneurship. As a consequence, the expression "strategic entrepreneurship" does not appear in the title, keywords or in the abstracts of the published papers. Similarly, the guest editors' introduction to the special issue was not counted in the final number of publications, as it does not belong to the academic paper/journal type. Taking into account the above considerations, there were no articles before 2003, which may be attributed to the growing interest in the fields during the late 1990s, which took time to appear in academic publications.

Table 1 shows the number of publications between 2003 and 2020. The last access for research on *Scopus* and *WoS* was on 11th June 2020. This means that publications for the last year are still ongoing. Because of the above, data about the papers published in 2020 should be considered to be provisional and to increase reasonably until the end of the year.

In order to evaluate and better understand possible trends, we divided the whole period by three, investigating these through a content analysis. Keyword research showed the prevalence of the following cited words related to SE: SME (verified 18 times), Innovation (verified 16 times), Corporate (14 times), Knowledge (13 times) and Growth (13 times), with an increasing focus on innovation from 2015.

The first period, defined between 2003 and 2008, consists of 16 papers and this is the period with the fewest publications. This period started with the publication by Ireland et al.'s (2003) first article, which detailed the notion of SE as a unique,

distinctive construct through which firms are able to create wealth. An entrepreneurial mindset, entrepreneurial culture and entrepreneurial leadership, the strategic management of resources and applying creativity to developing innovations were, in particular, identified as important dimensions of SE that are integrated to foster wealth creation. In order to address how combining and synthesizing opportunity-seeking behavior (entrepreneurial perspective) and advantage-seeking behavior (managerial perspective) leads to a competitive advantage, the authors integrated several theoretical backgrounds, including the Resource-Based View (RBV) of the firm, human capital, social capital, organizational learning, and creative cognition. In so doing, they opened up several research questions dealing with the way SE components relate to one another, as well as with the way different resources may be managed to enhance alertness and to identify entrepreneurial opportunities. Collaborative innovations were, therefore, identified to balance the *trade-off* between the exploitation of competitive advantages and the exploration of entrepreneurial opportunities in later works by Ireland and Webb (2007) and by Ketchen et al. (2007). Particularly referring to the role played by firms' size on their capacity to combine entrepreneurial and managerial behaviors, Ketchen et al. (2007) argued that collaborative innovations permit large firms to exploit their advantage-creating skills while concurrently exploring opportunities outside their current domain. Similarly, collaborative innovations enable small firms to overcome limits of inadequate knowledge stocks and lack of market power, improving their ability to acquire and sustain competitive advantages.

The second period from 2009 to 2014 showed a spike in the growth of articles, with a total of 58 papers representing an increase of 362% compared to the previous period, which demonstrates continuous interest in the topic. Papers published during this period are very diversified, as no issue related to SE seems to prevail over the others. By contrast, a focus on the exploitation of the concept emerged through the analysis, with several scholars providing conceptual frameworks of SE and exploring different perspectives of an emerging concept.

Beginning the tendency mentioned above, a special issue of *Entrepreneurship: Theory and Practices* was published in 2009, collecting papers from different perspectives, namely the strategic management perspective, the entrepreneurial perspective, the economic policy perspective, and integrative perspectives (ex.: entrepreneurship and strategic management, entrepreneurship and leadership, etc.). Within the field of the strategic management perspective, scholars examined the linkage between strategic entrepreneurship and firms' growth, with the term "performance" usually appearing in the emerging debate. Steffens et al. (2009) investigated the growth and profitability dynamics of younger versus older firms, with a strong suggestion of caution against the blind pursuit of growth for young firms, in favor of a careful analysis of the way both growth and profitability may be developed by organizations. Within the entrepreneurial perspective, Ireland et al. (2009) conceptualized the notion of Corporate Entrepreneurial Strategy (CES) as "*a vision-directed, organization-wide reliance on entrepreneurial behavior that purposefully and continuously rejuvenates the organization and shapes the scope of its operations through the recognition and exploitation of entrepreneurial opportunity*"

(p. 21). In so doing, they outlined not only the most relevant components of a CES, but also its antecedents and organizational outcomes. According to an economic policy perspective, the availability of founders and effective policy programs were examined as drivers for both new firms' internationalization (Fernhaber & McDougall-Covin, 2009) and academic ventures (Patzelt & Shepherd, 2009). Finally, Schindehutte and Morris (2009) introduced complexity science as an alternative theoretical lens to interpret SE. In so doing, they argued that SE is more than a conjunction or interface between strategy and entrepreneurship. It does not imply compromise, integration, or a balance between entrepreneurial and managerial perspectives but the simultaneous existence of these, acting as a source of creativity between order and chaos. According to the authors, the new perspective enables an alternative paradigm for SE, called the 3F (form-flow-function) paradigm, addressing "*the what (fluctuations and transformations), why (complexity), how (self-organization and emergence), who (different perspectives, e.g., entrepreneur, firms, institutions, or peripheral), and where (the opportunity space) of stability and change*" (p. 265). The new paradigm was expected to offer a fresh viewpoint on SE phenomena.

The final period goes from 2015 to 2020 and characterizes a focus on "innovation," "SMEs," and "corporate." The third period also characterizes a significant growth in the number of the papers, which went up to 109 in total. As mentioned, this period witnessed the appearance of the concept of "innovation." Since without innovation firms are not entrepreneurial (Covin & Miles, 1999), Mazzei (2018) defined SE as an "*organizationally consequential innovation within existing firms that involve the combination/integration of opportunity- and advantage-seeking behaviors*" (p. 660). In so doing, the author offered scholars a potentially rewarding framework: the intensifying of SE. Following the above, Utoyo et al. (2020) investigated the key variables to enhance innovation performance (IP) in a disruptive environment by applying a strategic entrepreneurship framework. In particular, collaborative innovation (Parida et al., 2012) and dynamic capabilities (Teece et al., 1997; Teece, 2007)—both of them belonging to the strategic entrepreneurship field—became the starting point to explore firms' innovation performance (Fontana & Musa, 2017). Related to the notion of innovation, the role of knowledge and knowledge spillover also began to be emphasized during this period (Cristo-Andrade & Ferreira, 2020; Naeiji & Siadat, 2019; Veréb & Ferreira, 2018; Adams et al., 2017; Ferreira et al., 2017; Sarkar, 2017; Tavassoli et al., 2017).

3.2 Countries Where Authors Have Published Research on "Strategic Entrepreneurship"

According to country analysis, articles from institutions in 46 different countries from five continents—Africa, America, Asia, Europe, and Oceania—were identified. The USA and the UK represent the highest number of institutions, collaborating in 47% of all the articles.

Table 2 Countries with highest contribution in the field of SE

Ranking	Country	No. of publications	Contribution to the field (% on the whole sample)
1	USA	60	32.79
2	UK	26	14.21
3	China (Hong Kong included)	10	5.46
4	Portugal	10	5.64
5	France	10	5.64
6	Italy	9	4.92
7	Canada	9	4.92
8	Indonesia	8	4.37
9	Belgium	8	4.37
10	Sweden	8	4.37
11	Germany	8	4.37
12	Netherlands	8	4.37
13	Finland	8	4.37
14	Norway	7	3.83
15	Denmark	7	3.83
16	Taiwan	7	3.83
17	Switzerland	6	3.28
18	Australia	6	3.28
19	Spain	5	2.73
20	India	5	2.73

Source: authors' own table

Table 2 shows the countries with the highest contribution in the research field. The ranking is limited to the top 20 countries, since the number of publications under five was not considered.

Europe (other than UK) is the continent with the largest participation with 94 articles (51.72%) from 12 different countries, where Portugal and France produced 10 articles, and Italy 9, and these are the most relevant countries from this region.

3.3 Journals in Which Authors Have Published Research on SE

Knowing about the journals that publish papers on SE is important for two main reasons: the first is to understand which are the disciplines from which research draws concepts and theories about SE; the second is to become more familiar with scholars' focus on the issue, thus suggesting directions for further research.

The 183 selected papers come from 104 different journals from quite homogenous fields, such as strategic management, entrepreneurship and innovation. Among them, a huge concentration on only one journal prevails, with 37% of the sample (68

Table 3 Journals publishing articles on SE

Ranking	Journals	Publisher	No. of publications	Impact factor (IF)[a]	SCImago Journal Rank (SJR)[b]
1	Strategic Entrepreneurship Journal	Wiley Online Library	35	6.2	38
2	International Entrepreneurship and Management Journal	Springer Journal	10	3472	50
3	Entrepreneurship: Theory and Practice	Sage Journal	8	10,750	140
4	International Journal of Entrepreneurial Venturing	Inderscience Publishers	5	1	14
5	Management Decision	Emerald Insight	5	2723	91
6	Technology Analysis and Strategic Management	Taylor & Francis Online	5	1867	64

Source: *authors' own table* (last access to data: 11th June 2020)
[a]IF measures the average number of citations received in a particular year by papers published in the Journal during the two preceding years (Clarivate Analytics, 2020)
[b]SJR is a prestige metrics based on the idea that not all the citations are the same. It provides a quantitative and qualitative measure of the Journal's impact (Elsevier Analytics, 2020)

papers) belonging to the field of entrepreneurship and 19% (35 papers) published in the *Strategic Entrepreneurship Journal.* The *Strategic Entrepreneurship Journal* concerns innovation and subsequent changes that add value to society, as well as entrepreneurial processes involving imagination, insight, and invention. By contrast, a significant fragmentation may be underlined for the remaining 115 papers, with 98 journals publishing fewer than five articles. The previously mentioned fragmentation may be interpreted as the results of the variety of subjects belonging to the issue of SE.

Table 3 shows the list of the journals that have published articles on SE between 2003 and 2020. Journals with fewer than five papers were not listed, as the number of publications was considered irrelevant. Information about the Impact Factor (IF), and SCImago ranking were collected on the journal's official website, as well as on SCImago Institutions ranking systems.

The IF provides scholars with an objective measure of the importance of different journals within a given category (Rey-Martí et al., 2016). In addition, SCImago is a prestige metrics based on the idea that not all the citations are the same. It provides a quantitative and qualitative measure of the Journal's impact, based on a similar algorithm as a Google page ranking.

As noted, 68 papers belong to only six different journals, the final ones all cited in SCImago.

Examining the data revealed the high quality of scholars' contributions in the SE field, since all the listed journals show good and very good ranking. In particular, we find that the *Strategic Entrepreneurship Journal* hosts the highest number of

publications about the examined topic. By contrast, *Entrepreneurship: Theory and Practice* characterizes the higher SJR (140), even if it has collected only eight papers about SE.

Four of the five listed journals mainly deal with entrepreneurship, suggesting that the majority of the examined contributions mostly belong to this area of knowledge. The area of management remained, with only five papers published in *Management Decision* and *Technology Analysis* and *Strategic Management* over the whole period.

3.4 Adopted Methodology (Qualitative, Quantitative or Mixed methods)

In order to provide a full understanding of the selected papers these were selected according to the applied methodology, namely qualitative versus quantitative. The results show that 58% of the whole sample are qualitative, followed by quantitative analysis (42%). It seems, therefore, that a good balance exists among the selected papers' type.

4 Thematic Analysis

In order to pursue the research aims, namely to identify the main areas of knowledge within which SE was investigated and to explore the extent to which SE relates to other concepts like SocEntr and HumEntr, this thematic analysis assessed the ontological and epistemological properties of SE as a concept based on the selected papers (Table 4).

For the above purposes, only the full papers were considered, thus a sample of 93 articles was subjected to an in-depth analysis. We first analyzed how SE is defined by scholars. After that, we examined how the concept was investigated by the authors.

Different meanings about SE were collected according to Suddaby's (2010) prescriptions about a good definition. In particular, definitional clarity, specificity (with reference to temporal, spatial, and contextual circumstances), parsimony (avoiding circularity or tautology), and coherence were checked. The result of the collected definitions is reported in Table 5. Despite this, a certain ambiguity may be

Table 4 Framework of the Analysis of SE

Ontological properties	How is SE defined?
Epistemological properties	How do SE theories overlap with different areas of knowledge?

Source: authors' own table

Table 5 Definitions of SE

References	Definitions
Hitt et al. (2001)[a]	An entrepreneurial action with a strategic perspective (p. 480)
Ireland et al. (2003)	Involves simultaneous opportunity-seeking and advantage-seeking behaviors and results in superior firm performance (p. 963)…, results from the integration of entrepreneurship and strategic management knowledge (p. 966)
Ireland and Webb (2007)	Strategic entrepreneurship (SE) is a term used to capture firms' efforts to simultaneously exploit today's competitive advantages while exploring the innovations that will be the foundation of tomorrow's competitive advantages. p. 50)
Ketchen et al. (2007)	Requires a continuous flow of innovations. When the flow of innovations slows or stops, the balance required to sustain strategic entrepreneurship is jeopardized (p. 374–375)
Kuratko and Audretsch (2009)	The innovations that are the focal points of strategic entrepreneurship initiatives represent the means through which opportunity is capitalized upon. These are innovations that can happen anywhere and everywhere in the company (p. 8)
Schindehutte and Morris (2009)	SE is not "strategy that is entrepreneurial" or "entrepreneurship that is strategic" or "entrepreneurship plus strategy"—it is not a binary construct. Viewing SE through the lens of complexity science provides an explanation of why intersections of strategy or entrepreneurship with other disciplines lead to transformations that are beyond simple interfaces … (p. 267)
Agarwal and Helfat (2009)	The term "strategic" can be defined as "*that which relates to the long-term prospects of the company and has a critical influence on its success or failure*" Further, the term 'entrepreneurship' has found its most enduring definition in the Schumpetarian notion of the creation of new products, processes, markets, and organizational forms (p. 281)
Mathews (2010)	Is the activity that drives the economy in new directions, through a recombination of resources, activities, and routines by firms and the entrepreneur as the economic agent who, in principle, lacks resources (but knows where to find them) (p. 224)
Hitt et al. (2011)	Is concerned with advantage-seeking and opportunity-seeking behaviors resulting in value for individuals, organizations, and/or society. This means that SE involves actions taken to exploit current advantages while concurrently exploring new opportunities that sustain an entity's ability to create value across time (p. 57)
Pereira and Naguib (2016)	Dynamic flexibility is a key feature in strategic entrepreneurship (p. 311)
Hitt and Ireland (2017)	Allows the firm to apply its knowledge and capabilities in the current environmental context while exploring opportunities to exploit in the future by applying new knowledge and new and/or enhanced capabilities (p. 69)
Simsek et al. (2017)	Set of domains, behaviors, cognitions, or decisions (p. 5)
Gölgeci et al. (2017)	Especially implies a simple structure, flexible operations, a quick decision-making process, and a lower formalization of processes (p. 246)
Paek and Lee (2018)	Is concerned with how a firm creates its initial performance and, more importantly, how established firms sustain an advantage over time as a result of entrepreneurial and managerial postures (p. 884)

(continued)

Table 5 (continued)

References	Definitions
Kuratko and Morris (2018)	Refers to a broad array of significant entrepreneurial activities or innovations adopted in a firm's pursuit of competitive advantage (p. 45)
Mazzei (2018)	Organizationally consequential innovations within existing firms that involve the combination/integration of opportunity- and advantage-seeking behaviors (p. 660)
Bao et al. (2020)	Is a function of the alignment between learning strategies and environmental conditions (p. 20)
Kiyabo and Isaga (2020)	Learning orientation, strategic resource management, and entrepreneurial orientation are components of strategic entrepreneurship (p. 4)

Source: authors' own table

[a]Hitt et al. ((2001) is reported in Table 5 as a seminal work, even though it is not considered in the examined sample of papers. A complete explanation for the exclusion is reported in the methodological section

underlined in the selected sample as, for example, there is still a huge vagueness when referring to the "*simultaneous opportunity-seeking and advantage-seeking behavior*" (Simsek et al., 2017) or to the too broad conceptualization offered by Schindehutte and Morris (2009). Nevertheless, all the reported contributions provide for a new understanding of SE, enabling researchers to consider technologies, business models, and environmental changes in a new and innovative way while reconfiguring the notion of SE. This is the reason why we considered all of these in our investigation.

Despite the fact that 20 years have passed since the first publication about SE, this remains a recent field of research, changing with the global business economy. We have encountered several meanings, most of them clearly based on the integration between exploration (opportunity-seeking) and exploitation (advantage-seeking) advocated by seminal works by Hitt et al. (2001) and Ireland et al. (2003). In general, an advantage-seeking characteristic deals with the exploitation of firms' existing competitive advantage, whereas the opportunity-seeking characteristic refers to the exploration and development of new opportunities (Ireland et al., 2003). Not surprisingly, the concept of *innovation* is usually put at the heart of SE (Stevenson & Gumpert, 1985), since innovation is necessary for any firm to compete in dynamic and competitive environments (Kuratko & Audretsch, 2009). As Mazzei (2018) notes, SE is about firms that actively and intentionally engage in both exploration and exploitation. Too much exploration leads to excessive costs. In contrast, too much exploitation can undermine a firm's capacity to improve returns in the future (March, 1991). Despite the above-mentioned considerations, the examined literature fails to suggest how to manage the existing tension between "explorative" and "exploitative" behaviors, thus there is still a huge ambiguity with reference to the way firms can simultaneously manage these dimensions. Moreover, no suggestion is provided about "when" and "where" the combination/integration takes place, i.e., which balance is necessary for a firm to be considered "strategically entrepreneurial." When examined in the field of innovation, ambiguity in the definitions of SE becomes even more evident, as no details are reported on the

quality and quantity of innovations that should be employed to achieve the advocated integration (Mazzei, 2018). The above-mentioned lack of knowledge justifies the growth in the number of papers dealing with SE and innovation that characterize the third period. Taking into account the inner linkage between innovations, knowledge and learning processes, both cognition and learning orientation were referred to by the authors when defining SE. In particular, the issues of *knowledge* and *knowledge spillover* have been intersected with the strategic entrepreneurial field since the first period, but with a growing trend in the third. *Knowledge spillovers* refers to the external benefits arising from a knowledge creation process that affects parties other than the actor investing in the process, and it relates to both knowledge transfer and knowledge flow (Canestrino & Magliocca, 2019). Many scholars (Ferreira et al., 2017; Sarkar, 2017; Tavassoli et al., 2017; Agarwal et al., 2007) agree on the critical role that knowledge spillovers and strategic entrepreneurship have in the process of creative destruction and creative construction, which means in innovation. In 2007, Agarwal et al. discussed the well-known fact that knowledge creators are often unable to grasp the value emerging from their knowledge investments (Canestrino & Magliocca, 2019) and that they are also imperfect sources of knowledge due to the presence of knowledge spillovers. In so doing, they also proposed a model of creative construction "*where knowledge investments by firms and universities had to be coupled with entrepreneurial action by employees and scientists who were the co-creators of the knowledge for the formation of new ventures*" (Agarwal et al., 2010, p. 274). Knowledge spillovers and strategic entrepreneurship were then related to the heterogeneity in firms' capabilities and performance. In 2010, the authors also incorporated firms' strategic renewal, thus clearly recognizing the efforts of the knowledge creator in knowledge investments.

Recently, the linkage between knowledge spillover and SE has been examined in a more systematic way, starting from the special issue of the *International Entrepreneurship and Management Journal*, published in 2017. The collected papers provided a comprehensive illustration of the driving factors to be accounted for when attempting to understand the relationships between knowledge spillovers and SE. However, they opened up new questions, which are still unanswered. Among them, defining actors and processes involved in knowledge spillover, identifying the mechanisms and the factors limiting or, alternatively, enabling knowledge creation processes and the way they affect SE, are worth investigation. In addition, the process of knowledge spillovers needed to be investigated with reference to regulatory, institutional and political influences.

In defining SE the notion of *dynamic flexibility* was finally considered by Pereira and Naguib (2016). Because of environmental turbulence, the acquisition and the maintenance of competitive advantage requires firms to make strategic adjustments, the most recent ones based on the development of dynamic capabilities and flexibility. According to Cardon et al. (2012), there are many and complex connections between entrepreneurship and Dynamic Capability Theory (DCT). According to DCT, entrepreneurial actions result from capabilities, and enterprises are a collection of capabilities. Accordingly, firms' ability to dynamically transform their resources and processes (i.e., strategic alternatives) provides them with "*better*

sensing and seizing abilities regarding new opportunities" (Kim et al., 2018, p. 185). As Teece (2014) suggests, DCT explains the underlying features and behavioral micro-foundations of strategic entrepreneurship, as well as entrepreneurial value creation. Despite this, recent studies warn scholars against the possibility of DCT becoming a "large umbrella" (Gölgeci et al., 2017; Barreto, 2010), under which the lack of theoretical foundations and of strong empirical support offer uncertain practical implications for managerial and entrepreneurial activities (Arend & Bromiley, 2009). On only one occasion (with reference to the selected sample of papers), was SocEntr suggested as a theme of interest in the field of SE (Short et al., 2009), while no paper deals with the concept of HumEntr (Parente et al., 2018, 2020; Kim et al., 2018), or examines a firm's behavior within the field of humanistic management (Melè, 2003).

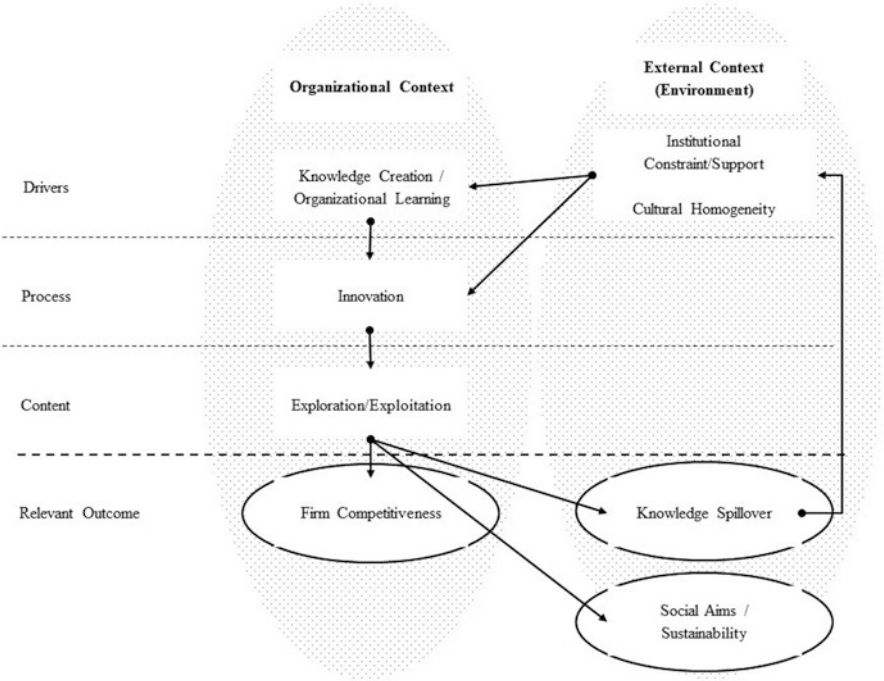
A thematic analysis revealed several definitions of SE, all of them mainly focusing on a firm's ability to integrate entrepreneurial (opportunity-seeking) and strategic (advantage-seeking) perspectives when developing and taking actions. Innovation is, therefore, proposed as a *conditio* sine qua non to firms' balancing of exploration and exploitation, and greatly emphasized in the works published between 2015 and 2020. SE draws on theoretical perspectives from multiple and different fields, including entrepreneurship, strategic management, organizational theories, and economics. More frequently, SE was investigated within the field of RBV (Barney, 1991), dynamic capabilities (Teece, 2007), and organizational learning. Schindehutte and Morris (2009) provided conceptual clarity by applying complexity theory to SE, while Kraus et al. (2016) used the configuration approach. More recently, Mazzei et al. (2017) have examined SE through nine alternative theoretical lenses not typically applied in SE research (general systems, institutional, ecology, strategic choices, upper echelons, real options, agency, network, and social identity), in an attempt to explain how a balance between exploration and exploitation may be achieved. Similarly, Gölgeci et al. (2017) intertwined both institutional and dynamic capability approaches to understand firms' strategic entrepreneurial behavior. Because of the above, establishing boundary conditions to the notion of SE is very difficult, limiting, in some circumstances, the effectiveness of investigations. Not surprisingly, despite growing interest among scholars, SE remains an ambiguous and under-developed concept (Mazzei et al., 2017; Simsek et al., 2017).

5 Discussions and Suggestions for Further Research

As discussed within this manuscript, SE remains an ill-defined and under-developed theoretical construct, characterized by confusion and misunderstandings about its content (what SE is), process (how organizations achieve SE), context (which factors—external and internal—affect SE) and relevant outcomes. Misperceptions are emphasized as different theoretical perspectives usually overlap in several ways, thus resulting in less clarity around what constitutes the core features of SE, its

drivers/enablers, as well as its effects. New frameworks are, therefore, required to clarify the boundaries between and among diverse domains, as well as to identify opportunities for further research and advancements. Depending on this, we propose a background that takes into account the most recent theoretical advancements about SocEntr and HumEntr.

Starting from the basic notion of SE, innovation (*process*) allows firms to balance exploration and exploitation (*content*) in order to gain competitiveness in the most dynamic markets. Innovation consists of new ideas turning into new products, processes or services, able to generate value for the firm (Rogers, 1983; Utterback, 1994; Afuah, 1998). Knowledge creation is perceived as one of the major *drivers* of innovation, and the main asset of innovative organizations (Calza et al., 2015; Merx-Chermin & Nijhof, 2005). Accordingly, firms' innovative capacity depends on their ability to develop and manage effective organizational learning processes, as well as to grasp new knowledge from the external environment (Calza et al., 2011). Firms' relationship with local actors, institutional support, and cultural homogeneity (Lundvall, 1990) promote the growth of a complex learning process, driving firms that are easily innovating. Every innovation is, therefore, responsible for new knowledge diffusion: once generated, it spreads locally, thus unintentional knowledge flows arise as a *relevant outcome* of the whole process. These knowledge spillovers may be used for strategic purposes by entities other than the creators of innovation, supporting the competitive growth of the local system through the emergence of "virtuous knowledge cycles" (Calza et al., 2015). Both social and humanistic perspectives may be fruitfully integrated in the proposed framework, providing a unique context for mixing strategy and entrepreneurship research. Zahra et al. (2009, p. 519) defined social entrepreneurship as "*the activities and processes undertaken to discover, define, and exploit opportunities in order to enhance social wealth by creating new ventures or managing existing organizations in an innovative manner.*" More recently, the notion of HumEntr was introduced to enhance traditional business-oriented entrepreneurship by adding a human-centered logic (Bae et al., 2018; Kartajaya, 2016). Embedded in the field of ethics, human-centered logic "*upholds the unconditional human dignity of every woman and man within an economic context*" (Spitzeck, 2011, p. 51), calling for a new and alternative vision of business according to which business itself 'serves' society in order to improve citizens' quality of life (Melè, 2003; Spitzeck et al., 2009). Kim et al. (2018), in particular, define HumEntr as a "*virtuous and sustainable integration of Entrepreneurship, Leadership, and HRM, in which successful implementation leads to a beneficial increase in wealth and quality job creation, perpetuated in a continuous cycle*" (p. 12). 'Ideal' HumEntr is particularly supposed to benefit both organizational members and society as a whole, by means of positive outcomes and the growth of wealth creation, since 'Ideal' HumEntr characterizes high levels of empathy, equity, empowerment, and enablement of employees. Moreover, firms' operations are focused on innovation, appropriate risk-taking, and early, decisive actions. In such circumstances, leadership and top management are committed to HumEntr and construct a culture resulting in high firm performance. In such circumstances, it is supposed that the *trade-off* between economic and social aims can be more easily



Source: *authors' own figure*

Fig. 2 A framework for further research on SE. (Source: authors' own figure)

achieved, thus supporting improvements in social entrepreneurial initiatives. It means, therefore, that pursuing social aims and providing entrepreneurship with a more humanistic dimension (sustainability) may be considered to be *relevant outcomes* of firms attempting to simultaneously achieve competitive advantages and create social value, suitable for investigation at the crossroads of SE and the social and humanistic domains.

Figure 2 synthesizes the above considerations contributing to further research by:

1. Clarifying the boundaries between and among diverse domains;
2. Widening the existing theoretical frameworks about SE, through the involvement of both the Soc and HumEntr field of studies.

6 Conclusions

The aim of this work was to perform a systematic literary review about SE in order to understand how the concept has evolved from 2003 and 2020, as well as which are the main areas of knowledge within which it was investigated. In so doing, we

also examined to what extent SE was explored in relation to the notions of Social and HumEntr. In order to achieve the research aims, a descriptive review was proposed as the first step in a thematic exploitation of the issue. We selected 183 articles and examined them according to the following analytical categories: (1) Years in which the articles were published; (2) Countries where authors have published research on strategic entrepreneurship; (3) Journals in which authors have published their papers; (4) Adopted methodology. After this, the thematic analysis assessed the ontological and epistemological properties of SE. According to our analysis, a growing interest in SE has been developing for the last 20 years, with the number of papers almost quadrupling in the last 6 years. The USA (60) and the UK (26) represent the highest number of institutions, collaborating in 47% of all the articles, although it should not be neglected that this could be due to the selection and inclusion of only the papers published in the English language. The examined papers mainly belonged to quite related fields, such as entrepreneurship and management.

With reference to the main themes of the investigations, our research revealed that scholars particularly addressed innovation, knowledge, and knowledge spillover with increasing interest during 2015–2020. Against our expectations, both SocEntr and HumEntr were neglected, with the exception of only one paper. In order to fill the existing gap, an integrative framework for further research was finally proposed, which takes into consideration both social aims and sustainability as potential outcomes of SE.

References

Adams, P., Fontana, R., & Malerba, F. (2017). Bridging knowledge resources: The location choices of spinouts. *Strategic Entrepreneurship Journal, 11*(2), 93–121.

Afuah, A. (1998). Models of innovation. In *Innovation management*. Oxford University Press.

Agarwal, R., & Helfat, C. E. (2009). Strategic renewal of organizations. *Organization Science, 20*(2), 281–293.

Agarwal, R., Audretsch, D., & Sarkar, M. B. (2007). The process of creative construction: Knowledge spillovers, entrepreneurship, and economic growth. *Strategic Entrepreneurship Journal, 1*(3–4), 263–286.

Agarwal, R., Audretsch, D., & Sarkar, M. B. (2010). Knowledge spillovers and strategic entrepreneurship. *Strategic entrepreneurship journal, 4*(4), 271–283.

Aghaei Chadegani, A., Salehi, H., Yunus, M., Farhadi, H., Fooladi, M., Farhadi, M., & Ale Ebrahim, N. (2013). A comparison between two main academic literature collections: Web of Science and Scopus databases. *Asian Social Science, 9*(5), 18–26.

Arend, R. J., & Bromiley, P. (2009). Assessing the dynamic capabilities view: Spare change, everyone? *Strategic Organization, 7*(1), 75–90.

Bae, Z. T., Kang, M. S., Kim, K. C., & Park, J. H. (2018). Humane entrepreneurship: Theoretical foundations and conceptual development. *The Journal of Small Business Innovation, 20*(4), 11–21.

Bakkalbasi, N., Bauer, K., Glover, J., & Wang, L. (2006). Three options for citation tracking: Google Scholar, Scopus and Web of Science. *Biomedical Digital Libraries, 3*(1), 7.

Bao, Y., Wei, Z., & Di Benedetto, A. (2020). Identifying the tacit entrepreneurial opportunity of latent customer needs in an emerging economy: The effects of experiential market learning versus vicarious market learning. *Strategic Entrepreneurship Journal, 14*, 444–469.

Barney, J. (1991). Special theory forum the resource-based model of the firm: Origins, implications, and prospects. *Journal of Management, 17*(1), 97–98.

Barreto, I. (2010). Dynamic capabilities: A review of past research and an agenda for the future. *Journal of Management, 36*(1), 256–280.

Bosma, N. S., & Levie, J. (2010). Global Entrepreneurship Monitor 2009 Executive Report.

Burnham, J. F. (2006). Scopus database: A review. *Biomedical Digital Libraries, 3*(1), 1–8.

Calza, F., Canestrino, R., & Cannavale, C. (2011, January). Why should I share my new ideas? Cultural barriers to innovation spreading. In *Proceedings of the 12th European Conference on Knowledge Management: Book of Abstract, Passau* (p. 166).

Calza, F., Canestrino, R., & Cannavale, C. (2015). A cultural insight for knowledge transfer: An interpretative model of innovation spreading at local level. *Journal of Global Economics, Management and Business Research, 2*(3), 129–142.

Canestrino, R., & Magliocca, P. (2019). *Dal Knowledge Management ai Knowledge Ecosystems*. ESI.

Canestrino, R., Bonfanti, A., Magliocca, P., & Oliaee, L. (2016). Networks for social innovation: Devoting "learning spaces" to social aims. In *IFKAD Conference*.

Canestrino, R., Ćwiklicki, M., Magliocca, P., & Pawełek, B. (2020). Understanding social entrepreneurship: A cultural perspective in business research. *Journal of Business Research, 110*, 132–143.

Cardon, M. S., Foo, M. D., Shepherd, D., & Wiklund, J. (2012). Exploring the heart: Entrepreneurial emotion is a hot topic. *Entrepreneurship Theory and Practice, 36*(1), 1–10.

Covin, J. G., & Miles, M. P. (1999). Corporate entrepreneurship and the pursuit of competitive advantage. *Entrepreneurship Theory and Practice, 23*(3), 47–63.

Cristo-Andrade, S., & Ferreira, J. J. (2020). Knowledge spillovers and strategic entrepreneurship: What researches and approaches? *International Entrepreneurship and Management Journal, 16*(1), 263–286.

De La-Torre-Ugarte-Guanilo, M. C., Takahashi, R. F., & Bertolozzi, M. R. (2011). Revisión sistemática: Nociones generales. *Revista da Escola de Enfermagem da USP, 45*(5), 1255.

Deis, L. F., & Goodman, D. (2005). Web of Science (Version 204) and Scopus. *Charleston Advisor, 6*(3), 5.

Denyer, D., & Tranfield, D. (2009). Producing a systematic review. In D. A. Buchanan & A. Bryman (Eds.), *The SAGE handbook of organizational research methods* (pp. 671–689). SAGE.

Dess, H. M. (2006). Database reviews and reports. In *Issues in Science and Technology Librarianship*.

Fernhaber, S. A., & McDougall-Covin, P. P. (2009). Venture capitalists as catalysts to new venture internationalization: The impact of their knowledge and reputation resources. *Entrepreneurship Theory and Practice, 33*(1), 277–295.

Ferreira, J. J., Ratten, V., & Dana, L. P. (2017). Knowledge spillover-based strategic entrepreneurship. *International Entrepreneurship and Management Journal, 13*(1), 161–167.

Fontana, A., & Musa, S. (2017). The impact of entrepreneurial leadership on innovation management and its measurement validation. *International Journal of Innovation Science, 9*(1), 2–19.

Gölgeci, I., Larimo, J., & Arslan, A. (2017). Institutions and dynamic capabilities: Theoretical insights and research agenda for strategic entrepreneurship. *Scandinavian Journal of Management, 33*(4), 243–252.

Guz, A. N., & Rushchitsky, J. J. (2009). Scopus: A system for the evaluation of scientific journals. *International Applied Mechanics, 45*(4), 351.

Hitt, M. A., & Ireland, R. D., (2017). The intersection of entrepreneurship and strategic management research. In *The Blackwell handbook of entrepreneurship* (pp. 45–63).

Hitt, M. A., Ireland, R. D., Camp, S. M., & Sexton, D. L. (2001). Strategic entrepreneurship: Entrepreneurial strategies for wealth creation. *Strategic Management Journal, 22*(6–7), 479–491.

Hitt, M. A., Ireland, R. D., Sirmon, D. G., & Trahms, C. A. (2011). Strategic entrepreneurship: Creating value for individuals, organizations, and society. *Academy of Management Perspectives, 25*(2), 57–75.

Ireland, R. D., & Webb, J. W. (2007). Strategic entrepreneurship: Creating competitive advantage through streams of innovation. *Business Horizons, 50*(1), 49–59.
Ireland, R. D., Hitt, M. A., & Sirmon, D. G. (2003). A model of strategic entrepreneurship: The construct and its dimensions. *Journal of Management, 29*(6), 963–989.
Ireland, R. D., Covin, J. G., & Kuratko, D. F. (2009). Conceptualizing corporate entrepreneurship strategy. *Entrepreneurship Theory and Practice, 33*(1), 19–46.
Jia, F., & Jiang, Y. (2018). Sustainable global sourcing: A systematic literature review and bibliometric analysis. *Sustainability, 10*(3), 595.
Kartajaya, H. (2016). Humane entrepreneurship: Inspired by marketing 3.0. In *Entrepreneurship and SME World Conference, Seoul, Repuplic of Korea*.
Ketchen, D. J., Jr., Ireland, R. D., & Snow, C. C. (2007). Strategic entrepreneurship, collaborative innovation, and wealth creation. *Strategic Entrepreneurship Journal, 1*(3–4), 371–385.
Kim, K. C., ElTarabishy, A., & Bae, Z. T. (2018). Humane entrepreneurship: How focusing on people can drive a new era of wealth and quality job creation in a sustainable world. *Journal of Small Business Management, 56*(sup1), 10–29.
Kiyabo, K., & Isaga, N. (2020). Entrepreneurial orientation, competitive advantage, and SMEs' performance: Application of firm growth and personal wealth measures. *Journal of Innovation and Entrepreneurship, 9*(1), 1–15.
Kraus, S., Mensching, H., Calabrò, A., Cheng, C. F., & Filser, M. (2016). Family firm internationalization: A configurational approach. *Journal of Business Research, 69*(11), 5473–5478.
Kuratko, D. F., & Audretsch, D. B. (2009). Strategic entrepreneurship: Exploring different perspectives of an emerging concept. *Entrepreneurship Theory and Practice, 33*(1), 1–17.
Kuratko, D. F., & Morris, M. H. (2018). Corporate entrepreneurship: A critical challenge for educators and researchers. *Entrepreneurship Education and Pedagogy, 1*(1), 42–60.
LaGuardia, C. (2005). Scopus vs. web of science. *Library Journal, 130*, 40–42.
Li, J., Burnham, J. F., Lemley, T., & Britton, R. M. (2010). Citation analysis: Comparison of web of science®, scopus™, SciFinder®, and google scholar. *Journal of Electronic Resources in Medical Libraries, 7*(3), 196–217.
Lundvall, B. Å. (Ed.). (1990). *National innovation systems: Towards a theory of innovation and interactive learning*. Pinter.
March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science, 2*(1), 71–87.
Mathews, J. A. (2010). Lachmannian insights into strategic entrepreneurship: Resources, activities and routines in a disequilibrium world. *Organization Studies, 31*(2), 219–244.
Mazzei, M. J. (2018). Strategic entrepreneurship: Content, process, context, and outcomes. *International Entrepreneurship and Management Journal, 14*(3), 657–670.
Mazzei, M. J., Ketchen, D. J., & Shook, C. L. (2017). Understanding strategic entrepreneurship: A "theoretical toolbox" approach. *International Entrepreneurship and Management Journal, 13*(2), 631–663.
McGrath, R. G., & MacMillan, I. C. (2000). *The entrepreneurial mindset: Strategies for continuously creating opportunity in an age of uncertainty* (Vol. 284). Harvard Business Press.
Melè, D. (2003). The challenge of humanistic management. *Journal of Business Ethics, 44*(1), 77–88.
Merli, R., Preziosi, M., & Acampora, A. (2018). How do scholars approach the circular economy? A systematic literature review. *Journal of Cleaner Production, 178*, 703–722.
Merx-Chermin, M., & Nijhof, W. J. (2005). Factors influencing knowledge creation and innovation in an organisation. *Journal of European Industrial Training, 29*(2), 135–147.
Meyer, G. D., & Heppard, K. A. (2000). *Entrepreneurship as strategy: Competing on the entrepreneurial edge*. SAGE.
Naeiji, M. J., & Siadat, S. H. (2019). Developing a measurement for strategic entrepreneurship by linking its dimensions to competitiveness in knowledge-based firms. *International Journal of Business Innovation and Research, 18*(1), 1–18.

Orzes, G., Moretto, A. M., Ebrahimpour, M., Sartor, M., Moro, M., & Rossi, M. (2018). United Nations global compact: Literature review and theory-based research agenda. *Journal of Cleaner Production, 177*, 633–654.

Paek, B., & Lee, H. (2018). Strategic entrepreneurship and competitive advantage of established firms: Evidence from the digital TV industry. *International Entrepreneurship and Management Journal, 14*(4), 883–925.

Parente, R., ElTarabishy, A., Vesci, M., & Botti, A. (2018). The epistemology of humane entrepreneurship: Theory and proposal for future research agenda. *Journal of Small Business Management, 56*(sup1), 30–52.

Parente, R., El Tarabishy, A., Botti, A., Vesci, M., & Feola, R. (2020). Humane entrepreneurship: Some steps in the development of a measurement scale. *Journal of Small Business Management*, 1–25.

Parida, V., Westerberg, M., & Frishammar, J. (2012). Inbound open innovation activities in high-tech SMEs: The impact on innovation performance. *Journal of Small Business Management, 50*(2), 283–309.

Patzelt, H., & Shepherd, D. A. (2009). Strategic entrepreneurship at universities: Academic entrepreneurs' assessment of policy programs. *Entrepreneurship Theory and Practice, 33*(1), 319–340.

Pereira, R., & Naguib, M. (2016). Strategic entrepreneurship and dynamic flexibility: Towards an integrative framework. *International Journal of Organizational Leadership, 5*, 307–312.

Rey-Martí, A., Ribeiro-Soriano, D., & Palacios-Marqués, D. (2016). A bibliometric analysis of social entrepreneurship. *Journal of Business Research, 69*(5), 1651–1655.

Rogers, E. M. (1983). *Diffusion of innovations*. Free Press.

Sarkar, S. (2017). Uncorking knowledge—Purposeful spillovers as a strategic tool for capability enhancement in the cork industry. *International Entrepreneurship and Management Journal, 13*(1), 251–275.

Schindehutte, M., & Morris, M. H. (2009). Advancing strategic entrepreneurship research: The role of complexity science in shifting the paradigm. *Entrepreneurship Theory and Practice, 33*(1), 241–276.

Short, J. C., Moss, T. W., & Lumpkin, G. T. (2009). Research in social entrepreneurship: Past contributions and future opportunities. *Strategic Entrepreneurship Journal, 3*(2), 161–194.

Simsek, Z., Heavey, C., & Fox, B. C. (2017). (Meta-) framing strategic entrepreneurship. *Strategic Organization, 15*(4), 504–518.

Snyder, H., Witell, L., Gustafsson, A., Fombelle, P., & Kristensson, P. (2016). Identifying categories of service innovation: A review and synthesis of the literature. *Journal of Business Research, 69*(7), 2401–2408.

Spitzeck, H. (2011). An integrated model of humanistic management. *Journal of Business Ethics, 99*(1), 51–62.

Spitzeck, H., Amann, W., Pirson, M., Khan, S., & Von Kimakowitz, E. (Eds.). (2009). *Humanism in business*. Cambridge University Press.

Stam, E., & Van Stel, A. (2011). Types of entrepreneurship and economic growth. *Entrepreneurship, innovation, and economic development,* 78–95.

Steffens, P., Davidsson, P., & Fitzsimmons, J. (2009). Performance configurations over time: Implications for growth–and profit–oriented strategies. *Entrepreneurship Theory and Practice, 33*(1), 125–148.

Stevenson, H. H., & Gumpert, D. E. (1985). The heart of entrepreneurship. *Harvard Business Review, 85*(2), 85–95.

Suddaby, R. (2010). Construct clarity in theories of management and organization. *Academy of Management Review, 35*(1), 346–357.

Tavassoli, S., Bengtsson, L., & Karlsson, C. (2017). Strategic entrepreneurship and knowledge spillovers: Spatial and aspatial perspectives. *International Entrepreneurship and Management Journal, 13*(1), 233–249.

Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal, 28*(13), 1319–1350.

Teece, D. J. (2014). The foundations of enterprise performance: Dynamic and ordinary capabilities in an (economic) theory of firms. *Academy of Management Perspectives, 28*(4), 328–352.

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal, 18*(7), 509–533.

Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British Journal of Management, 14*(3), 207–222.

Tsai, W., & Ghoshal, S. (1998). Social capital and value creation: The role of intrafirm networks. *Academy of Management Journal, 41*(4), 464–476.

Utoyo, I., Fontana, A., & Satrya, A. (2020). The role of entrepreneurial leadership and configuring core innovation capabilities to enhance innovation performance in a disruptive environment. *International Journal of Innovation Management, 24*(06), 2050060.

Utterback, J. M. (1994). Radical innovation and corporate regeneration. *Research-Technology Management, 37*(4), 10.

Venkataraman, S., & Sarasvathy, S. D. (2001). Strategy and entrepreneurship: Outlines of an untold story. In *Handbook of strategic management* (p. 650668).

Veréb, V. N., & Ferreira, J. J. (2018). Transnational entrepreneurship as a win-win scenario of international knowledge spillover. *Journal of the Knowledge Economy, 9*(2), 446–472.

Vigolo, V., Sallaku, R., & Testa, F. (2018). Drivers and barriers to clean cooking: A systematic literature review from a consumer behavior perspective. *Sustainability, 10*(11), 4322.

Zahra, S. A., Gedajlovic, E., Neubaum, D. O., & Shulman, J. M. (2009). A typology of social entrepreneurs: Motives, search processes and ethical challenges. *Journal of Business Venturing, 24*(5), 519–532.

Zhao, E. Y., Ishihara, M., & Jennings, P. D. (2020). Strategic entrepreneurship's dynamic tensions: Converging (diverging) effects of experience and networks on market entry timing and entrant performance. *Journal of Business Venturing, 35*(2), 105933.

Corporate Entrepreneurship Strategy and Internationalization: A Literature Review

Pedro Baena-Luna, Juan A. Martínez-Román, and Francisco Liñán

Abstract In recent years, the number of research papers concerning entrepreneurial activities carried out by organizations and companies has notably increased. In many cases, this rising interest has been associated with studying organizational performance based on the elements of the Corporate Entrepreneurship Strategy (CES). This has not been the case, however, in the field of internationalization processes. The purpose of this chapter is to analyze the specific impact of CES internal elements on the outcomes of these internationalization processes. The most relevant papers on this topic are examined based on a systematic literature review. The positive effect of these elements on the internationalization outcomes of the organizations is shown.

Keywords Internationalization · Corporate entrepreneurship · Corporate entrepreneurship strategy · Performance

1 Introduction

In recent years, a significant and increasing interest has been witnessed in the phenomenon of entrepreneurship (Kuratko et al., 2015b). This rise is due to its potential for empowerment and transformation, not only at the social and economic level. Entrepreneurship is a reality in which demographic, ethnic, organizational, institutional, geographical, cultural, and even border factors are involved (Kuratko & Morris, 2018). It is therefore a multi-dimensional phenomenon. This fact has contributed to its study and analysis from a variety of perspectives (Audretsch et al., 2015; Kuratko & Morris, 2018).

Within the current competitive environment, organizations are immersed in change and evolution processes. This implies an increased risk, a reduced forecast capacity, and a need for innovative management, in addition to an entrepreneurial mindset (Kuratko & Audretsch, 2013). This context is a consequence of the growing

P. Baena-Luna · J. A. Martínez-Román · F. Liñán (✉)
Faculty of Economics and Business Sciences, University of Seville, Seville, Spain
e-mail: pbaenaluna@us.es; jamroman@us.es; flinan@us.es

N. Faghih, A. Forouharfar (eds.), *Strategic Entrepreneurship*, Contributions to Management Science, https://doi.org/10.1007/978-3-030-86032-5_7

globalization, technological change, and the complexity of the new organizational forms required for the development of their activities (Boone et al., 2019). All these factors encourage the implementation of entrepreneurial activities within organizations. These types of activities are normally linked to the identification and exploitation of new opportunities, in many cases, by means of exploring new markets through internationalization processes. These are understood as the upper limit in a company's opening to new markets (Abrell & Karjalainen, 2017; Kantur, 2016; Martínez-Román et al., 2019).

When implementing an entrepreneurial initiative, the changing environment exerts a powerful influence on an organization's strategy and structure (García-Sánchez et al., 2018). A company's success will not only rely on its resources and capabilities, but also on how these are used (Kuratko & Audretsch, 2009). The organization's performance will therefore depend on its ability to adapt to the contingencies and characteristics of the markets in which it operates or intends to operate (Rua et al., 2018). This has extended the notion of entrepreneurship beyond the idea of company creation. Entrepreneurial actions within organizations whose aim involves enhancing performance are also significant forms of entrepreneurship (Martiarena, 2013). A relevant option among these new forms of entrepreneurship is the so-called "corporate entrepreneurship" (CE) (Audretsch et al., 2015).

Corporate entrepreneurship can be defined as a systematic process of identification and exploitation of opportunities within existing organizations (Hosseini et al., 2018). An increasing competitiveness forces companies to provide innovative products and services in new ways and in different places (Ekingen et al., 2018). Corporate entrepreneurship grants organizations the chance to concentrate knowledge and energy on developing new scenarios leading to new opportunities (Ahmed et al., 2018). In order to achieve these scenarios, it is necessary to keep the organization committed at all levels (Agapie et al., 2018; Kantur, 2016). Therefore, CE becomes a significant source of innovation, revitalization, and improvement of productivity for organizations. It creates a favorable environment for the generation of new capabilities, which, in turn, lead to ever-larger markets while improving performance (Zahra, 2015).

In whichever form the organization intends to implement CE actions, it must be borne in mind that innovativeness, risk-taking, and proactiveness have to be encouraged when aggressively seeking new business opportunities. These elements have already been identified for Entrepreneurial Orientation (EO) by Covin and Slevin (1989). Internationalization processes are paramount in this search for new opportunities. Internationalization arises from the combination of behaviors of the three variables upon which organizations' entrepreneurial actions are based (Lin et al., 2019). Therefore, the degree of EO will be fundamental in the management of a company's internationalization strategy, this strategy being defined in terms of the size and scope of its international operations (Jin et al., 2018).

The concept of CE is linked to that of Corporate Entrepreneurship Strategy (CES) (Mazzei et al., 2017). Formal and informal CE activities are important for a company's renewal, growth, and successful financial performance (Zahra, 2015).

Corporate Entrepreneurship Strategy is found amidst these entrepreneurial actions and the strategy of the organizations themselves (Demil et al., 2015). When integrating strategic planning into CE, the strategic thinking generated by the organization's management stands among the elements of greatest value (Kuratko & Audretsch, 2009).

The main purpose of this chapter is to identify and explain the influence of the CES elements on internationalization processes and their outcomes. The CES highlights the supplementary roles played by entrepreneurship and strategic management to improve the company's outcomes (Kim, 2018). Objectives and action plans are set strategically and from an entrepreneurial approach. Meeting these objectives helps the company's international development by means of an improved performance (Kantur, 2016).

The scientific literature addressing organizations' entrepreneurship from a strategic perspective and focusing on the management of internationalization operations remains scarce. This is significant, since all the potential advantages achieved must be permanently integrated into the company's strategy. This is the only way these operations will help produce a higher performance in the long term (Autio, 2017). This chapter contributes to the related literature by setting up a conceptual framework regarding the most relevant results that connect internationalization processes to the internal elements of the CES.

This chapter is structured as follows. After this introduction, the phenomena of CE and CES are addressed in an interrelated way, and their influence on organizations' outcomes is highlighted, especially regarding those in the internationalization field. The methodology used is subsequently described along with the analysis of the most relevant results in relation to the influence of the CES elements on international processes. Finally, the discussion of these results and the main conclusions of this chapter are explained.

2 Theoretical Framework

Both CE and CES are realities with a high degree of interrelation and multiple connections. The main purpose of CE is to search for and identify new business opportunities. Conceptually speaking, CES is broader from the perspective of the organization's entrepreneurial initiative (Mazzei et al., 2017). The focus of the CES is on the strategic integration of actions implemented in the lookout for competitive advantages (Ahmed et al., 2018; Kuratko et al., 2015a). The identification of these advantages will enhance business decision-making processes and will determine an improved performance (An et al., 2018). In this respect, the strategy needs to be integrated and show where the company intends to go and how to achieve its objectives. To this end, CE stands out as a valid resource within this process (Kuratko & Audretsch, 2009).

2.1 Corporate Entrepreneurship

Corporate Entrepreneurship implies a change of culture within organizations in order to encourage collaboration and improve ways of working. The surrounding uncertainty due to a changing business environment, along with a strong entrepreneurial culture, exert a positive impact on CE practices (Yang, 2018). This type of action gives people the chance to focus their knowledge and forces the development of new scenarios, which lead to opportunities (Ahmed et al., 2018). Therefore, CE has a complex and heterogeneous nature. It encompasses the processes of staff management (Nason et al., 2015), knowledge exchange, and learning processes both in-house and within the company's network (Turner & Pennington, 2015).

To date, research into CE has put the focus on the people who form part of the organizations along with the different levels of analysis of the business activity. Nowadays, contributions mostly come from research that explores the impact of people's decision-making and actions on organizational performance (Shepherd et al., 2015). Corporate Entrepreneurship actions are valuable tools for the generation and creation of an organizational environment that fosters creativity and innovation (Ahmed et al., 2018). Corporate Entrepreneurship also helps to develop various management capabilities, thereby allowing companies to be competitive, be renewed, and undertake transformation actions that may lead to the company's redefinition (Zahra, 2015). Therefore, not only does CE consist of searching for new business opportunities for the organization, but it also involves innovative actions addressed toward developing new products, technology services, administrative techniques, and competitive positioning.

Several authors state that CE is, to a great extent, implemented through the three main elements as identified by Covin and Slevin (1989) within their EO concept: Risk-Taking, Innovativeness, and Proactiveness (Antoncic & Hisrich, 2003). Recent work adds other elements that are also considered relevant to this idea of EOg: Autonomy (Kearney et al., 2013) and Competitive Aggressiveness (Adebiyi et al., 2018; Dess & Lumpkin, 2005). All these studies share the idea that these elements will have an influence on the organization's performance concerning its profitability, growth, and generation of different forms of wealth (Antoncic & Hisrich, 2003, 2004; Dess & Lumpkin, 2005; Kearney et al., 2008; Mazzei et al., 2017).

2.2 Corporate Entrepreneurship Strategy and International Activities

Uncertain environments, such as those of today, require organizational transformations including strategic renewal processes and the expansion of operations into new markets worldwide (Pishbin et al., 2015; Simsek et al., 2015; Turner & Pennington, 2015; Yang, 2018). In this framework, CES stands out as a strategic option that organizations may adopt when external environment triggering factors show the

need for strategic change and adaptation (Kuratko et al., 2001; Peltola, 2012; Zhang, 2017). Although the scopes of CE and strategy have traditionally been developed separately, in recent years the interest in studying both realities in a connected way has greatly increased (Kim, 2018; Kyrgidou & Hughes, 2010).

The concept of CES comprises all the entrepreneurial initiatives related to CE, and enables potential opportunities to be identified and put to good use (Crawford & Kreiser, 2015). This strategy implies a set of commitments and actions for the development of current and future competitive advantages. These actions lead to a sustained renewal, a redefinition of domains, a rejuvenation of the organization, and a reconstruction of the business model (Kantur, 2016).

The concept of strategy aligned with business decisions is not new and has already been described by Mintzberg (1987). He highlighted how strategy may be something intended. Having a plan is not sufficient, the behaviors leading to the achievement of the expected outcomes through this strategy must be defined (Mintzberg, 1987). The integration of CE and strategy refers to the need for the medium- and long-term orientation of the specific entrepreneurial activities implemented within the company (Kuratko & Audretsch, 2009). Corporate Entrepreneurship Strategy represents the coordinated efforts from an organization to foster entrepreneurial activities and is set up as a general strategic approach, which may be suitable for different types of organizations (Kreiser et al., 2021).

It should be borne in mind that the fact that autonomous entrepreneurial actions are taking place within a company's strategic processes does not necessarily mean the existence of a CES (Ireland et al., 2009). Actions of an entrepreneurial nature linked to the concept of strategy need to be transferred across the whole organization and sustained over time (Ireland et al., 2003). Strategy needs to have a purpose and a clear and defined intentionality (Ireland et al., 2009). Following a systematic strategic approach, companies with strong organization of their capabilities widely use these entrepreneurial actions as an instrument to meet their objectives (Ceptureanu et al., 2017).

The three components that make up a CES have to be considered for its implementation, as shown in Fig. 1: external elements, internal elements, and the outcomes of the CES. This chapter focuses on the internal elements: the Entrepreneurial Strategic Vision (ESV), the Pro-Entrepreneurial Organizational Architecture (PeOA), and the Entrepreneurial Behavior Process (EBP). The focus revolves around the influence that they have on the CES outcomes related to internationalization processes. Based on the literature, these internal elements represent factors causally related to their performance (Antoncic, 2006; Ireland et al., 2003, 2009; Kreiser et al., 2021; Kuratko, 2007). When it comes to defining the efficiency of aligning these three elements, it is necessary to evaluate their features with respect to a criterion variable, such as the company's outcomes (Kreiser et al., 2021).

On examining these three internal elements of a CES process in more detail, the following aspects may be highlighted:

1. *ESV*. This element stresses the necessary commitment by management to present entrepreneurial behavior from a strategic point of view (Ireland et al., 2009).

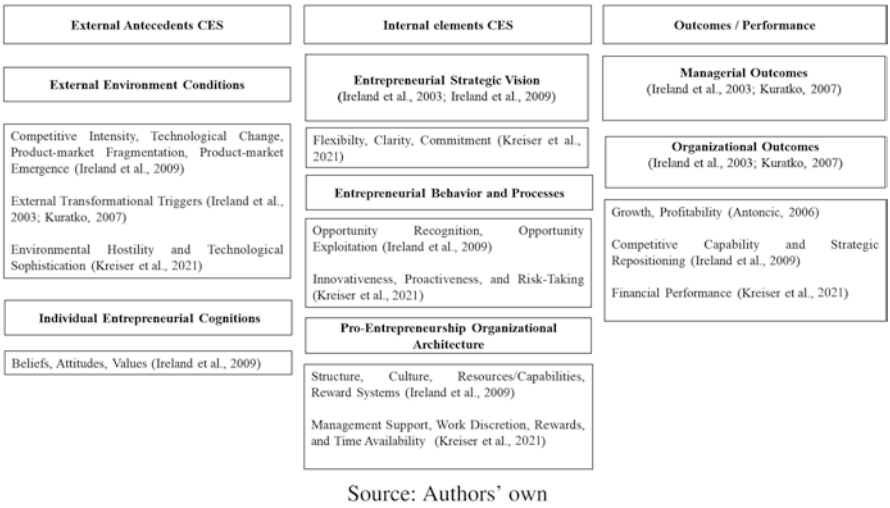


Fig. 1 Summary of CES elements. (Source: Authors' own)

It defines the areas in which opportunities must be sought from an entrepreneurial mindset (Ireland et al., 2003). This strategic vision is implemented when the organization's management fosters an environment promoting (a) Flexibility, (b) Clarity, and (c) Commitment. This is a one-dimensional strategic vision and it is implemented through risky, innovative, and proactive strategies (Lomberg et al., 2017; Urban & Streak, 2013).

2. *PeOA*. This is an organizational context (with attributes connected to the structure, resources, organizational culture, etc.), which fosters entrepreneurial behaviors at both individual and group levels (Ireland et al., 2009). A CES without a PeOA is a reality with no chance of succeeding (Ireland et al., 2003). Efforts toward organizational change require the preparation of the organization to promote successful entrepreneurial behaviors based on the CES (Hornsby et al., 2008).
3. *EBP*. This element refers to the innovative actions aimed at taking advantage of opportunities that their competitors have not yet identified or exploited. These actions are linked to the use of new resources, to the access to new customers, to their incorporation into new markets, or even a combination of all three links (Ireland et al., 2003, 2009). The interrelationship between the human factor and the organization lies in the nature of the EBP itself, and is defined by three key components: Innovativeness, Risk-Taking, and Proactiveness: the same components used by Covin and Slevin (1991) to define the EO. The idea of an EO integrated into the CES is subject to the active search for new opportunities (McCarthy et al., 2018).

The CES models proposed by Ireland et al. (2003, 2009) and Kuratko (2007) had a major impact on the literature. In these models, the CES outcomes are directly

related to the EBPs. The ESV and the PeOA exert an influence on and are influenced by the EBPs. In recent CES models, the outcomes are considered a consequence of the mutual relationships between these three elements, and not only of the EBPs (Kreiser et al., 2021). However, papers that analyze the outcomes of these processes still largely center on the influence of the EBPs.

Despite the rise in the application of CES, few papers show how the entrepreneurial action is linked to the organization's performance under different contingencies (Kim, 2018). However, various authors point out that searching for and identifying new opportunities will enhance the decision-making processes regarding access to new markets (An et al., 2018). Entrepreneurial and strategic actions often seek internationalization to develop their activities in other locations (Hitt et al., 2001).

The outcomes in internationalization based on the CES processes are included in the field of Organizational Outcomes (see Fig. 1). In particular, they are linked to the Growth (Antoncic, 2006) and Strategic Repositioning (Ireland et al., 2009) elements. Several authors have therefore stated the aspects to be considered within these outcomes in order to describe the degree of internationalization. The following ratios may be used:foreign sales to total sales (Chen & Tan, 2012; Cho & Lee, 2018; Ruigrok et al., 2007; Zahra & George, 2002); the number of overseas subsidiaries to the number of total subsidiaries (Paul & Gupta, 2014; Zhou, 2018); foreign employees to total employees; foreign assets to total assets (Ruigrok et al., 2007); total investment in subsidiaries as a percentage of total investment and investment for foreign market development (Paul & Gupta, 2014); and the speed of internationalization, namely, the time elapsed between launching the company and its first international sales (Zahra & George, 2002).

3 Methodology

The methodology employed to address this chapter involved a systematic review of the literature. Figure 2 shows the sequence of activities which has been performed. The use of this methodology enables information related to a topic or different topics to be grouped together. This helps to draw general conclusions from the analysis and the examination of individual papers (Dikert et al., 2016). The scientific database Web of Science (WoS) was chosen as a source of reference. Nowadays, WoS is considered one of the most trustworthy and useful sources in the field of scientific production (Mikki, 2009). Moreover, it includes indexed works of great scientific renown, and of high impact on academic production (Rueda et al., 2007).

When making requests, the search criteria used were those of key words in the field "Topic." The terms employed were: Corporate Entrepreneur* AND Internatio*. The request was made on WoS Core Collection, Citation Indexes, specifically in: (1) Science Citation Index Expanded (SCI-EXPANDED) from 1900 to the present; and (2) Social Sciences Citation Index (SSCI) from 1956 to the present. This request returned a total of 45 references.

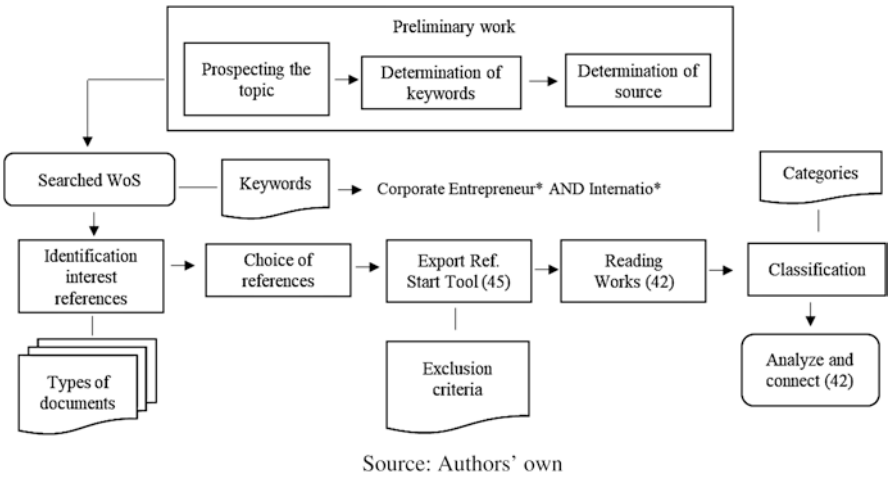


Fig. 2 Methodology schema. (Source: Authors' own)

When deciding on the type of documents, the option chosen was that of the "Article" document, including its "Early Access" subtype. This has been carried out according to Liao et al. (2017), who identified the scientific article as the document for which the review and publishing process was currently the most restrictive and demanding. On these grounds, the following types of documents have been dismissed from this analysis: (1) Books, (2) Book Chapters, (3) Proceedings Papers, (4) Reviews, and (5) Corrections.

The search was performed in the areas of knowledge causally related to our topic, particularly concerning: (1) Business Economics and (2) Development Studies. The 45 references identified were integrated into the Start Tool software. These were reviewed by the three authors to confirm that the search terms were indeed relevant to the topic addressed in each of these articles. Finally, 42 studies were selected for an in-depth content analysis.

Once the papers were identified and defined, the authors reviewed them again to determine both the critical and the connecting elements among them. Thus, it was possible to set out the results of the agreements and disagreements encountered on the subject matter.

4 Results

In this chapter, an analysis is carried out concerning the influence that the CES internal elements exert on the degree of internationalization. These consequences are included in the organizational outcomes (see Fig. 1). One of these internal elements, the EBP, is assimilated in the literature to the concept of EO by Covin and

Slevin (1989), as both are defined through the construct made up of the variables Innovativeness, Risk-Taking, and Proactiveness.

In the literature that addresses the relationship between these internal elements and internationalization, the EBP stands out over the other two elements. The number of scientific papers addressing the influence of the ESV and PeOA elements on internationalization is much lower. Even Ireland et al. (2009) identify the EBP as the only element having a direct influence on the organization's performance and dismiss a direct influence of the ESV and PeOA on the organization's outcomes.

Table 1 shows the outcomes and consequences derived from the direct and positive influence of the CES internal elements on internationalization processes. From this review, the following conclusions may be drawn on the relationship of the CES internal elements with internationalization.

1. ESV: the literature remains extremely limited. In this case, papers stress the influence of certain variables included in the ESV (particularly Flexibility and Commitment Management) on internationalization processes through the outcomes: (a) International Diaspora; (b) New Venture Creation; and (c) Degree of Internationalization (Kreiser et al., 2021).
2. PeOA: the internal elements of the PeOA within a CES model take into consideration the identification and uses of different resources along with components more related to the corporate culture. In the papers examined, the internal elements deal exclusively with the topic of resources and capabilities and their effect on internationalization processes. In this case, the outcomes are closely linked to: (a) International Performance, through the Export Performance, Foreign Market Performance and Export Venture Performance; (b) The International Diaspora; and (c) The New Venture Creation.
3. EBP: extensive literature addresses this element as EO and its effects on the outcomes of the internationalization processes. It refers to both the more traditional conceptualization by Covin and Slevin (1991) formed of Innovativeness, Proactiveness, and Risk-Taking, and the wider concept also includes Autonomy and Competitive Aggressiveness (Setiawan & Erdogan, 2020). The type and number of outcomes and consequences of the EO on internationalization processes are different in nature. The outcomes concerning the International Degree, International Scope, International Speed, and International Performance in their different forms deserve mention.

These papers also state the potential moderating effect of the EO on the dynamic capabilities of international SMEs (Swoboda & Olejnik, 2016). Likewise, the politicization of international decisions and the rising global hostility are considered as acting as moderating agents concerning the EO (Thanos et al., 2017).

Table 1 Summary of the effect of CES internal elements

CES internal elements	Authors (year)	Consequences/outcomes international activities
Entrepreneurial strategic vision		
Flexibility	Nkongolo-Bakenda and Chrysostome (2013)	International diaspora New venture creation
Commitment management	Javalgi and Todd (2011)	Degree of internationalization
Pro- entrepreneurial organizational architecture		
Capabilities and product service/ development	Nkongolo-Bakenda and Chrysostome (2013)	International diaspora New venture creation
Internal capabilities (networking capabilities, country and industry reputation, financial accessibility, global mindset, long-term exposure, short-term exposure and foreign market experiential knowledge)	Ismail and Kuivalainen (2015)	International Performance (overseas sales volume, overseas sales growth and overseas profitability)
Intangible resources (reputation, access to financial resources, human resources, relationships, and internationals) and absorptive resources (assimilation, transformation, and exploitation)	Rua (2018)	Export performance
Networking capabilities (planning, developing distribution channels, setting prices, and developing innovations. A strong proclivity toward networking and leveraging networking capability enhances planning, refining and implementing marketing strategy, which in turn leads to improved company performance)	Falahat et al. (2018)	Foreign market performance
Service capabilities (new product development service, sales service, distribution service)	Martin et al. (2018)	Export venture Performance (efficiency, effectiveness, adaptiveness)
Entrepreneurial behavior process		

(continued)

Table 1 (continued)

CES internal elements	Authors (year)	Consequences/outcomes international activities
Innovativeness, proactiveness, and risk-taking	Ripollés-Meliá et al. (2007)	International degree International scope International speed
	Lin et al. (2019)	International networking activities International knowledge acquisition activities
	Javalgi and Todd (2011)	International degree (percentage of foreign sales to Total sales)
	Jantunen et al. (2008)	International performance (satisfaction)
	Martin et al. (2018)	Export venture performance (efficiency, effectiveness, adaptiveness)
	Jin et al. (2018)	International degree International scope Financial performance
	Martin et al. (2018)	International new ventures
	Swoboda and Olejnik (2016)	International performance (sales growth, ROI, profit)
	Kuivalainen et al. (2004)	International performance (growth percentage, sale per employee, number of countries, profitability, growth compared to industry average)
Competitive aggressiveness, autonomy, risk-taking, innovativeness, and proactiveness	Freiling and Lütke-Schelhowe (2014)	International growth (number of new foreign market entries over the last 5 years, number of entries into new regions, level of change for the percentage of foreign employees and level of change for the percentage of foreign revenue)
	Setiawan and Erdogan (2020)	International activities (building effective networks, competitiveness, forming collaborative and partnering relationships)

Source: Authors' own

5 Discussion

The review of the specialized literature confirms the positive influence of CES internal elements on internationalization processes. Here, CES is considered as the crossroads of entrepreneurial actions and strategy (Kuratko & Audretsch, 2009). Its influence on internationalization processes and their outcomes is essentially based

on two variables: management commitment (Nkongolo-Bakenda & Chrysostome, 2013), and the ability to be flexible within the environment (Javalgi & Todd, 2011).

The significance of a PeOA constitutes a crucial element when it comes to achieving a successful CES (Ireland et al., 2003). The organization's Capabilities and Resources are overwhelmingly present in the papers analyzed. These show their direct relationship with the outcomes associated with International Performance, Export Venture Performance, and Foreign Market Performance. In this case, it is important to highlight the need to appropriately manage the organization's Capabilities and Resources (Ismail & Kuivalainen, 2015). However, other relevant aspects included in the PeOA, such as the Structure, Culture, and Reward System (Ireland et al., 2009), and the Management Support and Time Availability (Kreiser et al., 2021) are omitted from these papers. Therefore, the significance of these elements in the internationalization performance cannot be assured.

Regarding the EBPs, there are multiple findings that show their positive impact on the organization's internationalization. The outcomes are visible in several aspects within International Performance, such as Growth, Sales, Financial Performance, and Profitability. This frequently found relationship of the EBPs as a direct cause of many of the organizational outcomes may explain why CE is normally identified with the EBPs. When dealing with the benefits of CE within organizations, a great number of papers identify CE directly with the EBP as being assimilated into the EO. Nevertheless, the most recent models state that the CES elements support each other: strategic intentionality, entrepreneurial environment, and EO. In particular, the strategic intentionality is seen as "the existence of an organization-wide vision that supports the entrepreneurial activity" (Kreiser et al., 2021). This interrelationship leads to an improved organizational performance (Kreiser et al., 2021).

Excessive identification of the EBPs with the EO may present problems, since this provides a partial vision of the EO effect on performance. Many variables may exert an influence on the EO and may moderate its effect on the outcomes (Lin et al., 2019). The EO may be an insufficient resource to gain competitive advantages, unless this is integrated into a broader process within the organizational culture (Jin et al., 2018). Thus, a high degree of EO is not by itself a guarantee of success. For example, the scarcity of resources in an organization may reduce the probability of obtaining those results (Hosseini et al., 2018). The EO should therefore be more than just a unique activity. It must be built into a general strategy (Wales, 2016). A strategic perspective of the EO may help to identify opportunities in a proactive way by introducing new products and services (Altinay et al., 2011).

Finally, this study holds implications for organizations wanting to achieve an improvement in their international activities through CES. Entrepreneurship has to become a key element in their vision, and an encompassing global strategy (CES) should be devised. Organizations must identify the specific areas in which they want to improve. Once selected, they have to identify which internal elements (which are the responsibility of the management of the organization) need to be emphasized. In order to be successful, however, this must be carried out in alignment with actions to encourage the (entrepreneurial) employee behaviors required.

6 Conclusions

There is no doubt regarding the growing interest in the literature in recent years in the entrepreneurial activity of organizations. In these papers, the performance derived from these actions is commonly analyzed from a strategic point of view. However, this is not the case for internationalization processes derived from these entrepreneurial activities. In any case, the outcomes of internationalization are part of the organizational outcomes and, as such, are influenced by CES.

Within the CES model, the internal elements have traditionally received special attention due to their effect on the organizational outcomes. The CES internal elements are normally directly and positively linked to the International Degree, International Scope, International Speed, and International Performance of companies. Nonetheless, the number of papers that analyze this specific relationship remains extraordinarily small, which results in a considerable lack of knowledge within this important field of study. Moreover, in several models, the EBP appears as the only internal element that consistently possesses a direct and positive relationship with internationalization. However, the most recent empirical research is beginning to explore an end-to-end vision based on the interrelationship of the CES internal elements. In order to continue progressing along these lines, further research analyzing different configurations of the three CES internal elements, as well as their relationship with organization performance, is needed.

This chapter is not without certain limitations. The scarcity of literature addressing the CES outcomes in internationalization has been a constraint. Furthermore, there is excessive identification in the literature of the concept of EO with CE in general, and with the CES internal elements in particular. This has inhibited the possibility of more clearly identifying connections defined between these elements and their outcomes.

Based on our results, certain relevant research lines may be identified for the future. It would be of interest to empirically analyze the direct and indirect relationship of the CES elements with the outcomes derived from internationalization. Additionally, the study of the moderating elements that influence the relationship between the CES elements and international performance would also be of interest.

References

Abrell, T., & Karjalainen, T. M. (2017). The early stage of internal corporate venturing: Entrepreneurial activities in a large manufacturing company. *Journal of Enterprising Culture, 25*(1), 1–30. https://doi.org/10.1142/S0218495817500017

Adebiyi, J., Fayose, J., & Uchenna Eze, B. (2018). Corporate entrepreneurship and international performance of Nigerian banks. *Journal of Economics and Management, 32*(2), 5–17. https://doi.org/10.22367/jem.2018.32.01

Agapie, A., Vizitiu, C., Cristache, S. E., Nastase, M., Craciun, L., & Molanescu, A. G. (2018). Analysis of corporate entrepreneurship in public R and D institutions. *Sustainability, 10*(7), 1–14. https://doi.org/10.3390/su10072297

Ahmed, U., Shah, S. A., Qureshi, M. A., Shah, M. H., & Khuwaja, F. M. (2018). Nurturing innovation performance through corporate entrepreneurship: The moderation of employee engagement. *Studies in Business and Economics, 13*(2), 20–30. https://doi.org/10.2478/sbe-2018-0017

Altinay, L., Madanoglu, M., De Vita, G., Arasli, H., & Ekinci, Y. (2011). The interface between organizational learning capability, entrepreneurial orientation and SME growth. *Journal of Small Business Management, 54*(3), 871–891. https://doi.org/10.1111/jsbm.12219

An, W., Zhao, X., Cao, Z., Zhang, J., & Liu, H. (2018). How bricolage drives corporate entrepreneurship: The roles of opportunity identification and learning orientation. *Journal of Product Innovation Management, 35*(1), 49–65.

Antoncic, B. (2006). Impacts of diversification and corporate entrepreneurship strategy making on growth and profitability: A normative model. *Journal of Enterprising Culture, 14*(01), 49–63. https://doi.org/10.1142/S0218495806000040

Antoncic, B., & Hisrich, R. D. (2003). Clarifying the intrapreneurship concept. *Journal of Small Business and Enterprise Development, 10*(1), 7–24. https://doi.org/10.1108/14626000310461187

Antoncic, B., & Hisrich, R. D. (2004). Corporate entrepreneurship contingencies and organizational wealth creation. *Journal of Management Development, 23*(6), 518–550. https://doi.org/10.1108/02621710410541114

Audretsch, D. B., Kuratko, D. F., & Link, A. N. (2015). Making sense of the elusive paradigm of entrepreneurship. *Small Business Economics, 45*(4), 703–712.

Autio, E. (2017). Strategic entrepreneurial internationalization: A normative framework. *Strategic Entrepreneurship Journal, 11*(3), 211–227. https://doi.org/10.1002/sej.1261

Boone, C., Lokshin, B., Guenter, H., & Belderbos, R. (2019). Top management team nationality diversity, corporate entrepreneurship, and innovation in multinational firms. *Strategic Management Journal, 40*(2), 277–302. https://doi.org/10.1002/smj.2976

Ceptureanu, E. G., Ceptureanu, S. I., & Popescu, D. I. (2017). Relationship between entropy, corporate entrepreneurship and organizational capabilities in Romanian medium sized enterprises. *Entropy, 19*(8), 412. https://doi.org/10.3390/e19080412

Chen, S., & Tan, H. (2012). Region effects in the internationalization-performance relationship in Chinese firms. *Journal of World Business, 47*(1), 73–80. https://doi.org/10.1016/j.jwb.2010.10.022

Cho, J., & Lee, J. (2018). Internationalization and longevity of Korean SMEs: The moderating role of contingent factors. *Asian Business and Management, 17*(4), 260–285. https://doi.org/10.1057/s41291-018-0040-z

Covin, J. G., & Slevin, D. P. (1989). Strategic management of small firms in hostile and benign environments. *Strategic Management Journal, 10*(1), 75–87. https://doi.org/10.1002/smj.4250100107

Covin, J. G., & Slevin, D. P. (1991). A conceptual model of entrepreneurship as firm behavior. *Entrepreneurship Theory and Practice, 16*(1), 7–26.

Crawford, G. C., & Kreiser, P. M. (2015). Corporate entrepreneurship strategy: Extending the integrative framework through the lens of complexity science. *Small Business Economics, 45*(2), 403–423.

Demil, B., Lecocq, X., Ricart, J., & Zott, C. (2015). Introduction to the SEJ special issue on business models: Business models within the domain of strategic entrepreneurship. *Strategic Entrepreneurship Journal, 9*(1), 1–11. https://doi.org/10.1002/sej.1194

Dess, G. G., & Lumpkin, G. T. (2005). The role of entrepreneurial orientation in stimulating effective corporate entrepreneurship. *Academy of Management Perspectives, 19*(1), 147–156. https://doi.org/10.5465/ame.2005.15841975

Dikert, K., Paasivaara, M., & Lassenius, C. (2016). Challenges and success factors for large-scale agile transformations: A systematic literature review. *Journal of Systems and Software, 119*, 87–108. https://doi.org/10.1016/j.jss.2016.06.013

Ekingen, E., Ekemen, M. A., Yildiz, A., & Korkmazer, F. (2018). The effect of intrapreneurship and organizational factors on the innovation performance in hospital. *Revista de Cercetare Şi Intervenţie Socială, 62*(September), 196–219.

Falahat, M., Knight, G., & Alon, I. (2018). Orientations and capabilities of born global firms from emerging markets. *International Marketing Review, 35*(6), 936–957. https://doi.org/10.1108/IMR-01-2017-0021

Freiling, J., & Lütke-Schelhowe, C. (2014). The impact of entrepreneurial orientation on the performance and speed of internationalization. *Journal of Entrepreneurship, Management and Innovation, 10*(4), 169–199.

García-Sánchez, E., García-Morales, V. J., & Martín-Rojas, R. (2018). Analysis of the influence of the environment, stakeholder integration capability, absorptive capacity, and technological skills on organizational performance through corporate entrepreneurship. *International Entrepreneurship and Management Journal, 14*(2), 345–377. https://doi.org/10.1007/s11365-017-0436-9

Hitt, M. A., Ireland, R. D., Camp, S. M., & Sexton, D. L. (2001). Guest editors' introduction to the special issue on public sector ethics. *Strategic Management Journal, 22*(6/7), 479–491.

Hornsby, J. S., Holt, D. T., & Kuratko, D. F. (2008). The dynamic nature of corporate entrepreneurship: Assessing the CEAI. *Academy of Management Proceedings, 2008*(1), 1–6. https://doi.org/10.5465/ambpp.2008.33716544

Hosseini, M., Dadfar, H., & Brege, S. (2018). Firm-level entrepreneurship and international performance: A simultaneous examination of orientation and action. *Journal of International Entrepreneurship, 16*(3), 338–368. https://doi.org/10.1007/s10843-018-0235-6

Ireland, R. D., Kuratko, D. F., & Covin, J. G. (2003). Antecedents, elements, and consequences of corporate entrepreneurship strategy. In *Academy of management proceedings* (pp. L1–L6). Academy of Management. https://doi.org/10.5465/ambpp.2003.13793054

Ireland, R., Covin, J. G., & Kuratko, D. F. (2009). Conceptualizing corporate entrepreneurship strategy. *Entrepreneurship Theory and Practice, 33*(1), 19–46. https://doi.org/10.1111/j.1540-6520.2008.00279.x

Ismail, N. A., & Kuivalainen, O. (2015). Der Effekt von internen Kompetenzen und dem externen Umfeld auf den internationalen Unternehmenserfolg von KMU und die Moderator-Beziehung der geografische Reichweite: der Fall der Malaysischen Halal-Lebensmittelindustrie. *Journal of International Entrepreneurship, 13*(4), 418–451. https://doi.org/10.1007/s10843-015-0160-x

Jantunen, A., Nummela, N., Puumalainen, K., & Saarenketo, S. (2008). Strategic orientations of born globals-do they really matter? *Journal of World Business, 43*(2), 158–170. https://doi.org/10.1016/j.jwb.2007.11.015

Javalgi, R. G., & Todd, P. R. (2011). Entrepreneurial orientation, management commitment, and human capital: The internationalization of SMEs in India. *Journal of Business Research, 64*(9), 1004–1010. https://doi.org/10.1016/j.jbusres.2010.11.024

Jin, B., Jung, S., & Jeong, S. W. (2018). Dimensional effects of Korean SME's entrepreneurial orientation on internationalization and performance: The mediating role of marketing capability. *International Entrepreneurship and Management Journal, 14*(1), 195–215. https://doi.org/10.1007/s11365-017-0457-4

Kantur, D. (2016). Strategic entrepreneurship: Mediating the entrepreneurial orientation-performance link. *Management Decision, 54*(1), 24–43. https://doi.org/10.1108/MD-11-2014-0660

Kearney, C., Hisrich, R., & Roche, F. (2008). A conceptual model of public sector corporate entrepreneurship. *International Entrepreneurship and Management Journal, 4*(3), 295–313. https://doi.org/10.1007/s11365-007-0048-x

Kearney, C., Hisrich, R. D., & Antoncic, B. (2013). The mediating role of corporate entrepreneurship for external environment effects on performance. *Journal of Business Economics and Management, 14*(Supplement_1), S328–S357.

Kim, H. J. (2018). Reconciling entrepreneurial orientation and dynamic capabilities: A strategic entrepreneurship perspective. *Journal of Entrepreneurship, 27*(2), 180–208. https://doi.org/10.1177/0971355718781252

Kreiser, P. M., Kuratko, D. F., Covin, J. G., Ireland, R. D., & Hornsby, J. S. (2021). Corporate entrepreneurship strategy: Extending our knowledge boundaries through configuration theory. *Small Business Economics, 56*, 739–758. https://doi.org/10.1007/s11187-019-00198-x

Kuivalainen, O., Sundqvist, S., Puumalainen, K., & Cadogan, J. (2004). The effect of environmental turbulence and leader characteristics on international performance: Are knowledge-based firms different. *Canadian Journal of Administrative Sciences, 21*(1), 35–50.

Kuratko, D. F. (2007). Corporate entrepreneurship. *Foundations and Trends in Entrepreneurship, 3*(2), 151–203. https://doi.org/10.1561/0300000015

Kuratko, D. F., & Audretsch, D. B. (2009). Strategic entrepreneurship: Exploring different perspectives of an emerging concept. *Entrepreneurship: Theory and Practice, 33*(1), 1–17.

Kuratko, D. F., & Audretsch, D. B. (2013). Clarifying the domains of corporate entrepreneurship. *International Entrepreneurship and Management Journal, 9*(3), 323–335.

Kuratko, D. F., & Morris, M. H. (2018). Examining the future trajectory of entrepreneurship. *Journal of Small Business Management, 56*(1), 11–23. https://doi.org/10.1111/jsbm.12364

Kuratko, D. F., Ireland, R. D., & Hornsby, J. S. (2001). Improving firm performance through entrepreneurial actions: Acordia's corporate entrepreneurship strategy. *Academy of Management Perspectives, 15*(4), 60–71. https://doi.org/10.5465/ame.2001.5897658

Kuratko, D. F., Hornsby, J. S., & Hayton, J. (2015a). Corporate entrepreneurship: The innovative challenge for a new global economic reality. *Small Business Economics, 45*(2), 245–253. https://doi.org/10.1007/s11187-015-9630-8

Kuratko, D. F., Morris, M., & Schindehutte, M. (2015b). Understanding the dynamics of entrepreneurship through framework approaches. *Small Business Economics, 45*(1), 1–13. https://doi.org/10.1007/s11187-015-9627-3

Kyrgidou, L. P., & Hughes, M. (2010). Strategic entrepreneurship: Origins, core elements and research directions. *European Business Review, 22*(1), 43–63. https://doi.org/10.1108/09555341011009007

Liao, Y., Deschamps, F., Loures, E. F. R., & Ramos, L. F. P. (2017). Past, present and future of industry 4.0—A systematic literature review and research agenda proposal. *International Journal of Production Research, 55*(1), 1–21. https://doi.org/10.1080/00207543.2017.1308576

Lin, Z., Cao, X., & Cottam, E. (2019). International networking and knowledge acquisition of Chinese SMEs: The role of global mind-set and international entrepreneurial orientation. *Entrepreneurship and Regional Development, 32*, 449–465. https://doi.org/10.1080/08985626.2019.1640459

Lomberg, C., Urbig, D., Stöckmann, C., Marino, L. D., & Dickson, P. H. (2017). Entrepreneurial orientation: The dimensions' shared effects in explaining firm performance. *Entrepreneurship: Theory and Practice, 41*(6), 973–998. https://doi.org/10.1111/etap.12237

Martiarena, A. (2013). What's so entrepreneurial about intrapreneurs? *Small Business Economics, 40*, 27–39. https://doi.org/10.1007/s11187-011-9348-1

Martin, S. L., Javalgi, R. G., & Ciravegna, L. (2018). Service advantage built on service capabilities: An empirical inquiry of international new ventures. *Journal of Business Research, 88*(January), 371–381. https://doi.org/10.1016/j.jbusres.2018.01.024

Martínez-Román, J. A., Gamero, J., Delgado-González, M. L., & Tamayo, J. A. (2019). Innovativeness and internationalization in SMEs: An empirical analysis in European countries. *Technological Forecasting and Social Change, 148*, 119716. https://doi.org/10.1016/j.techfore.2019.119716

Mazzei, M. J., Ketchen, D. J., & Shook, C. L. (2017). Understanding strategic entrepreneurship: A "theoretical toolbox" approach. *International Entrepreneurship and Management Journal, 13*(2), 631–663.

McCarthy, D. J., Puffer, S. M., & Lamin, A. (2018). Entrepreneurial orientation in a hostile and turbulent environment: Risk and innovativeness among successful Russian entrepreneurs. *European Journal of International Management, 12*(1–2), 191–221. https://doi.org/10.1504/EJIM.2018.10009379

Mikki, S. (2009). Google scholar compared to web of science. A literature review. *Nordic Journal of Information Literacy in Higher Education, 1*(1), 41–51. https://doi.org/10.15845/noril.v1i1.10

Mintzberg, H. (1987). The strategy concept I: Five Ps for strategy. *California Management Review, 30*(1), 11–24.

Nason, R. S., McKelvie, A., & Lumpkin, G. T. (2015). The role of organizational size in the heterogeneous nature of corporate entrepreneurship. *Small Business Economics, 45*(2), 279–304. https://doi.org/10.1007/s11187-015-9632-6

Nkongolo-Bakenda, J. M., & Chrysostome, E. V. (2013). Engaging diasporas as international entrepreneurs in developing countries: In search of determinants. *Journal of International Entrepreneurship, 11*(1), 30–64. https://doi.org/10.1007/s10843-012-0098-1

Paul, J., & Gupta, P. (2014). Process and intensity of internationalization of IT firms—Evidence from India. *International Business Review, 23*(3), 594–603. https://doi.org/10.1016/j.ibusrev.2013.10.002

Peltola, S. (2012). Can an old firm learn new tricks? A corporate entrepreneurship approach to organizational renewal. *Business Horizons, 55*(1), 43–51.

Pishbin, S. A. R., Alambeigi, A., & Iravani, H. (2015). Investigation of the role of structural, leadership, and strategy factors in cooperatives entrepreneurship. *Journal of Agricultural Science and Technology, 17*(5), 1115–1125.

Ripollés-Meliá, M., Menguzzato-Boulard, M., & Sánchez-Peinado, L. (2007). Entrepreneurial orientation and international commitment. *Journal of International Entrepreneurship, 5*, 65–83. https://doi.org/10.1007/s10843-007-0016-0

Rua, O. L. (2018). From intangible resources to export performance: Exploring the mediating effect of absorptive capabilities and innovation. *Review of International Business and Strategy, 28*(3–4), 373–394. https://doi.org/10.1108/RIBS-02-2018-0012

Rua, O. L., França, A., & Fernández Ortiz, R. (2018). Key drivers of SMEs export performance: The mediating effect of competitive advantage. *Journal of Knowledge Management, 22*(2), 257–279. https://doi.org/10.1108/JKM-07-2017-0267

Rueda, G., Gerdsri, P., & Kocaoglu, D. F. (2007). Bibliometrics and social network analysis of the nanotechnology field. In *PICMET '07 - 2007 Portland International Conference on Management of Engineering & technology* (pp. 2905–2911).

Ruigrok, W., Amann, W., & Wagner, H. (2007). The internationalization-performance relationship at Swiss firms: A test of the S-shape and extreme degrees of internationalization. *Management International Review, 47*(3), 349–368. https://doi.org/10.1007/s11575-007-0020-6

Setiawan, H., & Erdogan, B. (2020). Key factors for successful corporate entrepreneurship: A study of Indonesian contractors. *International Journal of Construction Management, 20*(3), 252–268. https://doi.org/10.1080/15623599.2018.1484849

Shepherd, D. A., Williams, T. A., & Patzelt, H. (2015). Thinking about entrepreneurial decision making: Review and research agenda. *Journal of Management, 41*(1), 11–46. https://doi.org/10.1177/0149206314541153

Simsek, Z., Jansen, J. J. P., Minichilli, A., & Escriba-Esteve, A. (2015). Strategic leadership and leaders in entrepreneurial contexts: A nexus for innovation and impact missed? *Journal of Management Studies, 52*(4), 463–478. https://doi.org/10.1111/joms.12134

Swoboda, B., & Olejnik, E. (2016). Linking processes and dynamic capabilities of international SMEs: The mediating effect of international entrepreneurial orientation. *Journal of Small Business Management, 54*(1), 139–161. https://doi.org/10.1111/jsbm.12135

Thanos, I. C., Dimitratos, P., & Sapouna, P. (2017). The implications of international entrepreneurial orientation, politicization, and hostility upon SME international performance. *International Small Business Journal: Researching Entrepreneurship, 35*(4), 495–514. https://doi.org/10.1177/0266242616641749

Turner, T., & Pennington, W. W. (2015). Organizational networks and the process of corporate entrepreneurship: How the motivation, opportunity, and ability to act affect firm knowledge, learning, and innovation. *Small Business Economics, 45*(2), 447–463.

Urban, B., & Streak, M. (2013). Product innovation of private health insurers in South Africa and the impact of entrepreneurial orientation. *South African Journal of Economic and Management Sciences, 16*(3), 298–315.

Wales, W. J. (2016). Entrepreneurial orientation: A review and synthesis of promising research directions. *International Small Business Journal: Researching Entrepreneurship, 34*(1), 3–15. https://doi.org/10.1177/0266242615613840

Yang, M. (2018). International entrepreneurial marketing strategies of MNCs: Bricolage as practiced by marketing managers. *International Business Review, 27*(5), 1045–1056. https://doi.org/10.1016/j.ibusrev.2018.03.004

Zahra, S. A. (2015). Corporate entrepreneurship as knowledge creation and conversion: The role of entrepreneurial hubs. *Small Business Economics, 44*(4), 727–735. https://doi.org/10.1007/s11187-015-9650-4

Zahra, S. A., & George, G. (2002). Culture and its consequences for entrepreneurship. *Entrepreneurship: Theory and Practice, 26*, 5–9.

Zhang, H. (2017). Complexity absorption: A processual strategic approach to corporate entrepreneurship strategy. *Frontiers of Business Research in China, 11*(1), 1–20.

Zhou, C. (2018). Internationalization and performance: Evidence from Chinese firms. *Chinese Management Studies, 12*(1), 19–34. https://doi.org/10.1108/CMS-04-2017-0098

Defining, Measuring, and Developing Social Entrepreneurship Skills: A Crucial Element of Social Entrepreneurship Strategy

Thomas S. Lyons and Caroline Campbell

Abstract In this theoretical and conceptual chapter, we attempt to answer the questions: What are the essential skills of social entrepreneurship? How can these skills be measured in a way that permits them to be developed? How can the answers to these two questions be used to develop successful social entrepreneurs? We posit a conceptual framework for developing social entrepreneurship skills, identify the skills that must be developed, and offer a tool for guiding the development process through a clinical skills assessment. We conclude by discussing the implications of this approach for social entrepreneurship development/education and strategy.

Keywords Social entrepreneurship · Skills assessment · Skill development

An important emerging subfield of entrepreneurship is social entrepreneurship. It has been defined in many ways, but perhaps the simplest working definition is "…the application of the mindset, processes, tools and techniques of business entrepreneurship to the pursuit of a social and/or environmental mission" (Kickul & Lyons, 2016: 1). To this definition, we would add the application of skills, for reasons we will explain in this chapter. Yet, what do skills have to do with social entrepreneurship strategy? We would argue that without the essential skills of entrepreneurship, social entrepreneurs could not successfully manage change, people, and the structures and processes of business that are crucial to administering innovative ventures that must scale to achieve positive social impact. Our objective, herein, is to detail an approach to the development of skilled social entrepreneurs that involves identifying the skills required, measuring those skills in a way that can be acted upon, and undertaking strategic interventions to address skill weaknesses and leverage skill strengths.

T. S. Lyons (✉) · C. Campbell
University of Tennessee at Chattanooga, Chattanooga, TN, USA
e-mail: Thomas-Lyons@utc.edu

N. Faghih, A. Forouharfar (eds.), *Strategic Entrepreneurship*, Contributions to Management Science, https://doi.org/10.1007/978-3-030-86032-5_8

As entrepreneurship scholarship has steadily migrated away from traits theory as an explanation for entrepreneurship success toward an understanding that properly motivated individuals can be developed into successful entrepreneurs, entrepreneurship educators and other entrepreneur developers have continued to explore the "how" of this development process. Most recently, it has been asserted that entrepreneurship is a method to be practiced and not a process (Neck et al., 2018). This further suggests that developing skills may be what underlies successful practice (Smith et al., 2005; Cooney, 2012; Neck et al., 2018; Lyons et al., 2019a). This raises some important questions for entrepreneur developers. What are the essential skills to be developed? How can these skills be measured in a way that permits them to be developed? Most importantly for the purposes of this chapter, how can this thinking be applied to the development of successful social entrepreneurs?

In this theoretical and conceptual chapter, we attempt to answer these questions. We offer a conceptual framework for developing social entrepreneurship skills and a tool for guiding the development process through a clinical skills assessment. We conclude by discussing the implications of this approach for social entrepreneurship development/education.

1 Background and Literature Review

1.1 Developing Social Entrepreneurs at the Community Level

For some time now, support for entrepreneurship at the community level has been accepted as good policy. Research has found that entrepreneurial activity can effectively boost economic development (Dye & Alter, 2015) and may even address economic inequality (Fortunato & Alter, 2015; Lyons et al., 2018). The approach in good currency for buoying entrepreneurship activity at the community or regional level is the creation of "entrepreneurial ecosystems." There has been much written on this approach dating back to the early 1990s (Johannisson, 1993), and several variations on this theme have been presented. The gist of this thinking is that the most effective way to foster entrepreneurship in a given community is to create a community-wide "business incubator without walls." This requires building social capital that connects entrepreneurship support organizations (ESOs) of all types to each other, entrepreneurs from across the community to each other, and the entrepreneurs to the ESOs. Following Dees' (1998: 3) observation that "social entrepreneurs are one species in the genus entrepreneur," scholars have applied similar thinking to the support of social entrepreneurs (Lyons & Lichtenstein, 2011; Biggeri et al., 2018; Thompson et al., 2018).

Underlying this is the assumption that we know how to organize both the social entrepreneurship support organizations (SESOs) and the social entrepreneurs in a way that maximizes the effectiveness of their interactions toward the development of their social enterprises. However, the template for successful social entrepreneur

development networking remains fuzzy. Lyons and Lichtenstein (2011) provide some guidance in this regard by suggesting that social entrepreneurs can be segmented by their level of skill. They argue that this approach not only permits the grouping of social entrepreneurs in a way that facilitates strategic assistance provision but enables the community's SESOs to be similarly organized as well, assisting match-making between the two. However, this begs the question, "What are the essential skills for successful social entrepreneurship?" We will take up this question but first a brief review of relevant changes in entrepreneurship education.

1.2 Educating Entrepreneurs

Entrepreneurship education also has been in the process of evolving its approach to supporting would-be entrepreneurs. For many years, educators embraced a model of entrepreneurship that was process-oriented, stemming from the positivist rational problem-solving paradigm. It was believed, and still is by some, that entrepreneurship can be broken down into a systematic set of steps that will lead to success—e.g., doing the right things in the right order. This led to an emphasis on business planning (a form of step-wise analysis and prediction) in both the entrepreneurship curriculum and cocurricular activities.

With the emergence of Sarasvathy's (2008) Theory of Effectuation, Ries's (2011) lean startup methodology, and the work of Neck (2018) and her colleagues, this paradigm has come into question. It is now being held that entrepreneurship must involve a creation approach, as opposed to a prediction approach (Sarasvathy, 2008; Schlesinger et al., 2012). It is argued that this is more relevant to the uncertainty experienced in an entrepreneurial environment because such conditions do not lend themselves to establishing baselines and making predictions from past events. It is becoming increasingly clear that the traditional view that prediction provides control in entrepreneurship is no longer an applicable perspective (Neck et al., 2018; Blank & Dorf, 2012; Ries, 2011).

All of this suggests, as noted previously, that entrepreneurship itself is a method and not a process. As such, it involves a set of practices that require skills in order to be executed successfully. These skills can be learned in iterative phases. This further bolsters the idea that entrepreneurship is organic, not linear and mechanistic with a predictable outcome(s) (Neck et al., 2014; Lichtenstein & Lyons, 2010).

Thus, the fields of entrepreneurship-focused community development and entrepreneurship education have converged. They appear to agree that entrepreneurship skills underlie entrepreneurship success. The literature of entrepreneurship education further tells us that in order for skills to be developed, they must be deliberately practiced (Baron & Henry, 2010). Yet, none of this tells us what skills should be practiced or how to measure these skills in a way that permits identification of skill weaknesses and strengths, a developmental approach.

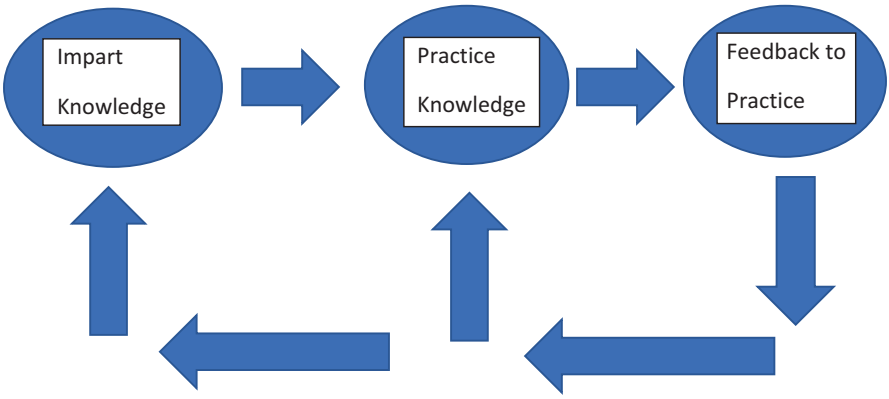
1.3 Conceptualizing Social Entrepreneurship Skills and Their Development

Bringing this back to social entrepreneurship, there has been very little discussion of skills in the literature. Dobele (2016) asserts that success in social entrepreneurship requires a set of skills and that these skills can be learned but does not specify them. De Ruysscher et al. (2017) offer a conceptual framework of the elements necessary for social entrepreneurship (including social skills, networking, and critical thinking) but do not address the practice of these elements. Wronka-Pospiech (2016) uses survey research to explore the competency levels of social entrepreneurs and social enterprise managers in Poland and calls for competency-based social entrepreneurship but does not make a case for the transferability of the findings to other contexts. All these elements support the framework posited by this chapter, but no single discussion has tied them together for an encompassing perspective.

There is a growing literature on skills in the general entrepreneurship space, however, which offers some guidance. First, an operating definition of "skill" is needed. There seems to be a general consensus that skill involves applying knowledge by practicing it within a given context (Fischer & Bidell, 2005; Mascolo & Fischer, 1999). Lichtenstein and Lyons (2010) assert that skills have three characteristics that make them particularly suitable for measurement and development. They are actionable; that is, they can be acted upon, which reflects the concept of applied knowledge. They are reproducible—they are the same from actor to actor and from context to context. They are repeatable, in that they can be executed with consistency. In light of these attributes, these authors offer the following definition of skill: "the ability to perform a particular action or task on a consistent basis, at a high level of performance, without a great deal of conscious thinking or attention, to achieve a desired outcome" (Lichtenstein & Lyons, 2010: 34). This definition suggests that skills can be improved upon and ultimately mastered (i.e., they can be developed). It is widely held that this development process involves learning, practice, and/or experience (Buchele, 1967; Susbauer, 1979; Van de Ven et al. 1984; Scherer et al. 1989; Herron, 1990; Chrisman et al. 1998; Rasmussen & Sorheim, 2006; Lyons et al., 2007; Kutzhanova et al., 2009; Lichtenstein & Lyons, 2010; Mwasalwiba, 2010; Neck et al., 2014). Taking this further, it has been argued that skill development involves a three-step process (Colvin, 2008; Coyle, 2009; Baron & Henry, 2010; Lichtenstein & Lyons, 2010):

1. Imparting knowledge.
2. Providing opportunities to practice that knowledge.
3. Providing regular feedback on practice.

This could be represented as a skill-building cycle (*see* Fig. 1). As the entrepreneur receives feedback on her or his practice, he or she makes adjustments to that practice. The entrepreneur may also adjust the way he or she thinks about what they know; thus, the feedback has triggered reflection. This cycle of activity builds skills.



Source: Authors' own figure.

Fig. 1 The Skill Building Process. (Source: Authors' own figure)

If success in entrepreneurship is skill-based, and it is possible to develop skills, what are the skills that require developing? Again, the general entrepreneurship literature offers some insight. The consensus on this matter appears to be that some mix of both "hard" and "soft" skills is required for successful entrepreneurship (Arasti et al., 2014), with "hard" skills being those needed to manage the structures and processes of business and "soft" skills being those essential to managing people (inside and outside the enterprise) and change. "Hard" skills have been characterized as the skills needed to manage a business startup (Gartner et al., 2004; Liao & Welsch, 2008; Davidsson & Reynolds, 2009; Putta, 2014). Hisrich et al. (2004) include accounting and finance, control, decision-making, marketing, and planning and goal-setting among these skills. Included in the skills cited as being "soft" are reflection and self-awareness (Middleton & Donnellon, 2014; Neck et al., 2014), empathy (Neck et al., 2014), and interpersonal skills (Mattare, 2010). Baron and Markman (2000) originally labeled these "social skills."

As thinking progressed, entrepreneurship skills were placed into typologies. Lichtenstein and Lyons (2001) identified what they called four dimensions of entrepreneurship skills: technical, managerial, entrepreneurial, and personal maturity. Hisrich et al. (2004) argue that managerial, personal, and technical skills are required for success. Both Smith et al. (2005) and Cooney (2012) built on the work of Lichtenstein and Lyons (2001) by populating the latter's dimensions with more-specified skillsets. For example, Cooney (2012) collapsed these dimensions to three: entrepreneurial, technical, and management—and identified 16 total skills, including inner discipline, ability to take risk, innovative, design, change-oriented, persistence, finance, selling, marketing, among others. Morris et al. (2013: 358) used the term "competencies," including in their list building and using networks, conveying a compelling vision, creative problem solving/imaginativeness, guerrilla skills (i.e., bootstrapping), maintain focus yet adapt, opportunity assessment, opportunity recognition, resilience, resource leveraging, risk management/mitigation, self-efficacy, tenacity/perseverance, and value creation.

2 Defining Skills for Social Entrepreneurship

Using the work described above and that of many other researchers, explored through an extensive literature review, and through field testing, we have identified what we are calling the 33 "essential" skills of social entrepreneurship, which have all been correlated with entrepreneurship/social entrepreneurship success in the literature. This skillset is not intended to be exhaustive. We merely have attempted to identify and define those skills that are fundamental to understanding a social entrepreneur's current level of skill, while keeping this skillset manageable and actionable. In this same vein, it should also be noted that these are "meta-skills." It is entirely possible to drill down on each of these to find underlying skillsets; however, when action toward development is the goal, there is a point of diminishing returns to such activity. We believe we have reached that point, and our field-testing in two major pilot projects tends to bear this out.

As can be seen in Table 1, the 33-skill set is distributed among four major skill domains. These domains were created as a means to broadly define the spectrum of skills required for achieving success in social entrepreneurship. They reflect Drucker's (1985) assertion that the key to success in entrepreneurship is management. We argue that these four types of management are essential. Business management skills are the skills needed to manage the structures of business. Relationship management skills are those required to manage people, including the employees of the enterprise, customers/target beneficiaries, and community stakeholders. Organizational process management skills refer to the skills essential to managing the processes of the enterprise, while the skills needed for managing change are labeled transformation management skills. Each domain was then populated with the skill variables necessary to measure that skill suite (Lyons et al., 2019b).

2.1 Business Management Skills

Gnyawali and Fogel (1994) describe these skills as the "ability to enterprise." Scholars have identified them as the skillset crucial to entrepreneurship success (Vesper, 1983) and the self-efficacy necessary for allowing an individual to make the initial decision to go into business (Gnyawali & Fogel, 1994). Domain expertise is argued by cognitive psychologists to be vital to effective decision-making, which can translate into success in any endeavor (Anderson, 1990; Gustafsson, 2006). Definitions of the skills that populate this domain and selected scholars who correlate them with entrepreneurship success follow:

1. *Knowledge of field/industry*: The understanding of the context surrounding the enterprise, with experience in the field itself (Vella & McGonagle, 1988; Grant, 1998; Bianchi et al., 2016; Harrison et al., 2018).
2. *Knowledge of laws/regulations*: Knowledge and understanding of the existing laws and regulations in the business environment of the organization that directly

Table 1 The essential skills of social entrepreneurship by skill domain

Skill domain	Individual skills
Business management skills	1. Knowledge of field/industry 2. Knowledge of laws/regulations 3. Accounting/bookkeeping 4. Finance 5. Marketing/communication 6. Operations management 7. Technology-enabled business management
Relationship management skills	8. Networking capacity 9. Leveraging existing partnerships 10. Resource leveraging 11. Building and maintaining reputation 12. Community involvement and influence 13. Accountability 14. Teaming
Organizational process management	15. Internal communication 16. Process design 17. Decision making 18. Conflict management 19. Performance and disciplined action
Transformational management skills	20. Problem solving 21. Moral compass 22. Moral judgment 23. Empathetic understanding 24. Persistence/relentlessness 25. Passion/charisma 26. Flexibility and adaptation 27. Knowledge as a resource 28. Creativity 29. Innovation 30. Leadership 31. Resilience 32. Resourcefulness 33. Self-awareness

Authors' own figure. (Source: Adapted from: Lyons, T.S., Lyons, J.S., & Jolley, G.J. (2019b))

pertain to the functioning of that organization (Smith et al., 2005; Bagley & Dauchy, 2011 Bianchi et al., 2016).

3. *Accounting/bookkeeping*: Knowledge and understanding of accounting and bookkeeping principles and practices (Terpstra and Olson 1993; Knotts et al., 2003; Hisrich et al., 2004; McEwen, 2013; Rybnicek et al., 2015; Tripopsakul & Charupongsopon, 2017; Harrison et al., 2018).
4. *Finance*: Knowledge and understanding of financial management principles and practices (Cheatham et al., 1993; Knotts et al., 2003; Hisrich et al., 2004; Smith et al., 2005; McEwen, 2013; Rybnicek et al., 2015; Macht 2016; Tripopsakul & Charupongsopon, 2017; Harrison et al., 2018).
5. *Marketing/communications*: Understanding of and experience with marketing, sales, and communication practices (Romero & Gray, 2002; Smith et al., 2005;

Cooney, 2012; Morris et al., 2013; Rybnicek et al., 2015; Tripopsakul & Charupongsopon, 2017; Chakraborty & Chakravarti, 2018; Kolade, 2018).

6. *Operations management*: Knowledge and understanding of operations management techniques, tools, and practices (Cagliano et al., 2001; Hisrich et al., 2004; Smith et al., 2005; Cooney, 2012; Rybnicek et al., 2015; Sousa, 2018).
7. *Technology-enabled business management*: Knowledge of the tools of technology-enabled business (e.g., social media, CRM, bookkeeping software) and their utility to the organization (Schulman & Rogoff, 2011; Tripopsakul & Charupongsopon, 2017; Sousa, 2018).

2.2 Relationship Management Skills

These are important skills to establishing, maintaining, and effectively utilizing relationships with people within the social enterprise and with external stakeholders. As noted above, Morris et al. (2013) identified a number of these among the "competencies" essential to entrepreneurship success. Relationship management skills include:

8. *Networking capacity*: The ability to build and maintain networks as a leader (Granovetter, 1973; Aldrich et al., 1987, Aldrich & Fiol, 1994; Kumar, et al., 2001; Batjargal, 2003; Frazier & Niehm, 2004; Freeman & Cavusgil, 2007; Aldrich & Kim, 2007; Stam et al., 2014; Rybnicek et al., 2015; Bianchi et al., 2016; Chakraborty & Chakravarti, 2018; Sousa, 2018).
9. *Leveraging existing partnerships*: The capacity to utilize one's existing network and relationships as a resource, including peer, advocacy, and funder organizations, as well as individuals. The ability to attract long-term, mutually beneficial partnerships in order to develop and grow (Polodny & Baron, 1997; Busenitz et al., 2005; Collins & Hitt, 2006; Collins et al., 2008; Sousa, 2018).
10. *Resource leveraging*: The ability to use the resources of others to achieve strategic goals. The understanding that one need not *own* resources to achieve one's goals, only *control* those resources (Stevenson, 1983; Starr & Macmillan, 1990; Chrisman et al., 1998; Rybnicek et al., 2015; Sousa, 2018).
11. *Building and maintaining a reputation*: The ability to cultivate respect as a leader and maintain a stellar reputation. The desire to share credit for success (Bordieu 1986; Morris, 1998; Davidsson & Honig, 2003; Firkin, 2003; Morrison & Wilhelm, 2004; Preston, 2004; Lam et al., 2007; Timmons & Spinelli, 2007; Chakraborty & Chakravarti, 2018).
12. *Community influence and involvement*: Development and creation of external working relationships towards strategic goals. The ability to perceive the political environment of a situation, and to understand and utilize influence over leaders and the community as a whole (Kotkin, 1986; Stevenson, 1987; Hindle, 2010; Lyons et al., 2012).

13. *Accountability*: The ability to define and create accountability structures whereby all business components have clearly articulated performance objectives that tie to the organization's broad goals and strategies (Gilmore & Kazanjian, 1989; Schneier et al., 1991; Chakraborty & Chakravarti, 2018; Sousa, 2018).
14. *Teaming*: The ability to structure teams and team-based approaches to the activities and processes of the organization (Vesper, 1983; Cooper & Daily, 1997; Van Horn & Harvey, 1998; Man & Lau, 2000; Ochani et al., 2002; Cooney, 2005; Tripopsakul & Charupongsopon, 2017; Chakraborty & Chakravarti, 2018; Harrison et al., 2018; Neck et al., 2018; Sousa, 2018).

2.3 Organizational Process Management Skills

Hisrich et al. (2004) and Cooney (2012) list several of these skills among those they assert are important for entrepreneurship success. Like business management skills these are "hard" skills. They involve the ability to manage the processes of the social enterprise. As an enterprise grows, these skills become increasingly important. Included in this skill domain are:

15. *Internal communication*: The ability to express one's meaning to others in a clear, transparent, and positive way; the ability to utilize effective communication to lead an organization (Hoffman, 1989; Boone, 2002; Sousa, 2018; Chakraborty & Chakravarti, 2018).
16. *Process design*: The ability to work efficiently and effectively toward goals and objectives through processes that are robust, lean, well-designed, consistently used, and widely accepted (Smith, 2003; Tuler & Webler, 2010; Doherty et al., 2012; Harrison et al., 2018; Sousa, 2018).
17. *Decision-making*: The ability to, first, make decisions, and then to make them in a well-reasoned, informed, and timely way toward achieving individual and organizational goals (Wally & Baum, 1994; Baum & Wally, 2003; Bygrave, 2004; Zenger & Folkman, 2007; Harrison et al., 2018; Sousa, 2018).
18. *Conflict management*: The ability to manage conflict in healthy and constructive ways; the ability to create an organizational culture that addresses conflict in this way (Tjosvold et al., 2003; Johnson et al., 2006; Mulholland & Turner, 2017; Kolade, 2018).
19. *Performance* and disciplined action: A focus on performance as an expected norm; self-discipline and the ability to encourage and reward high performance in others (Chrisman et al., 1998; Stewart & Roth, 2007; Sousa, 2018).

2.4 Transformation Management Skills

Schumpeter (1942) characterized entrepreneurs as agents of change in the economy. This domain identifies essential change management skills. A few of these skills were found to be crucial to entrepreneurship success, in general, by Smith et al. (2005), Cooney (2012), and Morris et al. (2013). Three skills that are particularly important to social entrepreneurship are included—moral compass, moral judgment, and empathetic understanding. The skills of transformation management are:

20. *Problem solving*: The ability to think strategically and play out multiple scenarios, understanding the potential consequences, to create possible solutions to obstacles (Bell, 2008; Dees, 2012; Lin & Nabergoj, 2014; Mulholland & Turner, 2017).
21. *Moral compass*: The ability to promote, live, and work by the highest moral and ethical standards. Able to embed ethical practices into the enterprise's culture and processes (Parkinson & Howorth, 2008; Chakraborty & Chakravarti, 2018).
22. *Moral judgment*: Driven to right something that is perceived as wrong. Pursuing efforts that are clearly stimulated and supported by a sense of moral responsibility (Mair & Noboa, 2006; Teise & Urban, 2015; Chakraborty & Chakravarti, 2018).
23. *Empathetic understanding*: Having a clear empathic appreciation for a target social cause. The ability to feel another's pain (Mair & Noboa, 2006; Bacq & Alt, 2018; Chakraborty & Chakravarti, 2018; Harrison et al., 2018).
24. *Persistence/resilience*: The determination, once an objective is set, to do anything possible to succeed. The ability to use adversity as a resource, drawing motivation to work harder through challenges (Dweck, 2006; Burke et al., 2008; Gompers et al., 2010; Vanthournout et al., 2012; Ghalwash et al., 2017; Neck et al., 2018).
25. *Passion/charisma*: A zealous drive towards a goal; the ability to compel and inspire others by one's personality and ability to communicate that goal (Mair & Noboa, 2006; Schlosser & Todorovic, 2006; Cardon, 2008; Below & Tripp, 2010; Roberts & Welsch, 2010; Chakraborty & Chakravarti, 2018).
26. *Flexibility/adaptability to change*: The ability to assess changes in a situation and modify actions accordingly; resolving negative emotions and embracing differences (Baron & Markman, 2000; Kuratko & Hodgetts, 2007; Kutzhanova et al., 2009; Audet & Couteret, 2012; Rae, 2012; Chakraborty & Chakravarti, 2018; Sousa, 2018).
27. *Knowledge as a resource*: The ability to harness the development and sharing of knowledge as a core strategy to achieve a goal (Hambrick & Mason, 1984; Baird & Meshoulam, 1988; Lichtenstein et al., 2001; Omerzel & Antoncic, 2008).
28. *Creativity*: The vision to use unique and alternative perspectives to create a new strategy or to progress in an existing situation; invention (Amabile, 1983; Sarri et al., 2010; Cooney, 2012; Elenurm, 2012; Rae, 2012; Bianchi et al., 2016; Mulholland & Turner, 2017; Sousa, 2018).

29. *Innovation*: The ability to recognize or produce creative ideas, then implement them through strategic thinking and action, efficiently and effectively; the implementation of invention (Amabile, 1983; Sarri et al., 2010; Cooney, 2012; Elenurm, 2012; Rae, 2012; Teise & Urban, 2015; Ghalwash et al., 2017; Mulholland & Turner, 2017; Chakraborty & Chakravarti, 2018; Sousa, 2018).
30. *Leadership skills*: The ability to lead one's team or peers effectively in pursuit of a goal (Bass, 1995; Fernald et al., 2005; Gumusluoglu & Ilsev, 2009; Mattare, 2010; Rybnicek et al., 2015; Mulholland & Turner, 2017; Kolade, 2018; Sousa, 2018).
31. *Resiliency*: The capacity to quickly and effectively recover from obstacles or setbacks, developing and growing strengths from challenges to better her/himself and the organization (Luthans & Youssef, 2007; Rae, 2012; Cooney, 2012; Flores et al., 2013; Rybnicek et al., 2015).
32. *Resourcefulness*: The ability to identify and utilize external/environmental strengths to progress and better both oneself and one's organization (Stevenson, 1983; Terry, 1995; Choi & Shepherd, 2004; Rybnicek et al., 2015; Sousa, 2018).
33. *Self-awareness*: The capability to recognize and identify one's own strengths and weaknesses as well as resource and capability needs; an ongoing process of self-reflection and metacognition (Schon, 1983; Mattare, 2010; Clark et al., 2012; Rae, 2012; Middleton & Donnellon, 2014; Rybnicek et al., 2015; Mulholland & Turner, 2017).

3 Measuring Social Entrepreneurship Skills

Attempting to identify and define the "essential" skills of social entrepreneurship is useful; however, it is not enough. If skills are to be developed, then a means for measuring, or assessing, those skills is essential. In light of the fact that the new paradigm for entrepreneurship education/development is skills-based and treats entrepreneurship as a method to be practiced, as opposed to a linear process, the theory of measurement employed cannot be predictive. It must be clinical; that is, it must enable development.

The dominant theory of measurement has been psychometrics; however, that approach relies on prediction. It can tell us only who might be a successful social entrepreneur. At its essence, this is endeavoring to "pick winners" (Lichtenstein & Lyons, 2010). It reflects the traits theory of entrepreneurship and is antithetical to an approach that holds that social entrepreneurs can be developed. It is tantamount to a social entrepreneurship professor walking into her or his course on the first day of class and announcing that, according to her/his prediction, students X, Y, and Z will be successful social entrepreneurs and that these students may stay and finish the course, while the rest of the class may leave. This violates both the ethos and the purpose of education; yet, it is the dilemma into which we put ourselves when we try to build skills based on predictive assessment.

Why not engage with our students, and all social entrepreneurs, in a manner that is more like that of medical doctors? Why not be clinical, attempting to understand the current skill level of the social entrepreneur and where they are strong and weak? In this way, a "plan of treatment" can be developed that addresses weaknesses and leverages strengths. To be able to do this requires a different theory of measurement—one that permits a current assessment of the situation and provides a measurement that can be directly acted upon. *Communimetrics* is such a model for measurement.

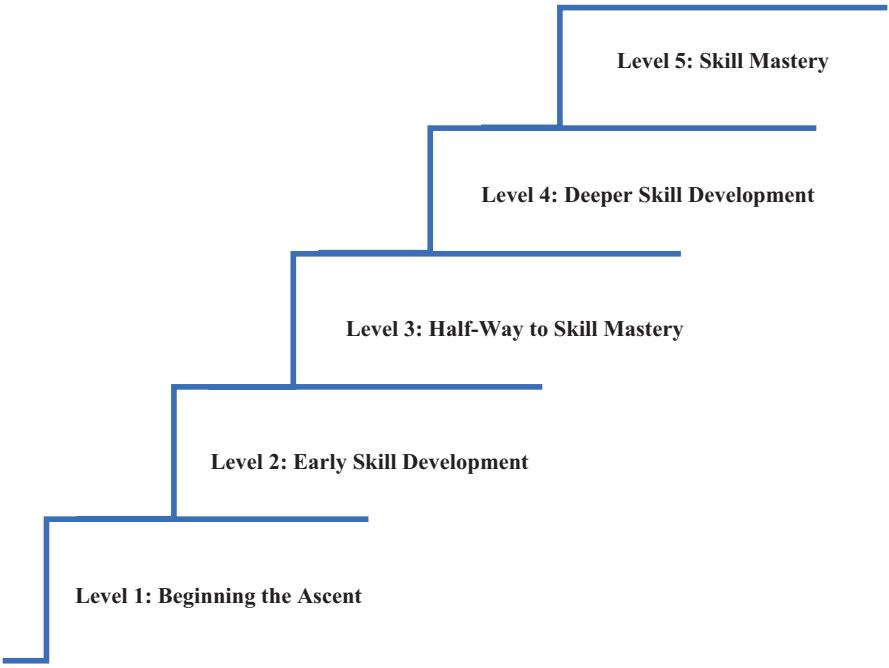
Communimetrics is relatively new and was developed by Dr. John S. Lyons of the University of Kentucky. At the time it was introduced, it was the first innovation in the assessment field in over 50 years. Since then, it has been tested by independent researchers around the world and documented as both reliable and valid. What makes communimetrics unique is its ability to use communication between parties—in this case, between a social entrepreneur and her or his coach or mentor—to measure the social entrepreneur's skill level. An essential attribute of communimetric measures is that the meaning of all numbers generated can be immediately acted upon. "In communimetrics, measurement is intended to be a 'good enough' representation of key elements of a person's story to allow for planning and monitoring that person's status using actionable indicators for those elements" (Lyons et al., 2019a: 6). Because immediate meaning is key to effective communication, communimetric measures are nonarbitrary. For this reason, the concept of benchmarking, essential to psychometric measures, is not necessary. The communimetric action levels for each skill item are (Lyons et al., 2019a: 14):

0. Lack of skill: Requires intensive development.
1. Inconsistent skill: Requires development.
2. Entrepreneur has the skill.
3. Entrepreneur's skill level is a strength: Exceptional skill.

Assessed skills can be organized by this action framework, and when measured, both the entrepreneur and the coach will have an immediate understanding of what must be done to develop the entrepreneur's skill. This permits individualized coaching or mentoring that addresses the leveraging of strengths and the amelioration of understood weaknesses.

Using communimetrics and the defined social entrepreneurship skillset detailed previously, a tool has been created for assessing the skills of individual social entrepreneurs. It is called the Readiness Inventory for Successful Entrepreneurship for Social Entrepreneurship (RISE-SE). It is a web-based tool that can produce a measure of each of the 33 skills discussed, a measure for each of the four skill domains, and an overall skill level measure. A coach. Mentor, or educator can use the RISE-SE measures to immediately understand the actions that must be taken to help the social entrepreneur to develop their skillset—that is, the knowledge that must be imparted and practiced. One way to visualize the development of skills using the RISE-SE is as a set of steps (or risers), as illustrated in Fig. 2.

Each step corresponds to a level of skill, with Level 1 representing low/no skill and Level 5 denoting skill mastery. The skill level is the overall RISE-SE score for



Authors' own figure. Source: Adapted from: Lyons, T.S., Lyons, J.S., & Jolley, G.J. (2019b).

Fig. 2 The Steps of Social Entrepreneurship Skill Development. (Authors' own figure. Source: Adapted from: Lyons, T.S., Lyons, J.S., & Jolley, G.J. (2019b))

the social entrepreneur. Once a RISE-SE assessment is completed, the entrepreneur can be placed on a step of the riser. The goal of the coach or educator is to help the social entrepreneur to advance their skills, effectively climbing the steps of development. The RISE-SE can be administered periodically (e.g. each quarter, every 6 months) to track the entrepreneur's skill development and provide feedback to the coach/educator on the effectiveness of their interventions.

4 Implications for Research and Practice

Utilization of the RISE-SE has several implications for both research and practice. The ability to measure social entrepreneurship skills in a clinical way creates opportunities for researchers to correlate changes in skill levels with interventions by coaches/educators as a way to explore what works and what does not in developing skills. Skill measurements can also be correlated with measures of social impact to examine the importance of individual skills to success. In other words, are the current skills measured by the RISE-SE truly the "essential" skills of social entrepreneurship? If so, can they be prioritized by their impact?

Entrepreneurs who have tested the skills assessment tool express appreciation for its ability to let them "know where they stand" relative to their professional development. It demystifies social entrepreneurship for them by clearly identifying what must be addressed in order to improve their practice and by demonstrating that there is a path forward. For coaches or educators, the RISE-SE affords an objective means to determining how best to help their coachees/students. For both social entrepreneurs and their mentors, this assessment tool gives them a common language for productive communication, making the development process more efficient and effective.

At the macrolevel, the RISE-SE provides a means to organize a social entrepreneurship ecosystem. Social entrepreneurs can be organized by skill level to facilitate peer coaching and other development interventions. Social entrepreneurship support organizations can be assessed by the skill level at which they work best, and matches can be more accurately made between social entrepreneurs and SESOs. Hand-offs of entrepreneurs between SESOs can be more strategic and transparent to the entrepreneur. Along similar lines, entrepreneurs can be prepared to make full use of the assistance afforded by individual SESOs.

Social entrepreneurship education can also benefit from the RISE-SE. Curricula can be assessed to ensure that students are getting the requisite knowledge in the classroom for skill building. Cocurricular activities can be aligned with the curriculum to provide essential opportunities to practice knowledge. Faculty, staff, and practitioners can more appropriately provide feedback to this practice in ways that complete the skill-building cycle. If social entrepreneurship students' skills are assessed when they enter the program, they can be tracked throughout in order to make necessary adjustments, and they can be assessed at the end of the program to provide a learning outcomes measure.

5 Conclusion

In this chapter, we have argued that changing paradigms of the development of entrepreneurs in the areas of entrepreneur-focused economic development and entrepreneurship education have shifted the spotlight to skill development. This is no less true for social entrepreneurship. With this in mind, we advocate for the need for a clear definition of the skills required for social entrepreneurship success and a method of measuring skills in a meaningful way.

We present a 33-skill set for social entrepreneurship that we maintain, based on research, is the "essential" skillset for success. These skills were built into a web-based assessment tool, called the Readiness Inventory for Successful Entrepreneurship for Social Entrepreneurship (RISE-SE), that measures them using a theory of measurement known as communimetrics, which is clinical in its approach. The assessment allows the social entrepreneur and their coach/educator to immediately understand the entrepreneur's skill strengths and weaknesses, so that a plan of action for addressing weaknesses and leveraging skills can be

generated. To put this another way, the tool, itself, is a means to an end. The real value lies in the collaboration of the entrepreneur and the coach/educator toward a common goal of skill development.

This new means of assessing skills and using that assessment to guide the development of those skills have important implications for social entrepreneurship researchers, educators, and developers. It opens the door to testing the efficacy and impact of coaching and education interventions. It allows for better understanding which skills are truly essential to successful social entrepreneurship. It also provides an efficient mechanism for organizing social entrepreneurship ecosystems and social entrepreneurship curricula at all levels. All of this contributes to building the capabilities necessary for making social entrepreneurship more strategic.

References

Aldrich, H. E., & Fiol, M. (1994). Fools rush in? The institutional context of industry creation. *Academy of Management Journal, 19*(4), 645–670.

Aldrich, H. E., & Kim, P. H. (2007). Small worlds, infinite possibilities? How social networks affect entrepreneurial team formation and search. *Strategic Entrepreneurship Journal, 1*, 147–165.

Aldrich, H. E., Rosen, B., & Woodward, W. (1987). The impact of social networks on business foundings and profit: A longitudinal study. In N. C. Churchill, J. A. Hornaday, B. A. Kirchhoff, O. J. Krasner, & K. H. Vesper (Eds.), *Frontiers of entrepreneurship research* (pp. 154–168). Babson College.

Amabile, T. M. (1983). *The social psychology of creativity*. Springer-Verlag.

Anderson, J. R. (1990). *Cognitive psychology and its implications* (3rd ed.). W.H.Freeman/Times Books/Henry Holt.

Arasti, Z., Fakhrisadat, N., & Narges, I. (2014). Explaining the role of managerial skills in business success. *International Journal of Management Science, 4*(1), 42–52.

Audet, J., & Couteret, P. (2012). Coaching the entrepreneur: Features and success factors. *Journal of Small Business and Enterprise Development, 19*(3), 515–531.

Bacq, S., & Alt, E. (2018). Feeling capable and valued: A prosocial perspective on the link between empathy and social entrepreneurial intentions. *Journal of Business Venturing, 33*(3), 333–350.

Bagley, C. E., & Dauchy, C. E. (2011). *The entrepreneur's guide to business law*. Cengage Learning.

Baird, L., & Meshoulam, I. (1988). Managing two fits of strategic human resource management. *Academy of Management Review, 13*(1), 116–128.

Baron, R. A., & Henry, R. A. (2010). How entrepreneurs acquire the capacity to excel: Insights from research on expert performance. *Strategic Entrepreneurship Journal, 4*, 49–65.

Baron, R., & Markman, G. (2000). Beyond social capital: How social skills can enhance entrepreneurs' success. *Academy of Management Perspectives, 14*(1), 106–116.

Bass, B. M. (1995). Transformational leadership. *Journal of Management Inquiry, 4*(3), 293–298.

Batjargal, B. (2003). Social capital and entrepreneurial performance in Russia: A longitudinal study. *Organization Studies, 24*(4), 535–556.

Baum, J. R., & Wally, S. (2003). Strategic decision speed and firm performance. *Strategic Management Journal, 24*(11), 1107–1129.

Bell, J. R. (2008). Utilization of problem-based learning in an entrepreneurship business planning course. *New England Journal of Entrepreneurship, 11*(1), 53–61.

Below, C. L., & Tripp, K. D. (2010). Freeing the social entrepreneur. *Stanford Social Innovation Review, 8*(4), 36–41.

Bianchi, M., Parisi, V., & Salvatore, R. (2016). Female entrepreneurs: Motivations and constraints. An Italian regional study. *Bingley, 8*(3), 198–220.

Biggeri, M., Testi, E., Bellucci, M., During, R., & Persson, H. T. R. (2018). *Social entrepreneurship and social innovation: Ecosystems for inclusion in Europe*. Routledge.

Blank, S., & Dorf, B. (2012). *The startup owner's manual: The step-by-step guide for building a great company*. K&S Ranch.

Boone, M. (2002). Interactive management. *Executive Excellence, 19*(5), 12.

Bordieu, P. (1986). The forms of capital. In J. Richardson (Ed.), *The handbook of theory and research for the sociology of education*. Greenwood.

Buchele, R. B. (1967). *Business policy in growing firms*. Chandler.

Burke, A. E., FitzRoy, F. R., & Nolan, M. A. (2008). What makes a die-hard entrepreneur? Beyond the 'employee or entrepreneur' dichotomy. *Small Business Economics, 31*(2), 93–115.

Busenitz, L. W., Fiet, J. O., & Moesel, D. D. (2005). Signaling in venture capitalist-new venture team funding decisions: Does it indicate long-term venture outcomes? *Entrepreneurship Theory and Practice, 29*(1), 1–12.

Bygrave, W. D. (2004). The entrepreneurial process. In W. D. Bygrave & A. Zacharakis (Eds.), *The Portable MBA in Entrepreneurship* (3rd ed., pp. 1–27). Wiley.

Cagliano, R., Blackmon, K., & Voss, C. A. (2001). Small firms under Microscope: International differences in production/operations management practices and performance. *Integrated Manufacturing Systems, 12*(7), 469–482.

Cardon, M. S. (2008). Is passion contagious? The transference of entrepreneurial passion to employees. *Human Resource Management Review, 8*(2), 77.

Chakraborty, S., & Chakravarti, S. (2018). The teaching of soft communication skills in entrepreneurship development courses at the +2 level in India. *IUP Journal of Soft Skills, 12*(4), 30–40.

Cheatham, L. R., Dunn, P., & Cheatham, C. (1993). Do college level business courses provide adequate financial management expertise? *Journal of Business and Entrepreneurship, 5*(1), 105–109.

Choi, Y. R., & Shepherd, D. A. (2004). Entrepreneurs' decisions to exploit opportunities. *Journal of Management, 30*(3), 377–395.

Chrisman, J. J., Bauerschmidt, A., & Hofer, C. W. (1998). The determinants of new venture performance: An extended model. *Entrepreneurship Theory and Practice, 23*(1), 5–29.

Clark, T., Osterwalder, A., & Pigneur, Y. (2012). *Business model you*. Wiley.

Collins, J. D., & Hitt, M. A. (2006). Leveraging tacit knowledge in alliances: The importance of using relational capabilities to build and leverage relational capital. *Journal of Engineering and Technology Management, 23*(3), 147–167.

Collins, J. D., Uhlenbruck, K., & Reutzel, C. R. (2008). Entrepreneurial social capital and the Gatsby effect. *Journal of Business and Entrepreneurship, 20*(1), 18–36.

Colvin, G. (2008). *Talent is overrated*. Penguin.

Cooney, T. M. (2005). Editorial: What is an entrepreneurial team? *International Small Business Journal, 23*, 226–235.

Cooney, T. M. (2012). Entrepreneurship skills for growth-orientated businesses. In *Report for the workshop on 'skills development for SMEs and entrepreneurship', Copenhagen, November 28*.

Cooper, A. C., & Daily, C. M. (1997). Entrepreneurial teams. In D. L. Sexton & R. W. Smilor (Eds.), *Entrepreneurship 2000* (pp. 127–150). Upstart.

Coyle, D. (2009). *The talent code*. Bantam.

Davidsson, P., & Honig, B. (2003). The role of social and human capital among nascent entrepreneurs. *Journal of Business Venturing, 18*(3), 301–331.

Davidsson, P., & Reynolds, P. D. (2009). PSED II and the Comprehensive Australian Study of Entrepreneurial Emergence [CAUSEE]. In P. D. Reynolds & R. T. Curtin (Eds.), *New firm creation in the United States: Preliminary explorations with the PSED II data set* (pp. 263–278). Springer.

De Ruysscher, C., Claes, C., Lee, T., Cui, F., Van Loon, J., De Maeyer, J., & Schalock, R. (2017). A systems approach to social entrepreneurship. *Voluntas: International Journal of Voluntary and Nonprofit Organizations, 28*(6), 2530–2545.

Dees, J. G. (1998). *The meaning of 'social entrepreneurship'*. Graduate School of Business, Stanford University. http://www.caseatduke.org/documents/dees_sedef.pdf

Dees, J. G. (2012). A tale of two cultures: Charity, problem solving, and the future of social entrepreneurship. *Journal of Business Ethics, 111*(3), 321–334.

Dobele, L. (2016). A new approach in higher education: Social entrepreneurship education. In *Management, enterprise and benchmarking in the 21st century* (pp. 227–237). Obuda University, Keleti Karoly Faculty of Economics.

Doherty, N. F., Ashurst, C., & Peppard, J. (2012). Factors affecting the successful realisation of benefits from systems development projects: Findings from three case studies. *Journal of Information Technology, 27*, 1–16.

Drucker, P. F. (1985). *Innovation and entrepreneurship*. Harper & Row.

Dweck, C. (2006). *Mindset: The new psychology of success*. Random House.

Dye, B., & Alter, T. R. (2015). Government and entrepreneurship ecology: the case of Halifax, Nova Scotia. *Community Development, 46*(5), 444–455.

Elenurm, T. (2012). Entrepreneurial orientations of business students and entrepreneurs. *Baltic Journal of Management, 7*(2), 217–231.

Fernald, L. W., Solomon, G. T., & Tarabishy, A. (2005). A new paradigm: Entrepreneurial leadership. *Southern Business Review, 30*(2), 1–13.

Firkin, P. (2003). Entrepreneurial capital. In A. De Bruin & A. Dupuis (Eds.), *Entrepreneurship: New perspectives in a global age* (pp. 57–75). Ashgate.

Fischer, K. W., & Bidell, T. R. (2005). Dynamic development of action, thought, and emotion. In W. Damon & R. M. Lerner (Eds.), *Theoretical models of human development. Handbook of childhood psychology* (Vol. 1, 6th ed., pp. 313–399). Wiley.

Flores, I. B., Muniz, E., & Serviere-Munoz, L. (2013). Entrepreneurs' resilience in violent areas: A cognitive triad approach. *Journal of International Business & Economics, 13*(1), 5–12.

Fortunato, M. W.-P., & Alter, T. (2015). Community entrepreneurship development: an introduction. *Community Development, 46*(5), 444–455.

Frazier, B., & Niehm, L. S. (2004). Exploring business information networks of small retailers in rural communities. *Journal of Developmental Entrepreneurship, 9*(1), 23–42.

Freeman, S., & Cavusgil, S. T. (2007). Toward a typology of commitment states among managers of born-global firms: A study of accelerated internationalization. *Journal of International Marketing, 15*(4), 1–40.

Gartner, W. B., Carter, N. M., & Reynolds, P. D. (2004). *Business start-up activities. Handbook of entrepreneurial dynamics*. Sage.

Ghalwash, S., Tolba, A., & Ismail, A. (2017). What motivates social entrepreneurs to start social ventures? An exploratory study in the context of a developing economy. *Social Enterprise Journal, 13*(3), 268–298.

Gilmore, T. N., & Kazanjian, R. K. (1989). Clarifying decision making in high growth ventures: The use of responsibility charting. *Journal of Business Venturing, 4*(1), 69–83.

Gnyawali, D. R., & Fogel, D. S. (1994). Environments for entrepreneurship development: Key dimensions and research implications. *Entrepreneurship Theory and Practice, 18*(4), 43–62.

Gompers, P., Kovner, A., Lerner, J., & Scharfstein, D. (2010). Performance persistence in entrepreneurship. *Journal of Financial Economics, 96*(1), 18–32.

Granovetter, M. S. (1973). The strength of weak ties. *American Journal of Sociology, 78*(6), 1360–1380.

Grant, R. M. (1998). *Contemporary strategy analysis* (3rd ed.). Blackwell Business.

Gumusluoglu, L. H., & Ilsev, A. (2009). Transformational leadership, creativity, and organizational innovation. *Journal of Business Research, 62*, 461–473.

Gustafsson, V. (2006). *Entrepreneurial decision making: Individuals, tasks and cognition*. Edward Elgar.

Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review, 9*(2), 193–206.

Harrison, C., Burnard, K., & Stuart, P. (2018). Entrepreneurial leadership in a developing economy: A skill-based analysis. *Journal of Small Business and Enterprise Development, 25*(3), 521–548.

Herron, L. (1990). *The effects of characteristics of the entrepreneur on new venture performance*. Unpublished doctoral dissertation. University of South Carolina.

Hindle, K. (2010). How community context affects entrepreneurial process: A diagnostic framework. *Entrepreneurship and Regional Development, 22*(7/8), 599–647.

Hisrich, R.B., Peters, M.P. and Shepherd, D. (2004), Entrepreneurship, 6th ed., McGraw-Hill, New York, NY.

Hoffman, F. O. (1989). Improving internal communication. *Executive Excellence, 6*(9).

Johannisson, B. (1993). Designing supportive contexts for emerging enterprises. In C. Karlsson, B. Johannisson, & D. Story (Eds.), *Small business dynamics: International, national and regional perspectives* (pp. 117–144). Routledge Kegan Paul.

Johnson, D. W., Johnson, R. T., & Tjosvold, D. (2006). Constructive controversy: The value of intellectual opposition. In M. Deutsch, P. T. Coleman, & E. Marcus (Eds.), *The conflict resolution: Theory and practice* (pp. 69–91). Jossey-Bass.

Kickul, J., & Lyons, T. S. (2016). *Understanding social entrepreneurship: The relentless pursuit of mission in an ever changing world*. Routledge.

Knotts, T. L., Jones, S. C., & Udell, G. G. (2003). Small business failure: The role of management practices and product characteristics. *Journal of Business and Entrepreneurship, 15*(2), 48–63.

Kolade, O. (2018). Venturing under fire. *Education and Training, 60*(7), 749–766.

Kotkin, J. (1986). The reluctant entrepreneur: Are American blacks still stuck at the bottom rung of the economic ladder because so few start businesses of their own? *Inc, 8*(9).

Kumar, K., Subramanian, R., & Strandholm, K. (2001). Competitive strategy, environmental scanning, and performance: A context specific analysis of their relationship. *International Journal of Commerce and Management, 11*(1), 1–33.

Kuratko, D. F., & Hodgetts, R. M. (2007). *Entrepreneurship: Theory, process, practice* (7th ed.). Thomson/South Western Publishing.

Kutzhanova, N., Lyons, T. S., & Lichtenstein, G. A. (2009). Skill-based development of entrepreneurs and the role of personal and peer group coaching in enterprise development. *Economic Development Quarterly, 23*(3), 193–210.

Lam, W., Shaw, E., & Carter, S. (2007). Entrepreneurial capital: Convertibility, personal reputation and firm performance. In *Institute for Small Business & Entrepreneurship, November 7–9, Glasgow, Scotland*.

Liao, J., & Welsch, H. (2008). Patterns of venture gestation process: Exploring the differences between tech and non-tech nascent entrepreneurs. *The Journal of High Technology Management Research, 19*(2), 103–113.

Lichtenstein, G. A., & Lyons, T. S. (2001). The entrepreneurial development system: Transforming business talent and community economies. *Economic Development Quarterly, 15*(1), 3–20.

Lichtenstein, G. A., & Lyons, T. S. (2010). *Investing in entrepreneurs: A strategic approach to strengthening your regional and community economy*. Praeger/ABC-CLIO.

Lichtenstein, B., Bergmann, M., & Brush, C. G. (2001). How do resource bundles develop and change in new ventures? A dynamic model and longitudinal exploration. *Entrepreneurship Theory and Practice, 25*(3), 37–58.

Lin, J., & Nabergoj, A. S. (2014). A resource-based view of entrepreneurial creativity and its implications to entrepreneurship education. *Economic and Business Review for Central and South Eastern Europe, 16*(2), 163–183. 218–219.

Luthans, F., & Youssef, C. M. (2007). Emerging positive organizational behavior. *Journal of Management, 33*(3), 321–349.

Lyons, T. S., & Lichtenstein, G. A. (2011). A community-wide framework for encouraging social entrepreneurship using the pipeline of entrepreneurs and enterprises model. In A. Fayolle

& H. Matlay (Eds.), *Handbook of research on social entrepreneurship* (pp. 252–270). Edward Elgar.

Lyons, T. S., Lichtenstein, G. A., & Kutzhanova, N. (2007). What makes a successful entrepreneur? In N. Walzer (Ed.), *Entrepreneurship and local economic development*. Lexington.

Lyons, T. S., Alter, T. R., Audretsch, D., & Augustine, D. (2012). Entrepreneurship and community: The next frontier of entrepreneurship inquiry. *Entrepreneurship Research Journal, 2*(1), 1. https://doi.org/10.2202/2157-5665.1064

Lyons, T. S., Hamlin, R. E., & Hamlin, A. (2018). *Using entrepreneurship and social innovation to mitigate wealth inequality*. DeGruyter.

Lyons, T. S., Lyons, J. S., & Jolley, G. J. (2019a). Entrepreneurial skill-building in rural ecosystems: A framework for applying the readiness inventory for successful entrepreneurship (RISE). *Journal of Entrepreneurship and Public Policy, 9*, 112–136. https://doi.org/10.1108/JEPP-09-2019-0075

Lyons, T. S., Lyons, J. S., & Jolley, G. J. (2019b). The readiness inventory for successful entrepreneurship (RISE): A tool for university engagement in entrepreneurial learning. *Journal of Economic Development in Higher Education, 2*(July), 1–7.

Macht, S. A. (2016). Putting "entrepreneurial finance education" on the map. *Education and Training, 58*, 984–1002.

Mair, J., & Noboa, E. (2006). Social entrepreneurship: How intentions to create a social venture are formed. In J. Mair, J. Robinson, & K. Hockerts (Eds.), *Social entrepreneurship* (pp. 121–135). Palgrave Macmillan.

Man, T. W. Y., & Lau, T. (2000). Entrepreneurial competencies of SME owner/manager in the Hong Kong services sector: A qualitative study. *Journal of Enterprising Culture, 8*, 235–254.

Mascolo, M. F., & Fischer, K. W. (1999). The dynamic co-development of intentionality, self and social relations. In J. Brandstadter & R. M. Lerner (Eds.), *Action and development: Origins and functions of intentional self-development* (pp. 133–166). Sage.

Mattare, M. (2010). Use of self 101: The case for teaching personal development in the entrepreneurship curriculum. *New England Journal of Entrepreneurship, 13*(1), 17–28.

McEwen, T. (2013). An examination of the barriers that impact the implementation of environmental sustainability practices in small business. *Journal of Business and Entrepreneurship, 25*(1), 117–139.

Middleton, K. W., & Donnellon, A. (2014). Personalizing entrepreneurial learning: A pedagogy for facilitating the know why. *Entrepreneurship Research Journal, 4*(2), 167–204.

Morris, M. H. (1998). *Entrepreneurial intensity: Sustainable advantages for individuals, organizations, and societies*. Greenwood.

Morris, M. H., Webb, J. W., Fu, J., & Singhal, S. (2013). A competency-based perspective on entrepreneurship: Conceptual and empirical insights. *Journal of Small Business Management, 51*(3), 352–369.

Morrison, A. D., & Wilhelm, W. J. (2004). Partnership firms, reputation, and business capital. *The American Economic Review, 94*(5), 1682–1692.

Mulholland, G., & Turner, J. (2017). Enterprise education: Towards a framework for effective engagement with the learners of today. *The Journal of Management Development, 36*(6), 801–816.

Mwasalwiba, E. S. (2010). Entrepreneurship education: A review of its objectives, teaching methods, and impact indicators. *Education and Training, 52*(1), 20–47.

Neck, H. M., Greene, P. G., & Brush, C. (2014). *Teaching entrepreneurship: A practice-based approach*. Edward Elgar.

Neck, H. M., Neck, C. P., & Murray, E. L. (2018). *Entrepreneurship: The practice and the mindset*. SAGE.

Ochani, M., Chowdhury, S., & Ponthieu, L. (2002). Demographic characteristics to consider for teaming up an effective high-tech entrepreneurial firm: Some empirical evidence. *Journal of Business and Entrepreneurship, 14*(1), 17–36.

Omerzel, D. G., & Antoncic, B. (2008). Critical entrepreneur knowledge dimensions for the SME performance. *Industrial Management & Data Systems, 108*(9), 1182–1199.
Parkinson, C., & Howorth, C. (2008). The language of social entrepreneurs. *Entrepreneurship and Regional Development, 20*(3), 285–309.
Polodny, J. M., & Baron, J. N. (1997). Resources and relationships: Social networks and mobility in the workplace. *American Sociological Review, 62*, 673–693.
Preston, L. E. (2004). Reputation as a source of corporate social capital. *Journal of General Management, 30*(2), 43–49.
Putta, S. S. (2014). Improving entrepreneurs' management skills through entrepreneurship training. *Journal of Commerce & Management Thought, 5*(3), 459–474.
Rae, D. (2012). Enterprise & entrepreneurship education: The new curriculum guidelines in Ireland and the UK. In *Presented at the ISBE Conference, Dublin, Ireland, November 6*.
Rasmussen, E., & Sorheim, R. (2006). Action-based entrepreneurship education. *Technovation, 26*(2), 185–194.
Ries, E. (2011). *The lean startup*. Crown Business.
Roberts, J., & Welsch, H. (2010). Passion as a predictor of entrepreneurial goal achievement: An opportunity costs and commitments approach. In *ICSB World Conference Proceedings* (pp. 1–21). International Council for Small Business.
Romero, E., & Gray, S. R. (2002). Management skills and training needs of small business managers. *Journal of Business and Entrepreneurship, 14*(1), 91–101.
Rybnicek, R., Ruhri, M., & Suk, K. (2015). *How to integrate entrepreneurship education and creativity into a bureaucratic environment (Case Study)*. Varazdin Development and Entrepreneurship Agency (VADEA).
Sarasvathy, S. D. (2008). *Effectuation: Elements of entrepreneurial expertise*. Edward Elgar.
Sarri, K. K., Bakouros, I. L., & Petridou, E. (2010). Entrepreneur training for creativity and innovation. *Journal of European Industrial Training, 34*(3), 270–288.
Scherer, R. F., Adams, J. S., & Wiebe, F. A. (1989). Developing entrepreneurial behaviours: A social learning theory perspective. *Journal of Organizational Change Management, 2*(3), 16–27.
Schlesinger, L., Kiefer, C., & Brown, P. (2012). *Just start: Take action, embrace uncertainty, create the future*. Harvard Business School Press.
Schlosser, F. K., & Todorovic, Z. W. (2006). Entrepreneurial charisma: A key to employee identification? *Journal of Small Business and Entrepreneurship, 19*(1), 49–62.
Schneier, C. E., Shaw, D. G., & Beatty, R. W. (1991). Performance measurement and management: A tool for strategy execution. *Human Resource Management, 30*(3), 279–301.
Schon, D. A. (1983). *The reflective practitioner: How professionals think in action*. Basic Books.
Schulman, S. A., & Rogoff, E. G. (2011). The technology enabled entrepreneur: Today's hope for a better tomorrow. *Entrepreneurship Research Journal, 1*(4). https://doi.org/10.2202/2157-5665.1057
Schumpeter, J. (1942). *Capitalism, socialism and democracy*. Harvard University Press.
Smith, M. (2003). Business process design: Correlates of success and failure. *The Quality Management Journal, 10*(2), 38–49.
Smith, W. L., Schallenkamp, K., & Eichholz, D. E. (2005). Entrepreneurial skills assessment: An exploratory study. *International Journal of Management and Enterprise Development, 2*(3), 349–359.
Sousa, M. J. (2018). Entrepreneurship skills development in higher education courses for teams leaders. *Administrative Sciences, 8*(2), 18.
Stam, W., Arzlanian, S., & Elfring, T. (2014). Social capital of entrepreneurs and small firm performance: A meta-analysis of contextual and methodological moderators. *Journal of Business Venturing, 229*(1), 152–173.
Starr, J. E., & MacMillan, I. C. (1990). Resource cooptation via social contracting: Resource acquisition strategies for new ventures. *Strategic Management Journal, 11*(1), 79–92.
Stevenson, H. H. (1983). A perspective on entrepreneurship. In *Harvard Business School Working Paper* (Vol. 9, pp. 384–131).

Stevenson, H. H. (1987). Entrepreneurship education: Crisis or opportunity. In *Seventh Annual Meeting of the Strategic Management Society*.
Stewart, W. H., & Roth, P. L. (2007). A meta-analysis of achievement motivation differences between entrepreneurs and managers. *Journal of Small Business Management, 45*(4), 401–421.
Susbauer, J. C. (1979). Strategic management: New ventures and small business. In D. E. Schendel & C. W. Hofer (Eds.), *Strategic management: A new view of business policy and planning* (pp. 327–332). Brown, Little.
Teise, H., & Urban, B. (2015). Antecedents to social entrepreneurship intentions: An empirical study in South Africa. *Management Dynamics, 24*(2), 36–52.
Terpstra, D. E., & Olson, P. (1993). Entrepreneurial start-up and growth: A classification of problems. *Entrepreneurship Theory and Practice, 17*(3), 5–20.
Terry, J. V. (1995). *Dictionary for business finance* (3rd ed.). University of Arkansas Press.
Thompson, T. A., Purdy, J. M., & Ventresca, M. J. (2018). Hoe entrepreneurial ecosystems take form: Evidence from social impact initiatives in Seattle. *Strategic Entrepreneurship Journal, 12*(1), 96–116.
Timmons, J. A., & Spinelli, S. (2007). *New venture creation: Entrepreneurship for the 21st century* (7th ed.). McGraw-Hill/Irwin.
Tjosvold, D., Hui, C., & Yu, Z. (2003). Conflict management and task reflexivity for team in-role and extra-role performance in China. *International Journal of Conflict Management, 14*(2), 141–163.
Tripopsakul, S., & Charupongsopon, W. (2017). What skills do nascent entrepreneurs need? The evidence from Thailand. *European Research Studies, 2017*(2A), 250–263.
Tuler, S., & Webler, T. (2010). How preferences for public participation are linked to perceptions of the context, preferences for outcomes, and individual characteristics. *Environmental Management, 46*, 254–267.
Van de Ven, A. H., Hudson, R., & Schroeder, D. M. (1984). Designing new business startups: Entrepreneurial, organizational and ecological considerations. *Journal of Management, 10*(1), 87–107.
Van Horn, R. L., & Harvey, M. G. (1998). The rural entrepreneurial venture: Creating the virtual megafirm. *Journal of Business Venturing, 13*(4), 257–274.
Vanthournout, G., Gijbels, D., Coertjens, L., Donche, V., & Van Petegem, P. (2012). Students' persistence and academic success in a first-year bachelor program: The influence of students' learning strategies and academic motivation. *Education Research International, 2012*, 152747. https://doi.org/10.1155/2012/152747
Vella, C. M., & McGonagle, J. J. (1988). *Improved business planning using competitive intelligence*. Quorum Books.
Vesper, K. H. (1983). *Entrepreneurship education*. Entrepreneurial Studies Center, University of California, Los Angeles.
Wally, S., & Baum, J. R. (1994). Personal and structural determinants of the pace of strategic decision making. *Academy of Management Journal, 37*(4), 932–956.
Wronka-Pospiech, M. (2016). The identification of skills and competencies for effective management in social enterprises: A managerial perspective. *Management: Zielona Gora, 20*(1), 40–57.
Zenger, J., & Folkman, J. (2007). Leadership development 6.0. *Leadership Excellence, 24*(10), 7.

How Strategic Entrepreneurship Benefits Public Administration: A Potential Application of Complexity Theory

Nazak Nobari

Abstract Sustainable development is a tool to build shared prosperity for today and future societies. This chapter studies the correlation between features of public administration and sustainable development. The aim is to outline the role of strategic entrepreneurship in public administration through the lens of complexity theory from a critical perspective. From the perspective of the epistemological dimension of complexity, the multiple linear regression (MLR) analysis is used to assess the correlation between three features of public administration (effectiveness, accountability, and inclusiveness) and levels of prosperity delivered in 102 selected countries, as well as their correlation with entrepreneurship. Based on the findings, effectiveness and accountability are of great importance, and strategic entrepreneurship appears as an emergent attractor characterizing how an administration works to build up prosperity. The results will help public policymakers and planners build sustainable capacity to improve public administration performance and facilitate the path of prosperity for societies.

Keywords Complexity theory · Public administration · Strategic entrepreneurship · Sustainable development · Prosperity

1 Introduction

In recent decades, global environmental challenges have affected all public administration areas due to reforms and rearrangements to adapt to the environment. In addition, policies and practices to meet sustainable development goals (SDGs) are a relatively new focus for public administration bodies.

On the one hand, since administration is a cooperative effort of a group of people to achieve specific goals, public administration can be seen as a natural complex system with nonlinear interconnected multi actors in each action level. Moreover, public administration should promote sustainable entrepreneurship development as

N. Nobari (✉)
Administrative and Recruitment Organization, Tehran, Iran

N. Faghih, A. Forouharfar (eds.), *Strategic Entrepreneurship*, Contributions to Management Science, https://doi.org/10.1007/978-3-030-86032-5_9

a launch pad for attaining new dynamic and modern societies, and hence a sustainable world.

Thus, this chapter drives a new insight from complexity theory into both realms of societies and public administration. The impetus behind writing such a chapter is the new and emerging patterns of societies, especially based on globalization, open market context, fast exchange of information, emergent technologies, and more recently dynamic network interactions, which challenge limitations of rationality-based classic approaches for determining the characteristics of public administration day in, day out. The key concepts in complex systems theory seem to be very relevant for public administration. Complexity theory and its implementation on public administration offer a new way to understand the complex nature of societies and public administration (Erkoçak & Açıkalın, 2014). The concept of dynamics corresponds to the interaction patterns in governance networks and the model of governing the complex integrated service delivery. In particular, the concept of unstable equilibrium offers a perspective on the notion of incremental change, which is well known in public administration, especially within administrative reform models (Klijn, 2008).

In this chapter, after presenting a summary of complexity theory application in public administration to deliver *SDGs*, the potential of three main principles of public administration as comprehensive variables (effectiveness, accountability, and inclusiveness) will be examined in relation to the "prosperity" concept. The chapter also addresses particular properties of complex systems that need to be understood to devise modern public administration reforms. Therefore, the collected data verifying the assumptions of the conceptual model will be analyzed through multiple linear regression. Furthermore, the study contributes to resolving the problem of identifying the driving force behind features of public administration to meet the challenges of sustainable development. Strategic view to a state's entrepreneurship, accompanied with sound and supporting public administration, is a main driving force that promotes the dynamic capability of public administration to find a way to adapt to the environment and in the next step to achieve prosperity. That is to say, strategic entrepreneurship captures public administration complexities and works as an incubator to bring forth comprehensive prosperity to modern societies.

2 Literature Review

2.1 Public Administration and Sustainable Development

Public administration has been affected by many paradigms, approaches, and tools so far. According to Adejare et al. (2014), the term "public administration" is very often used, but very difficult to define. This is because the field boundaries have never been delineated precisely. However, all approaches in administering the public affairs aim at improving the functioning and productivity of governments for

better service delivery to the public. In a sense, public administration could be assumed as a technology by which resources are arranged and then used to adapt to the social-political community problems (Starling, 2013: 106). Public administration, regardless of its academic definition, has three different core features common to traditional processions as follows (Shafritz et al., 2017: 23):

1. A body of academics and knowledge, which is applied to the service of society.
2. A system of control over the professional practice, which regulates the education of new members and maintains both the code of ethics and appropriate sanctions.
3. A standard of success and level of goal achievement, which is measured by serving the needs of society rather than actively seeking power and gain. The philosophical angle to these three core features of public administration is that it attempts to describe what constitutes an ideal state.

On the one hand, based on the traditional public administration values, public administration has three main pillars: efficiency (i.e., the relationship between inputs and outputs in policies, programs, projects, services, and organizations), effectiveness (i.e., which goals were or should be achieved due to the policy, program, project, service, or the organization's activities), and social equity (i.e., to achieve an equal outcome in the public conditions for all individuals and seek to eliminate differences in outcomes for groups and communities) (Svara & Brunet, 2004; European Union, 2015). Thus, doubtlessly it could be claimed that the well-being of nations is increasingly dependent on the efficiency of their system of public administration (Farooquee, 2017). The reason behind such a claim is that public administration directly determines the level of prosperity and creates occasions for a happy life for all who live in a country (Kokhanovskaya et al., 2019). Nevertheless, it depends on how actors' relations were arranged and also on the design of the way to increase the efficiency of government performance. Efficiency and effectiveness are concerned with how the government operates and equity questions for which government operates (Goggins, 2017).

On the other hand, the models of public administration and the government roles for sustainable development have received limited attention in scientific debates (Fiorino, 2010). With respect to the implementation of government policies, public administration is concerned with pursuing the policy goals effectively through layered administrative systems composed of government and nongovernment entities. Therefore, public administration does not sit separately from civil society, the private sector, and NGOs. New Public Governance (NPG) extends previous iterations of public administration reform, attempting to capture ever-complex networks of actors now engaged in public policy (Carey & Friel, 2015). Governance networks include actors and their relationship—institutional and individual—responsible for the formulation of law that public administration puts into effect (Opolski et al., 2013).

In summary, public administration is viewed as a means of delivering public services to implement the public policy set out by the government. In the 1980s and early 1990s, there had been an important and deep transformation in the public administration concepts and models. The traditional public administration

characterized by rigid, hierarchical, and bureaucratic changes to flexible, dynamic, competitive, and market-based public management. There was a paradigmatic and fundamental shift from the notion of public administration to the Public Management (PM), New Public Management (NPM), and then after New Public Service (NPS) that brings public administration and business management practices together (Gautam, 2014). Public administration makes and implements public policies to meet the political, managerial, and social challenges of translating the concept of sustainable development into action (Farooquee, 2017). In fact, the utility of public service has undergone numerous transformations in response to changing contexts both in respect to the international arena and every national priority. Effective public administration and the efficient delivery of public services as what makes the state visible and accessible to its people play a critical role in developing nations (UNDP, 2018), and hence the crucial role that public administration plays in the road to sustainable development should not be neglected.

The application of sustainable development perspectives in modern public administration could be seen both in developed and developing countries. Sustainability in a developmental context refers to the apparent dichotomy between destruction and life. Destruction implies lack of development, environmental devastation, and intervention in nature that culminate to excessive natural resources consumption contamination. Moreover, lifecycle is a fundamental concept of sustainability, which is a characteristic of a process or state that can be maintained through series of stages (Trainer, 1997: 219). Sustainable development is an action directed by the philosophy of sustainability and is increasingly supported, promoted, and required by public admonition, which includes public, nonprofit, and private agencies from the local to the global levels (Leuenberger & Wakin, 2007). Furthermore, the United Nations Conference held in 1972 put the spotlight on the principles of sustainable development concept. It was the first formal meeting where developed and developing nations came together to discuss environmental issues. Later in 1978, basic definition of sustainable development was presented by the Brundtland Report. According to that report, development is an equilibrium point between meeting the needs of the present and maintaining the resources needed by the future generations (WCED, 1978). One of the main results of aligning any public administration policy with the sustainable development concept is the guidelines of the United Nations General Assembly in 2015 which defined 17 SDGs containing 169 related targets that should be achieved by 2030 by the member states for achieving SD. These goals and targets are an essential part of the 2030 Agenda for sustainable development which were built on the Millennium Development Goals of 2000 that have not been fully achieved until now (UN General Assembly, 2015).

Sustainable development accentuates that growth must be comprehensive to reduce poverty and thus to build shared prosperity for today's population and also to continue to meet the needs of future generations (Krishna & Manikam, 2017). According to Thiele (2013: 1), sustainability is one of the very few ideals or values, such as democracy, equality, and human rights that receives near-universal agreement. The key principle of sustainable development underlying all public life concepts is the continuous attention to the environmental, social, and economic concerns

in all aspects of public decision-making (Dernbach, 2003). Corresponding to the prevalent description of sustainability that employs three interconnected pillars, the UN SDGs address three central aspects of sustainability as economic prosperity, social equity, and environmental protection. They are called as the triple bottom line or TBL, and they emphasized a balance between economic, social, and environmental needs and goals (Filser et al., 2019). The role of a government is to balance ecological (sustainability) and economic (development) interests to maintain the resources and cope with the ecological crisis without affecting existing economic growth (Baeten, 2000). Thus, a good public administration framework promises a better standard of living, and how this can be realized depends on the integrated approach adopted by the government.

In addition, prosperity as a modern concept in SD should be responded appropriately by the governments. A nation's productivity and well-being will be the outcome of social and political innovative practices. It is noted that prosperity is not wealth or growth just in the economy. It is not assigned by gross domestic product (GDP). It is about flourishing the health of society, inclusive political institutions, a guarantee of human capital development, and civil liberties. In other words, a well-functioning and productive public administration provides conditions for prosperity, and its features play a fundamental role in making prosperity possible in the long run. Hence, entrepreneurship is one of the potential strategic scenarios for reaching this prosperity.

Moreover, sustainable development in relation to public administration calls for two main changes: (1) The change in the orientation of public management toward sustainable development, and (2) Establishing relevant procedures for the implementation of sustainable development by the public administrators (Bartle & Leuenberger, 2006). In general terms, public administration is an essential factor for sustainable development. Sustainable development in public administration aims to prioritize the public interest by providing quality public services.

In practice, public administration is called upon to adopt policies, strategies, or measures to achieve certain SDGs such as poverty eradication policies, empowerment policies and laws, access to clean water and quality sanitation, access to energy, economic policies aiming at supporting productive activities, job creation, entrepreneurship, creativity, and innovation, social protection policies, regulation of financial markets and institutions, migration policies, inclusion and integration policies, measures against degradation of natural habitats, measures against poaching and trafficking of protected species, and the introduction of invasive alien species (Bouckaert et al., 2016).

Every administrative system has three important subsystems: a driven subsystem, whose output controls the input of the entire system; a decisional subsystem, whose output represents the input of the driven system; and a reaction system that transmits the output of the driven system at the input of the decisional subsystem (Matei & Antonie, 2014). In addition, self-organization and coevolution are key concepts in complexity theory, and how different decision-making processes affect each other, and are very relevant for public administration (Klijn, 2008). Self-organization is defined here as the emergence and maintenance of structures out of

limited interaction, an emergence that is not imposed or determined by one single agent but is rather the result of nonlinear interactions between various agents (Heylighen, 2001). Through these interactions, coevolution results from a combination of the strategic actions of agents and the collectives of agents (Mitleton-Kelly, 2003a, b). In public administration, decision-making and decisions are not one-sided responses to a changing environment, but under complexity theory, decisions as adaptive moves, affecting both the initiator of the action and all others affected by it.

2.2 *Complexity Theory and Its Application in Public Administration*

All social systems are naturally complex with nonlinear behaviors, and hence, a public administration system as a social system is a multidimensional system with social roots which lead to complex behaviors and concepts. Complexity is not an unusual phenomenon. It is ubiquitous in our world. Although the definition of complexity as a phenomenon arising from the interaction among numerous things is common, it is not supported completely (Johnson, 2007). The complexity science searches the emergent behavior of complex systems through interconnections of the system components and system components arrangement, rather than focusing on the individual components themselves. Thus, complexity science has introduced a new scientific approach across traditional discipline limitations (Matei & Antonie, 2014). Furthermore, complexity does not only refer to several dynamic components and beyond that, but it also refers to the system composed of some interconnected components with characteristics such as self-organization, evolution, and novelty (Lissack & Gunz, 1999).

The general framework and characteristics of *complexity theory* can be summarized by the following features (Valle, 2000):

(a) A large number of similar, independent, and interdependent agents in the complex system can be considered simple.
(b) Constant responses from these agents to other agents and many direct and indirect feedback loops.
(c) Adaptiveness to new situations to sustain and survive.
(d) Self-organization, in which patterns forms spontaneously.
(e) Local rules that apply to each agent.
(f) Coevolution.

Any science is understood as an organized complexity, and the scientific configuration requires structural components, which may be analyzable or near-analyzable (Gonzalez & Jose Arrojo, 2015: 302). Also, understanding complexity generally depends on the mode/aspect that we choose for interpreting it. Each mode/aspect and its subtypes attempt to capture and analyze only some part or dimension of complexity in its view (Gerrits & Marks, 2012: 3).

By looking deeper into the modes of complexity, different aspects pointed out by Nicholas Rescher (1998) are noteworthy. His analysis embraces epistemic complexity as well as ontological complexity. Two different modes of complexity as structural modes are: (1) epistemic modes (related with knowledge, which involves formulaic complexity) and (2) ontological modes (connected to reality itself) (Rescher, 1998: 9; Schlindwein & Ison, 2004; Gerrits & Marks, 2012: 3):

1. *Epistemic modes* can be diversified into following three subtypes of complexity:
   (a) *Descriptive complexity*: The minimum length of the account that is accurate and sufficient to provide an adequate description of the system.
   (b) *Generative complexity*: The minimum length of the set of characteristics and instructions necessary to generate a complex system.
   (c) *Computational complexity*: The effort necessary to solve a problem as a complex issue.
2. *Ontological modes* include following three main types of complexity:
   (a) *Compositional complexity* contains two subtypes of complexity:
      - *Constitutional complexity*: The number of constituent elements making up a system.
      - *Taxonomical complexity*: The heterogeneity of constituent components.
   (b) *Structural complexity* includes two subtypes of complexity:
      - *Organizational complexity*: The different possibilities for the arrangement of the components.
      - *Hierarchical complexity*: The elaborateness of hierarchical (sub-orientation) relationships between levels.
   (c) *Functional complexity* contains two subtypes (it has biological research applications):
      - *Operational complexity*: The variety of modes of functioning.
      - *Nomic complexity*: The elaborateness and intricacy of the laws governing a system.

Public administration is an increasingly important field involving various agents (actors) from national governments to private companies, professional and business communities, households, and civil societies. The interaction of the agents is even more pronounced when public administration takes measures to resolve public issue with the available resources (Matei & Antonie, 2014). In other words, and by considering the abovementioned modes of complexity, public administration is a complex adaptive system.

In the complexity worldview, ongoing nonlinear interactions result in macro patterns. A complex adaptive system is an approach built on the systems theory, which was taken over by some characteristics such as emergence, connectivity, interdependence, learning, coevolution, and dynamic feedback loops from that theory (Fidan & Balci, 2017).

Systems, especially complex adaptive systems, present emergent properties because of the interaction of their elements (agents) (Mitleton-Kelly, 2003a, b). Agents interpret existing institutional rules and shape or reshape institutional structures with their actions (Giddens, 1984).

Emergent properties are often used to differentiate complex systems from exclusively complicated systems (Johnson, 2007). The concept of emergence plays a central role in the sciences of complexity and entrepreneurship (Garud et al., 2015). The idea of emergence is highlighted by Anderson in his article "More is different." He stated a change of scale generally often causes a qualitative change in the system behavior (Anderson, 1972).

The emergence is resulted from the patterns of interrelationships among the agents (NAPCRG Resources, 2009). Emergence is a new concept that introduces new ways of inquiry. In particular, it declares public management scientists that there is order behind the ostensible chaos of numerous government actions and changes, of course (Teisman & Gerrits, 2014). Moreover, the concept of emergence is usually put to use in the context of two metaphysical claims: (1) *ontological unitarianism*—i.e., there is just one kind of stuff in the world and (2) *hierarchical realism*—i.e., the natural world contains hierarchies, and there exist multiple legitimate levels of complexity and organization (Christen & Franklin, 2002).

Based on *hierarchical realism*, emergence is a phenomenon that becomes apparent at the macrolevel but develops itself through microlevel dynamics. The emergence at the microlevel, in turn, affects the microlevel elements is causing new dynamics (Van de Walle & Vogelaar, 2010). *Emergence* depends on a system with at least four characteristics: nonlinearity, self-organization, being beyond equilibrium, and attractors (Goldstein, 1999).

The concept of *emergence* can be further elaborated to describe the characteristics of the presented definition in more detail. As a summary:

- Emergence is a process that increasingly makes and generates an outcome: an "emergent."
  - Emergence appears through an agency—it is driven by purpose.
  - Emergence increases the capacity of the system.
  - Emergence occurs in cycles; each cycle has an internal logic of five sequential phases (Lichtenstein, 2014):

    Phase 1: Initiate Disequilibrium Organizing.
    Phase 2: Stress and Experiments.
    Phase 3: Amplification to a Critical Threshold.
    Phase 4: New Order through Recombination.
    Phase 5: Stabilizing Feedback.

  - Emergence suggests unpredictability—i.e., an inability to state precisely how a system will evolve (NAPCRG Resources, 2009).
  - Emergence in entrepreneurship is an effectuation process that follows a distinct pattern, and its result is new creation and innovation.

- Emergence makes complex adaptive systems irreducible; due to its emergent properties, higher order states cannot be reduced to their original lower level states (Turner & Baker, 2019).
- Entrepreneurial outcomes are nonlinear, and they are not arrayed on a normal curve, but according to a *Pareto Curve*, the vast majority of instances have no effect on the dynamic system, but a few instances have massive leverage.

From an overall perspective, the concept of dynamics offers a different view on the making process and interaction patterns in public administration and also generates insights on how complex integrated service delivery can be governed. In particular, the concept of unstable equilibrium and emergent properties may enhance the notion of incremental change, which is well known in public administration. Finally, the concepts of negative and positive feedback loops can also shed light on some of the unexpected changes that affect decision-making in public administration (Klijn, 2008). Decision-making in this circumstance is like entrepreneurship because it is about order creation, not an equilibrium. This condition creates opportunity space for public administration to adapt and overcome any public challenges. In sum, *complexity theory*, in general, and the notion of an opportunity space, in particular, facilitate a new articulation of and enable an alternative paradigm for strategic entrepreneurship (Schindehutte & Morris, 2009).

2.3 Public Strategic Entrepreneurship

Entrepreneurship as a concept is a multidimensional subject rooted in several disciplines, including economics, psychology, sociology, and anthropology. The role of entrepreneurship as an engine of economic and societal transformation is not new in the economic literature, but its role in achieving sustainability goals is emerging as a new important issue of some scientific communities in recent few years. In this regard, three distinct intellectual traditions in the development of the entrepreneurship literature have been identified as below (Foss et al., 2008):

1. *The German Tradition;* Emphasis on the concept of the entrepreneur as the creator of instability and creative destruction.
2. *The Chicago Tradition;* Emphasis on the role of the entrepreneurs in leading markets' equilibrium.
3. *The Austrian Tradition;* Emphasis on entrepreneurship and complementary market-process explanations of economic activity.

According to Drucker (1985), entrepreneurship is an innovation act and means creating a new business, and anyone who manages to establish a new business is an entrepreneur outright. Furthermore, Global Entrepreneurship Monitor to define entrepreneurship emphasizes any attempt to create new businesses, and/or expanding new business organizations or the established businesses (GEM, 2017). Entrepreneurship in a comprehensive sense is a frame of mind, a willingness and

Table 1 Entrepreneurship and dimensions of sustainable development

Dimension	Entrepreneurship
Economic	• Drives economic growth by creating jobs (UN General Assembly, 2016) • Drives structural transformation and industrialization leading to inclusive and sustainable socioeconomic development (UNIDO, 2013) • Can alleviate poverty through recognizing space for the explosive development of businesses that will add value to the economy
Social	• Can promote social cohesion, reducing inequalities and expanding opportunities for all people (UN General Assembly, 2016) • Is a mission-driven activity social aspects (Dixon & Clifford, 2007) • Can help to solve societal problems and create value for society (Zahedi & Otterpohl, 2015) • Can solve humanitarian disasters with continuous recovery and improvement (Ibrahim & El Ebrashi, 2017)
Environmental	• Can help to address environmental challenges and solve environmental problems • Can help to promote environmentally sustainable practices and manage the consumption pat terns (UN General Assembly, 2016) • Can help to discover, evaluate, and exploit economic opportunities that are present in environmentally relevant market failures (Dean & McMullen, 2007)

Source: Author's own work

ability to create and be receptive to opportunities, an orientation toward a decision (policy)-making, and act to adapt to the fitness landscape (Shafritz et al., 2017: 433).

Thus, the UN General Assembly has recognized and introduced entrepreneurship with innovation as a key element for addressing sustainable development challenges (UN General Assembly, 2016; Filser et al., 2019). Hence, by taking into consideration the entrepreneurship literature reviewed above and by reliance on the studies about the effective factors on sustainable development, Table 1 shows the interpretation of entrepreneurship from dimensions of development.

Additionally, the concept of entrepreneurship in public administration was introduced in the 1960s (Ostrom, 1965; Wagner, 1966). Documents show the term of strategic entrepreneurship, and its practice formally appeared in 2001 in strategic management journal on-strategic entrepreneurship, and the first strategic entrepreneurial journal was published in 2007 (Tülüce & Yurtkur, 2015). The construct of strategic entrepreneurship has rooted in management research (Drucker, 1985; Mintzberg, 1973).

The explanation of entrepreneurship was developed according to the strategy by presenting a strategic process model for entrepreneurial activities (Burgelman, 1983). In the following, an important concept put forward by Miller is that an entrepreneurial strategic process is not specific to one type of organization, but rather may take various forms for different business profiles (Miller, 1983).

Strategic entrepreneurship builds on previous researches in entrepreneurship and strategic management and offers new insights into public administration (Kearney & Meynhardt, 2016). Strategic management is involved with processes and activities undertaken to achieve competitive advantage and gain above the mean interests

(Ireland et al., 2001). Some of these activities under strategic management provide the context for entrepreneurial actions. Thus, strategic entrepreneurship is strongly affected by management through theories about business improvement models (Hjorth, 2004). Entrepreneurship and strategic management are associated together by referring to ongoing change and innovation as characteristic of the contemporary competitive landscape (Hitt & Reed, 2000). Further, strategic entrepreneurship involves simultaneous opportunity-seeking and emphasis on the leader's role in recognizing opportunities and doing something with those opportunities that are conducive for wealth and prosperity creation (Kyrgidou & Hughes, 2010). A review of entrepreneurship and strategy literature presents six elements central to entrepreneurship as identifying an opportunity, innovation, acceptance of risk, flexibility, vision, and growth; they are reinforced in a strategic context.

Building upon the reviewed concepts of complexity, entrepreneurship, and public administration and by considering the dynamic capabilities approach, which relates to how institutions and firms identify opportunities, create new knowledge, disseminate information internally, embed in new business models and/or new goods or services, and launch new products and services on the market (Teece, 2011), strategic entrepreneurship field could offer important insights into how public administration should deploy capabilities to pursue value creation. Governmental dynamic capabilities that can create value from public resources are essential to government productivity (Klein et al., 2013). The nature of governance, society, and governability is highly dynamic and nonlinear (Kooiman, 2003). According to studies and practices in the field of entrepreneurship, special consideration needs to be given to the relationships between structure, culture, and leadership at the level of public administration (Höglund & Mårtensson, 2019).

Public administration through various arms and levels of government, private section, and other agents provides public services to common groups of citizens with competing or conflicting demands, aims, or drivers. This comprehensive complex system is not fixed and stable and needs a complex governance system. Also, public administration has become increasingly complex at least on three levels: (1) the level of the administrative system itself, (2) the problems facing the society, and (3) the governance model for dealing with these problems. At each level, specific agents participate based on their behavior patterns (i.e., culture), and specific organizing and processes (i.e., structure) used, and different leadership styles which are needed. Nonlinear and complex interactions between *structure*, *culture*, and *leadership* style in any public administration system determine the governance system characteristics, especially in respect to the expansion of public entrepreneurship activities.

Besides, one of the key concepts that relates to strategic entrepreneurship and dynamic capabilities is *Open Government*. The concept of *Open Government* is not a new one, and it appeared in late 1970s. The emergence and gradual development of the concept of *Open Government* represents a radical change with deep consequences in political systems, governments' administration, and government agencies worldwide (OECD, 2011). *Open Government* is in essence a type of social innovation. It has included policies and programs involving access to information, social media, open data, data on spending and other governmental processes, and the use of online meetings or comments forums (Jaeger & Bertot, 2010).

Moreover, *openness* in government is designed to ensure its legitimacy and involves the relationships of at least two parties, and intended to ensure its legitimacy and transparency (Meijer et al., 2012). In other words, government transparency is part of a quest of the public and government itself for better governance (Piotrowski & Van Ryzin, 2007). Thus, *Open Government* is transformed and reinforced by new means of the comprehensive external contribution of public administration actors (private sectors, NGOs, and other people) in a public setting.

In this chapter, *dynamic capabilities* refer to how public administration actors renew their competencies to improve the productivity of their policies, decisions, and operations, as well as how they develop innovations in the process to respond to rapid shifts in sociopolitical technological environments in the pursuit of superior and sustainable development. It could also be said that public administration is nothing except the policies, practices, rules, and regulations, etc., in action.

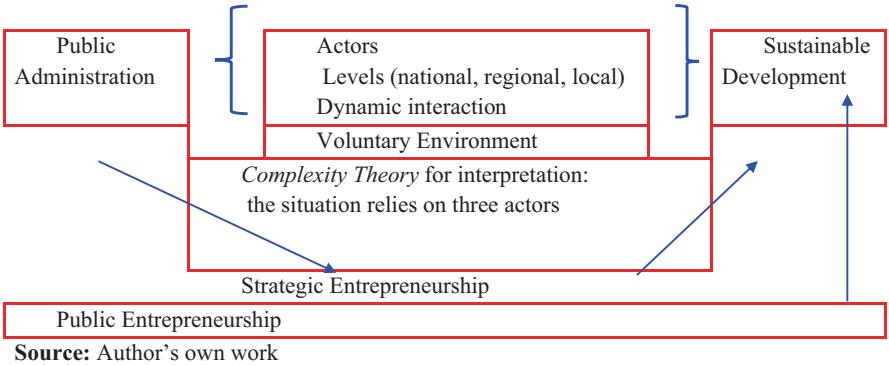
2.4 Conceptual Model and Methodology

As shown in Fig. 1, the proposed framework hypothesized that sustainable development could be explained by the complexity of public administration through strategic entrepreneurship and epistemological reflections, particularly generative complexity; thus, the research question is formulated as follows:

What are the important factors of public administration features to meet SDGs*?*

Related equations based on the conceptual model are as following:

- Strategic Level
  Sustainable development = *f* (Strategic entrepreneurship = *f* (Public administration arrangements)).
- Operational Level
  Prosperity = *f* (Entrepreneurship = *f* (Effectiveness, Accountability, Inclusiveness)).



Source: Author's own work

Fig. 1 Methodological dominant ideas of the complexity of public administration for achieving sustainable development. (Source: Author's own work)

To assess the impact of public administration characteristics on prosperity as an outcome of sustainable development more systematically, this chapter uses a *multiple regression analysis* (MRA). As a powerful technique, MRA can accurately reflect the correlations among factors, indicate the degree of fit, and improve the effectiveness of the regression equation (Holmes & Rinaman, 2015). These are useful for adequately highlighting the role of strategic entrepreneurship to capture the complexity of public administration and its impact on the level of prosperity delivered by every country.

2.5 Variables Definition

- *Effectiveness*, *accountability*, and *inclusiveness* are three main principles of public administration essential to achieving the SDGs. They are prepared by the UN Committee of Experts on Public Administration (CEPA) and UN DESA.[1]
  - *Effectiveness* includes competence, sound policymaking, and collaboration.

Competence: To perform their functions effectively, institutions must have sufficient expertise, resources, and tools to deal adequately with the mandates under their authority.

Sound policymaking: To achieve the intended results, public policies are to be coherent with one another at all levels of governance and founded on true or well-established grounds, in full accordance with fact, reason, and good sense.

Collaboration: To address problems of common interest, institutions and enterprises at all levels of public administration and in all sectors should work together and jointly with nonstate actors towards the same end, purpose, and effect.

  - *Accountability* includes integrity, transparency, and independent oversight.

Integrity: To serve in the public interest, civil servants are to discharge their official duties honestly, fairly, and in a manner consistent with the soundness of the moral principle.

Transparency: To ensure accountability and enable public scrutiny, institutions and enterprises are to be open and candid in the execution of their functions and promote access to information, subject only to the specific and limited exceptions as are provided by law.

Independent oversight: To retain trust in government, oversight agencies act according to strictly professional considerations and apart from and unaffected by others.

  - *Inclusiveness* includes leaving no one behind, nondiscrimination, participation, subsidiarity, and intergenerational equity.

[1] https://publicadministration.un.org/en/developmentmgt

Leaving no one behind: To ensure that all human beings can fulfill their potential in dignity and equality, public policies are to consider the needs and aspirations of all segments of society, including the poorest and most vulnerable and those subject to discrimination.

Nondiscrimination: To respect, protect, and promote human rights and fundamental freedoms for all, access to public service is to be provided on general terms of equality, without distinction of any kind as to race, color, sex, language, religion, political or another opinion, national or social origin, property, birth, disability, or another status.

Participation: To have an effective state, all significant political groups should be actively involved in matters that directly affect them and have a chance to affect policy.

Subsidiarity: To promote a government responsive to the needs and aspirations of all people, central authorities should perform only those tasks that cannot be performed effectively at a more intermediate or local level.

Intergenerational equity: To promote prosperity and quality of life for all, institutions should construct administrative acts that balance the short-term needs of today's generation with the longer term needs of future generations.

- The *Global Entrepreneurship Index*[2] is an annual index that measures the health of the entrepreneurship ecosystems in selected countries and provided by the Global Entrepreneurship and Development Institute.
- The *Prosperity Index*[3] is an annual ranking developed by the *Legatum Institute*, and it is based on a variety of factors, including wealth, economic growth, education, health, personal well-being, and quality of life.

2.6 Selected Countries

In this study, the sample was composed of 102 developed and developing countries (n = 102). The data cover the year 2018 (Table 2).

2.7 Analyses

Multicollinearity refers to the existence of more than or exact linear relationship among some or all explanatory variables of a regression model. In this study, tolerance and variance inflation factor (VIF) was used. Therefore, before running the multiple regression model, the presence of collinearity among the independent

[2] https://thegedi.org/global-entrepreneurship-and-development-index/

[3] https://www.prosperity.com/

Table 2 Sample countries in this study

Algeria	Argentina	Australia	Austria	Bangladesh
Belgium	Belize	Bolivia	Botswana	Brazil
Bulgaria	Cambodia	Cameroon	Canada	Chile
China	Colombia	Costa	Rica	Croatia
Czech Republic	Denmark	Dominican Republic	Ecuador	Egypt
El Salvador	Estonia	Ethiopia	Finland	France
Germany	Ghana	Greece	Guatemala	Honduras
Hong Kong	Hungary	Iceland	India	Indonesia
Iran, Islamic Rep.	Ireland	Israel	Italy	Jamaica
Japan	Jordan	Kazakhstan	Kenya	Kuwait
Latvia	Lebanon	Lithuania	Luxembourg	Malaysia
Mali	Mexico	Moldova	Montenegro	Morocco
Mozambique	Namibia	Netherlands	Nicaragua	Nigeria
Norway	Pakistan	Panama	Paraguay	Peru
Philippines	Poland	Portugal	Romania	Russian Federation
Rwanda	Saudi Arabia	Senegal	Singapore	Slovak Republic
Slovenia	South Africa	Korea, Rep.	Spain	Sri Lanka
Sweden	Switzerland	Tajikistan	Tanzania	Thailand
Trinidad and Tobago	Tunisia	Turkey	Uganda	Ukraine
United Arab Emirates	United Kingdom	United States	Uruguay	Venezuela, RB
Vietnam	Zambia			

Source: Author's own work

variables has been examined using variance inflation factors (VIF), and the result is shown in the following Table 3.

Table 3 shows that the tolerance value of effectiveness is 0.427, accountability is 0.520, and inclusiveness is 0.701, meaning the tolerance value of each variable is more than 0.10. The VIF value of effectiveness is 2.281, accountability is 1.831, and inclusiveness is 1.202. The total VIF value of each variable is less than 10. The result suggests that the current study does not have any problem with multicollinearity, allowing for a standard interpretation of the regression coefficients.

3 Multiple Linear Regression for Explaining Prosperity as an Outcome of Development

The information about results obtained from fitting the multiple linear regression took prosperity and entrepreneurship as the dependent variables and effectiveness, accountability, and inclusiveness were the independent variables (predictors).

Table 3 Tolerance value and variation inflation factor (VIF)

Year	Model	Collinearity statistics	
		Tolerance	VIF
2018	Effectiveness	0.427	2.281
	Accountability	0.522	1.831
	Inclusiveness	0.701	1.202
	Accountability		
	Inclusiveness		

Source: Author's own work

3.1 Coefficient of Determination (R-square)

The coefficient of determination with a standard error of estimates.

The results as shown in the above Table 4, the adjusted R square value of 0.831 indicates that the independent variables (predictors) as effectiveness, accountability, and inclusiveness used in this regression model explained about 83.1% of the total variation in dependent variable prosperity under study and the remaining 16.9% is explained by other factors which are not considered in this study.

3.2 Analysis of Variance (ANOVA)

Analysis of variance (ANOVA) was used to assess the statistical significance of the result. Table 5 illustrates the value of F statistic 59.886 is highly significant with P-value = 0.00 < 0.05, indicating a linear relationship between prosperity and the principles of public administration (Table 6).

The estimated multiple linear regression equation is

$$\hat{Y} = 2.101 + 0.478X1 + 0.420X2 + 0.271X3$$

Where

Y = Prosperity.
$X1$ = Effectiveness.
$X2$ = Accountability.
$X3$ = Inclusiveness.
e = Error of the explanations of the multiple regression equation are as follows:
$\beta 0$ = 2.101 represents the influence of effectiveness, accountability, inclusiveness, and prosperity. In a condition where all independent variables are constant (zero), prosperity is predicted to be 2.101.
Effectiveness has an influence on prosperity as 0.478. $\beta 1$ indicates that one-unit increase in effectiveness results in 0.478 units increase in the prosperity.

Table 4 Model summary

	Model	*R*	*R*-square	Adjusted *R*-square	Std. error
Year	2018	0.919[a]	0.845	0.831	1.001

Source: Author's own work
[a]Predictors: (Constant), Effectiveness, Accountability, Inclusiveness
[b]Dependent variable: Prosperity

Table 5 Overall test of significance (ANOVA table)

Year		Sum of square	Df	Mean sum of square	*F*	Sig.
2018	Regression	179.970	3	59.990	59.886	0.000[b]
	Residual	33.057	99	1.002		
	Total	213.027	102			

[a]Dependent variable: Prosperity
[b]Predictors: (Constant), Effectiveness, Accountability, Inclusiveness

Table 6 Multivariate regression coefficients with prosperity as dependent variable

		Unstandardized coefficients		Standardized coefficients		
Year	Model	β	Std. error	Beta	*T*	Sig.
2018	Constant	2.101	1.381		1.521	0.138
	Effectiveness	0.478	0.106	0.469	4.517	0.000
	Accountability	0.420	0.101	0.388	4.155	0.000
	Inclusiveness	0.271	094	0.232	2.885	0.007

Source: Author's own work
[a]Dependent variable: Prosperity

Accountability has an influence on prosperity as 0.420. A condition where other variables are constant, if there is one unit increasing in accountability, prosperity is predicted to be increased by 0.420.

Likewise, coefficient $\beta 3 = 0.271$; one-unit increase in relationship with inclusiveness results in 0.271 units increase in the prosperity.

Table 7 Multivariate regression coefficients with prosperity as dependent variable

Correlations				
			Entrepreneurship	Open government
Spearman's rho	Entrepreneurship	Correlation coefficient	1.000	0.670[a]
		Sig. (2-tailed)		0.000
		N	68	68
	Open government	Correlation coefficient	0.670[a]	1.000
		Sig. (2-tailed)	0.000	
		N	68	68

Source: Author's own work
[a]Correlation is significant at the 0.01 level (2-tailed)

4 Public Administration Performance and Strategic Entrepreneurship

The *openness* of the government is considered as one of potential public administration performance indicators, and it includes four dimensions of government (policies and actions): (1) inclusive government, (2) responsive government, (3) accessible government, and (4) transparent government. In order to clarify the role of strategic entrepreneurship in a complex environment of public administration, the correlation between entrepreneurship and open government is examined.

Table 7 shows the strongest correlation exists between entrepreneurship and open government. Entrepreneurship at this level is strategic entrepreneurship that simultaneously promotes public entrepreneurship through all public administration actors and increases the fitness of a dynamic environment. Therefore, it implies the evolutionary cycle of strategic entrepreneurship function.

5 Conclusion

Public administration is a complex adaptive system with a great number of interconnected agents, and in real world, it operates in a dynamic environment that changes in cooperation and compliance with the impact of government and public sector, private sector, NGOs, and the public. Based on the epistemic mode of *complexity*, this chapter developed and validated a framework for evaluating the factors that drive sustainable development under a public administration model.

The findings suggested that public strategists must focus on effectiveness and accountability. These two variables extend and generate positive and negative feedbacks to all parts (variables) of public administration and manage the system behavior to meet development goals. Besides, positive correlations were observed between

the country's prosperity degree and all three fundamental principles of public administration. Among the three principles, effectiveness had the greatest impact on deliver prosperity, and inclusiveness had the least impact.

Feedback processes shaped how change happens within a complex system. This study emphasized the emergence of evolutionary behavior at the public administration level. Strategic entrepreneurship as a process that creates an emergent outcome and improves the flexibility and capacity of public administration to redesign itself continuously in an adaptive manner was accentuated by the findings. Findings also provided new insight into how public administration adjusts its dynamic behavior. According to the effective role of strategic entrepreneurship, government is not the main or sole actor in the field of policymaking and regulation; thus, small groups, networks of interconnected actors, factors, and systems also play a dominant role. Therefore, under the lens of complexity theory, dynamic interconnection networks have responsibilities to deliver prosperity and facilitate sustainable development.

To sum up, this chapter attempted to present an approach that combines complexity theory and public administration. Surely, it is not an end-result chapter, but it can be considered as a new approach, especially among the methods of administrative reform plans. Additionally, the chapter could provide a foundation for future research on public strategic entrepreneurship (SE) through public administration practices. The important role of the public administration characteristics (models) on sustainable development will be the basis for future studies. Also, future researches, on the one hand, could focus on the corporate governance model and its mechanisms to implement public administration reform plans. On the other hand, developing ways to empower all public administration agents will be necessary to adapt to an increasingly dynamic environment.

References

Adejare, A., Olla, J. O., & Oluwafemi, J. (2014). Towards a theoretical definition of public administration. *Journal of Business and Management, 16*(3), 65–70.

Anderson, P. W. (1972). More is different. *Science, 177*(4047), 393–396.

Baeten, G. (2000). The tragedy of the highway: Empowerment, disempowerment and the politics of sustainability discourses and practices. *European Planning Studies, 8*(1), 69–86.

Bartle, J. R., & Leuenberger, D. (2006). The idea of sustainable development in public administration. *Public Works Manag Policy, 10*(3), 191–194.

Bouckaert, G., Loretan, R., & Troupin, S. (2016). Public administration and the sustainable development goals. Written statement by the International Institute of Administrative Sciences, Submitted to the *15th session of the United Nations Committee of Experts in Public Administration.*

Burgelman, R. A. (1983). Corporate entrepreneurship and strategic management: Insights from a process study. *Management Science, 29*(12), 1349–1364.

Carey, G., & Friel, S. (2015). Understanding the role of public administration in implementing action on the social determinants of health and health inequities. *Int J Health Policy Manag, 4*(12), 795–798.

Christen, M., & Franklin, L. R. (2002). The concept of emergence in complexity science: Finding coherence between theory and practice. *Proceedings of the Complex Systems Summer School, 4*, 1–15.

Dean, T. J., & McMullen, J. S. (2007). Toward a theory of sustainable entrepreneurship: Reducing environmental degradation through entrepreneurial action. *Journal of Business Venturing, 22*, 50–76.

Dernbach, J. C. (2003). Achieving sustainable development: The Centrality and multiple facets of integrated decision making. *Indiana Journal of Global Legal Studies, 10*, 247–285.

Dixon, S., & Clifford, A. (2007). Ecopreneurship—A new approach to managing the triple bottom line. *Journal of Organizational Change Management, 20*(3), 326–345.

Drucker, P. F. (1985). *Innovation and entrepreneurship*. William Heinemann.

Erkoçak, E., & Açıkalın, Ş. N. (2014). Complexity theory in public administration and metagovernance. In *Springer proceedings in complexity* (pp. 73–84). https://doi.org/10.1007/978-3-319-09710-7_6

European Union. (2015). *Quality of public administration: A toolbox for practitioners*. Publications Office of the European Union.

Farooquee, N. A. (2017). *Unit-2 Public administration and sustainable development* (pp. 22–37) http://egyankosh.ac.in//handle/123456789/39207

Fidan, T., & Balci, A. (2017). Managing schools as complex adaptive systems: A strategic perspective. *International Electronic Journal of Elementary Education, 10*(1), 11–26.

Filser, M., Kraus, S., Tierno, N., Kailer, N., & Fischer, U. (2019). Entrepreneurship as catalyst for sustainable development: Opening the black box. *Sustainability, 11*(16), 1–18.

Fiorino, D. J. (2010). Sustainability as a conceptual focus for public administration. *Public Adm Rev, 70*(1), S78–S88.

Foss, N., Klein, P., Kor, Y., & Mahoney, J. (2008). Entrepreneurship, subjectivism, and the resource-based view: Toward a new synthesis. *Strategic Entrepreneurship Journal, 2*(1), 73–94.

Garud, R., Simpson, B., Langley, A., & Tsoukas, H. (2015). The emergence of novelty in organizations. In *Perspectives on process organization studies*. Oxford University Press.

Gautam, N. (2014). Governance' beyond the boundaries of public administration. *The Post, 52*(190), 123–127.

Gerrits, L., & Marks, P. (2012). *COMPACT I: Public administration in complexity*. EMERGENT Publication.

Giddens, A. (1984). *The constitution of society: Outline of the theory of structuration*. Macmillan.

Global Entrepreneurship Monitor. (2017). *GEM key indicators*. http://www.gemconsortium.org/data/key-indicators.

Goggins, Sh. L. (2017). *Social equity in public administration*. Online Theses and Dissertations (p. 527). https://encompass.eku.edu/etd/527.

Goldstein, J. (1999). Emergence as a construct: History and issues. *Emergence, 1*(1), 49–72.

Gonzalez, W. J., & Jose Arrojo, M. (2015). Diversity in complexity in communication sciences: epistemological and ontological analyses. In D. Generali (Ed.), *Le Radici della Rationalitá Critica: Saperi, Pratiche, Teleologiel* (pp. 297–312). Mimesis Edizioni.

Heylighen, F. (2001). The science of self-organization and adaptivity. In L. D. Kiel (Ed.), *Knowledge management, organizational intelligence and learning, and complexity. The encyclopedia of life support systems* (pp. 126–146). Eolss Publishers.

Hitt, M. A., & Reed, T. (2000). Entrepreneurship in the new competitive landscape. In G. D. Meyer & K. A. Heppard (Eds.), *Entrepreneurship as strategy* (pp. 23–48). Sage.

Hjorth, D. (2004). Creating space for play/invention–concepts of space and organizational entrepreneurship. *Entrepreneurship & Regional Development: An International Journal, 16*, 413–432.

Höglund, L., & Mårtensson, M. (2019). Entrepreneurship as a strategic management tool for renewal—The case of the Swedish public employment service. *Administrative Sciences, 9*(4), 1–16.

Holmes, W., & Rinaman, W. (2015). *Multiple linear regression. Statistical literacy for clinical practitioners* (pp. 367–396). Springer International.

Ibrahim, S. E., & El Ebrashi, R. (2017). How social entrepreneurship can be useful in long-term recovery following disasters. *Journal of Humanitarian Logistics and Supply Chain Management, 7*(3), 324–349.

Ireland, R. D., Hitt, M. A., Camp, S. M., & Sexton, D. (2001). Integrating entrepreneurship and strategic management actions to create firm wealth. *Academy of Management Executive, 15*, 49–63.

Jaeger, P. T., & Bertot, J. C. (2010). Transparency and technological change: Ensuring equal and sustained public access to government information. *Government Information Quarterly, 27*(4), 371–376.

Johnson, N. F. (2007). *Two's company, three is complexity: A simple guide to the science of all sciences*. One world.

Kearney, C., & Meynhardt, T. (2016). Directing corporate entrepreneurship strategy in the public sector to public value: Antecedents, components, and outcomes. *Int Public Manag J, 19*, 543–572.

Klein, P. G., Mahoney, J. T., Mcgahan, A. M., & Pitielis, C. H. N. (2013). Capabilities and strategic entrepreneurship in public organizations. *Strategic Entrepreneurship Journal, 7*, 70–91.

Klijn, E. H. (2008). Complexity theory and public administration: what's new; key concepts in complexity theory compared to their counterparts in public administration. *Public Manag Rev, 10*(3), 299–317.

Kokhanovskaya, I. I., Fatykhova, A. L., Khachaturyan, A. A., & Khachaturyan, K. S. (2019). Questions of the estimation of efficiency of public administration in modern conditions. In *SHS Web of Conferences* (Vol. 62, p. 02002).

Kooiman, J. (2003). *Governing as Governance*. Sage.

Krishna, I. V. M., & Manikam, V. (2017). Environmental management: science and engineering for industry. Chapter Two. In *Sustainable development* (pp. 5–21).

Kyrgidou, L. P., & Hughes, M. (2010). Strategic entrepreneurship: Origins, core elements and research directions. *European Business Review, 22*(1), 43–63.

Leuenberger, D. Z., & Wakin, M. (2007). Sustainable development in public administration planning: An exploration of social justice, equity, and citizen inclusion. *Administrative Theory & Praxis, 29*(3), 394–411.

Lichtenstein, B. (2014). *Generative emergence: A new discipline of organizational, entrepreneurial, and social innovation*. Oxford Scholarship Online. Chapter 18. Enacting Emergence.

Lissack, M. R., & Gunz, H. P. (1999). Introduction. In M. R. Lissack & H. P. Gunz (Eds.), *Managing complexity in organizations: A view in many directions* (pp. 1–8). Quorum Books.

Matei, A., & Antonie, C. (2014). The new public management within the complexity model. *Procedia Soc Behav Sci, 109*, 1125–1129.

Meijer, A. J., Curtin, D., & Hillebrandt, M. (2012). Open government: Connecting vision and voice. *International Review of Administrative Sciences, 78*, 10–29.

Miller, D. (1983). The correlates of entrepreneurship in three types of firms. *Management Science, 29*(7), 770–792.

Mintzberg, H. (1973). Strategy-making in three modes. *Calif Manage Rev, 16*(2), 44–53.

Mitleton-Kelly, E. (2003a). Ten principles of complexity and enabling infrastructures. In E. Mitleton-Kelly (Ed.), *Complex systems and evolutionary perspectives on organizations: The application of complexity theory to organizations. Advanced series in management* (pp. 3–20). Elsevier Science.

Mitleton-Kelly, E. (2003b). *Ten principles of complexity & enabling infrastructures*. In E. Mitleton-Kelly (Ed.), *Complex systems and evolutionary perspectives of Organisations: The application of complexity theory to organizations* (pp. 23–50). Elsevier.

NAPCRG Resources. (2009). *A complexity science primer: What is complexity science and why should I learn about it?* Adapted from Zimmerman, B., Lindberg, C., & Edgeware, P. P. (1998). Lessons from complexity science for health care leaders. VHA Inc.

OECD. (2011). *Government at a glance*. OECD.

Opolski, K., Modzelewski, P., & Kocia, A. (2013). New approach to network in public administration. *Journal of Applied Business and Economics, 14*(5), 99–109.
Ostrom, E. (1965). *Public entrepreneurship: a case study in ground water basin management*. Doctoral Dissertation. University of California.
Piotrowski, S. J., & Van Ryzin, G. G. (2007). Citizen attitudes toward transparency in local government. *Am Rev Public Adm, 37*(3), 306–323.
Rescher, N. (1998). *Complexity; a philosophical overview*. Transaction Publishers.
Schindehutte, M., & Morris, M. H. (2009). Advancing strategic entrepreneurship research: The role of complexity science in shifting the paradigm. *Enterp Theory Pract, 33*(1), 241–276.
Schlindwein, S. L., & Ison, R. (2004). Human knowing and perceived complexity: implications for systems practice. *Emergence: Complexity and Organization, 6*(3), 27–32.
Shafritz, J., Russell, E. W., & Borick, C. (2017). *Introducing public administration* (3rd ed.). Taylor & Francis.
Starling, G. (2013). *Managing the public sector*. Longman/Pearson Press.
Svara, J. H., & Brunet, J. R. (2004). Filling in the skeletal pillar: Addressing social equity in introductory course in public administration. *Journal of Public Affairs Education, 10*(2), 99–109.
Teece, D. J. (2011). Dynamic capabilities: a guide for manager. *Ivey Business Journal, 75*(2), 29–33.
Teisman, G., & Gerrits, L. (2014). The Emergence of complexity in the art and science of governance. *Complexity, Governance & Networks, 1*(1), 17–28.
Thiele, L. P. (2013). *Sustainability*. Polity Press.
Trainer, F. E. (1997). The global sustainability crisis: The implications for community. *International Journal of Social Economics, 24*(11), 1219–1240.
Tülüce, N. S., & Yurtkur, A. K. (2015). Term of strategic entrepreneurship and Schumpeter's creative destruction theory, 11th International Strategic Management Conference. *Procedia Soc Behav Sci, 207*, 720–728.
Turner, J. R., & Baker, R. M. (2019). Complexity theory: An overview with potential applications for the social sciences. *Systems, 7*(1), 1–23.
UN General Assembly. (2015). *Transforming our world: The 2030 Agenda for sustainable development.* Resolution adopted by the General Assembly on 25 September 2015. United Nations.
UN General Assembly. (2016). *Entrepreneurship for sustainable development*; Resolution adopted by the General Assembly on 21 December 2016. United Nations.
UNDP Global Centre for Public Service Excellence. (2018). *Making the sustainable development goals happen.* https://www.undp.org/content/undp/en/home/librarypage/capacity-building/global-centre-for-public-service-excellence/PS2030.html.
United Nations Industrial Development Organization. (2013). Industrial development report: sustaining employment growth—the role of manufacturing and structural change.
Valle, V. (2000). *Chaos, complexity and deterrence.* http://www.stormingmedia.us/72/7292/A7/29234.html.
Van de Walle, S. & Vogelaar, M. (2010). Emergence and Public Administration: A literature review for the project. A new synthesis in public administration. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.1580126.
Wagner, R. E. (1966). Pressure groups and political entrepreneurs: A review article. *Papers on Non-Market Decision Making, 1*(1), 161–170. https://doi.org/10.1007/BF01718992
WCED. (1978). *Report of the world commission on environment and development: Our common future (UN)*. Oxford University Press.
Zahedi, A., & Otterpohl, R. (2015). Towards sustainable development by creation of green social entrepreneur's communities. *Procedia CIRP*, 196–201.

Part III
Strategic Entrepreneurship: Practices

The Strategic Entrepreneurship Pitching on Crowdfunding Platforms: A Traction Toward Emerging Advanced Technologies

Yilong "Eric" Zheng, Sarfraz A. Mian, and Yiru Wang

Abstract The emerging technologies such as virtual reality, artificial intelligence, machine learning, 5G, internet-of-things (IoT), and other technological advancements are drastically shaping different industries, including entrepreneurs and their businesses, as well as the investors of entrepreneurial firms. Consequently, a growing number of entrepreneurs have incorporated these technological advancements (henceforth called advanced technologies) in their start-up ventures seeking investment from crowdfunding platforms. Due to the complex and emerging nature of these advanced technologies, little is known about whether involving these latest technology transformations in a crowdfunding project could create a strategic advantage over other projects in their conversations about funding acquisition with the general public.

Through the empirical analyses of project descriptions and success rate from the data of two leading crowdfunding platforms, we analyzed the strategic importance of highlighting a single or multiple trendy topics on the funding outcomes—both the amount of funding pledged and the additional dollars pledged to a project. Our results suggest that crowdfunding projects featuring a trendy technology transformation are likely to achieve more funding, thus a better success rate of the project proposal, compared to the non-trendy projects. This relationship appears to be highly significant on Kickstarter and marginally significant on Indiegogo. Such findings expand the current theoretical understanding on technological crowdfunding and provide strategic implications for the entrepreneurs in term of the composition of their fundraising conversations.

Y. "Eric" Zheng (✉)
Marketing, Department of Marketing and Sport Management, Merrimack College, Girard School of Business, North Andover, MA, USA
e-mail: zhengy@merrimack.edu

S. A. Mian
Strategic Management and Entrepreneurship, Department of Marketing and Management, School of Business, State University of New York at Oswego, Oswego, NY, USA
e-mail: sarfraz.mian@oswego.edu

Y. Wang
Marketing, Department of Marketing and Management, School of Business, State University of New York at Oswego, Oswego, NY, USA
e-mail: yiru.wang@oswego.edu

N. Faghih, A. Forouharfar (eds.), *Strategic Entrepreneurship*, Contributions to Management Science, https://doi.org/10.1007/978-3-030-86032-5_10

Keywords Crowdfunding · Advanced technology terms · Language Expectancy Theory (LET)

1 Introduction

According to the International Data Corporation (IDC), the total investment in Digital Transformation (DX/DT[1]) technologies between 2019 and 2023 will increase between 15% and 20% across all sectors (IDC, 2019). The advancement and the digitization of modern devices and applications have shaped people's work and life in an unprecedented way, such as the usage of these technologies during COVID-19 (e.g., grocery shopping utilizing internet-of-things, virtual reality traveling, health device monitoring, and remote doctor checkup). According to Deloitte (2019), machine learning, artificial intelligence, blockchain, and quantum computing will significantly affect the financial and banking sectors. Such large incremental use of these technologies signals a closer connection between technological advancement and the global market, as well as business participants including established companies and entrepreneurial establishments. Specifically, entrepreneurs who tend to react fast to market trends, thus, are more likely to be interested in incorporating technological advancements in their business practices.

Advanced technological projects have become mainstream in the crowdfunding context. In the entrepreneurial financing sector, prominent U.S. crowdfunding platforms such as Kickstarter, Indiegogo, and Gofundme play an active role in the crucial fundraising phase. Entrepreneurs, or small business owners, upload information on their products on these crowdfunding platforms to pitch for investors' support. To date (Sept. 2020), Kickstarter has funded $4.76 billion dollars in projects and Indiegogo has funded over $1 billion dollars in projects (Indiegogo, 2020). The crowdfund platform users then visit the platforms to support the products they are interested in and/or invest in the projects that they find promising. On Kickstarter, advanced technological project category ranks the ninth in terms of the number of projects on Kickstarter, but it is ranked as the third largest project category in terms of getting funded. Over the years, there are 135 projects raised more than 1 million dollars per project, and the most popular project Arsenal intelligent camera assistant got $3,979,245 dollars pledged (Kickstarter, 2020).

For crowdfunding platforms users, due to a lack of accumulated prior knowledge of the business owners and the face-to-face communication cues, the key determinant of a crowdfunding project's success is its pitch, which is the project description content shown on the platform. Business owners describe details about their businesses to facilitate platforms users' purchase or investment decision-making. Prior research has shown that the content of entrepreneurial pitching can heavily

[1] "DT" (e.g. Tabrizi et al., 2019; Vial, 2019) and "DX" (e.g. IDC, 2019) are used interchangeably for "Digital Transformation" in the past literatures.

impact the investors' decisions (Ahlers et al., 2015; Gorbatai & Nelson, 2015; Parhankangas & Renko, 2017).

Following Parhankangas and Renko (2017), we built the theoretical foundation of this study based on the Language Expectancy Theory (Burgoon, 1995). We propose that technology entrepreneurs may achieve a better crowdfunding outcome when they explicitly connect their projects to the trendy technology transformation by adopting certain keywords that make their campaigns more attractive to their target audiences.

Using web-crawled project information from two of the top U.S. crowdfunding platforms, Kickstarter and Indiegogo, we tested our hypotheses using a sample of technology campaigns. We extracted the technology keywords from the pitches and found that entrepreneurs' usage of trendy technology transformation terms led to a significant contribution in terms of dollar amount raised on these crowdfunding platforms. In line with our prediction, we found that using relevant technical terms contributed to the success of project campaigns across different platforms. The results were significant especially for the Kickstarter platform and were marginal for the Indiegogo platform.

This study contributes to the entrepreneurship (especially social entrepreneurship) literature in the area of crowdfunding with a special focus on technological entrepreneurship, and the results shed light on guiding entrepreneurs in terms of how to compose pitches in their fund-raising conversations.

2 Background and Theory

2.1 Technology Advancements and Entrepreneurial Innovation

The seminal entrepreneurship literature positioned innovation as crucial to entrepreneurial development (Schumpeter, 1934; Quinn, 1979). Innovation refers to "creating and introducing original solutions for new or already identified needs" (Quinn, 1979). Throughout the history of entrepreneurship, the successful entrepreneurship establishments are always built on various types of innovations, including the innovation in the form of new products or business solutions (Link et al., 2007). Therefore, entrepreneurs are always at the frontline of incorporating innovations to their businesses.

Innovation is multidisciplinary, it may happen in different contexts including technology, management, policy, and so on. Here, we focus on the technology focused innovation, which referred as "technovation" (Agarwal & Selen, 2006). Technovation happens in a continuum (Nambisan & Sawhney, 2007) from minor alterations to dramatic paradigm shifts (Agarwal & Selen, 2006). For example, in terms of cell phones, the minor alterations can be regular updates on the existing products: cell phone screens go larger from 4.8 to 5.6 in. Such changes may improve the cellphone functionality but most of the users may not experience any counter

intuition. While a paradigm shift can be as groundbreaking as changing from keyboard-based cellphones to touch-screen cellphones that completely revamped consumers' perception of cellphones and their cellphone usage.

Technological advances generated from foundational science such as physics, linguistics, and biology have developed exponentially and induced many groundbreaking technovation. Such technovation typically "involves many disruptive technologies which together enable disruption of industry structure, perhaps accompanied by substantial product, service process and/or organizational innovation" (Millar et al., 2018). Taking "recorded music" as an example, back in 1980 and 1990s, recorded music is either in form of tapes or CD records, each may contain 10–15 songs. As the memory device got smaller and exponentially powerful, MP3 devices occupied more market. Later, as small liquid crystal screens became available and affordable, the portable media players took over not only the music recording market but also cannibalized the video recording market. In the early 2000s, more consumers were using their cellphones to store hundreds of songs and videos. Nowadays, consumers do not even bother how and where to store their music, they have them in the cloud storage which does not even occupy any physical storage space anywhere offline. At the same time, more and more consumers have started to take advantage of the AI technology and let their computers or cellphone programs recommend music depending upon their music playlist, user selected genres, or even user activities on other platforms. The technovation in the music record industry is a representative example of how technovation has impacted everyone's daily life.

Scattered changes also happen in various contexts as we stepped into the "third industrial revolution" represented by the internet-of-things (Rifkin, 2011). As "the gathering place for all those who thrive on the business of consumer technologies" (CTA, 2019). The Consumer Technology Association (CTA) tracked different types of technological advances during 2015–2018 as summarized in Table 1. Here, we review the focal technological advances that were mentioned more than once from 2015 to 2018 in detail since they could be more representative, distinguishing, and impactful among all.

Artificial intelligence (AI) refers to the autonomous response of an entity as a result of its observation of the surroundings (Pomerol, 1997). AI simplifies human life by providing effective and efficient response and decision-making on many matters. Such decisions are made by computers and are automatically based on a series of factors taken into consideration. Computers learnt to make decisions by massive learning and processing of large number of historical cases and observations, while their decision rules are based on the foundational computational logics that were initially written by human computational scientists.

Nowadays, AI is widely adopted in different contexts. In consumer relationship management (CRM), AI provides efficient consumer services 24/7 regardless of the locations. The online shopping assistants can answer a wide range of questions from "Does this pair of shoes fit well?" to "My package went missing, what should I do?" by learning from the embedded dataset of example conversations with other consumers and its own experience communicating with other consumers. AI also helps

Table 1 Technology advancement types during 2015–2018

Occurrences	Technology advancements
2015/2016/2017/2018	Artificial intelligence
2015/2016/2018	Smart home
2016/2017	Augmented reality
	Blockchain
2017/2018	Digital health
2015	Unmanned aerial vehicle
	3D printer
	Internet-of-things
	Big data
	Machine learning
2016	Virtual reality
	Near-field communication
	Content streaming
	4k Ultra TV
	Smart city
	Sharing economy
	Natural language processing
2017	Digital assistant
	Autonomous vehicles
	Voice assistant
2018	5G
	Edge computing

Third-Party Source: Summary of the CTA technological advances 2015–2018

with decision-making in many cases. For example, the trendy investment software Robinhood provides a metrics called "analyst ratings" to indicate the level of tendency to purchase stock, and the stock with a higher rating in terms of "purchase" will generate more buyers and purchases. Also, Facebook's "friend-based" recommendation system would recommend a user to buy items his or her friend recently bought; while the Amazon "purchase-based" recommendation systems provide customers with "more to consider" according to its memory of other consumers' purchasing records. More advanced adoptions happen in the healthcare industry where the Da Vinci Surgical System is adopted in complex cardiovascular and gynecologic surgical procedures to reduce the unnecessary and undesired invasiveness of the procedures.

Smart home technology refers to the remote controlling technology that is realized by using LAN to connect different home devices. When connected via internet, the home devices including washer, dryer, lightings, TV, alarming systems, all become important constituent of the internet-of-things (IoT). The smart home devices can be a $15 smart charger that enables remote control of a lamp using one's smart phone 100 miles from home. It can also be a complex integrated command control center of a large community that services hundreds. Such system integrates

CCTV, ANPR (automated number plate recognition), gate barrier, control center in the central office, while access control, intercom on each client's end.

Augmented reality (AR) refers to the usage of integrated devices to simulate real-life visual, auditory, haptic, somatosensory, and olfactory sensory modalities. Wu et al. (2013) summarized three major functions of AR, which are creating a combination of real and virtual worlds, facilitating real-time interaction and implementing accurate 3D registration of virtual and real objects.

The realization of AR is based on various technological advancements including hardware devices such as high-capacity processor, retina display, projectors, and sensors and input devices such as tracking devices like cameras, speech recognition systems, or body wears such as eyeglasses, contact lens, wands, stylus, pointer, gloves, and so on. The implementation of AR benefits in various industries including help visualizing urban design, architecture, manufacture, and archeology projects, facilitating constructive, cost-effective, and vivid education processes in various STEM (e.g., R swirl learning program), business (e.g., simulation projects), and art (e.g., virtual world-wide museum tours) disciplines.

Blockchain refers to "an open, distributed ledger that can record transactions between two parties efficiently and in a verifiable and permanent way" (Lakhani & Iansiti, 2017). By design, blockchain is embedded within a collectively adherent protocol among all blocks in a close ended network. Once recorded, the data in any block cannot be altered without the consensus of all blocks in the network (Raval, 2016). The open and decentralized characteristics of blockchain technology offer more flexibility and security to users and suit the globalization trend in a more user-friendly way.

The most widely known implication of blockchain technology is the cryptocurrencies such as Bitcoin's use of blockchain technology to record user transactions. Other financial and supply chain services including IMF, IBM, JP Morgan and Chase, Walmart, and so on also adopted the blockchain embedded services to track, distribute, and manage product and service flows and traffic. Nowadays, the blockchain technology can be personalized as well, others cannot join without host permissions, which may offer new and wider adoptions on family financial management, copyright management, and so on.

Digital health refers to the convergence of a series of health-related technological advancements to implement precise and personalized healthcare delivery (Fadahunsi et al., 2019). Digital health solution may include all of the above technological advancements. AI may lead to better decision-making utilizing the machine learning of all historical medical cases and treatment plans in different countries that is far beyond human knowledge base and come up with better treatment plans for the target patient. AR health solutions may provide quick and easy diagnostics for easier cases. For example, the patient can easily find a virtual doctor to get advices to treat minor scald or cut in a timely manner rather than waiting for a doctor's appointment that is weeks from the accident at the same time looking at a big bill.

During COVID-19, such advance is especially salient. To reduce the risk of virus transmission, telemedicine is being widely adopted across the U.S. to reduce unnecessary hospital visits for many patients with chronic diseases. In developing countries, the digital health solutions also reduce cost of medical care and treatment by providing medical care via cellphone communication.

The above technological advances provide entrepreneurs various opportunities and a sizable market to explore and exploit new products and solutions. In the history of entrepreneurship, even one single technology advance may generate multiple successful businesses. For example, the development of internet triggered an endless list of successful businesses including Amazon, Google, Facebook, Airbnb, and so on. These have been the glorious decades for entrepreneurial development, and it also triggered the development of the entrepreneurship discipline. Nowadays, these technovation have provided more entrepreneurial opportunities than ever before.

Compared to large institutions with longer decision-making paths and generally a risk averse orientation (Quinn, 1979), entrepreneurship provides solutions through the technovation exploitation. Entrepreneurs can explore one or many of the above technological advances and exploit such innovations, to gain considerable competitive advantages in the competitive investors' market. Compared with other types of innovations, the technovation projects provide highly reliable, profitable, and sustainable investment opportunities.

2.2 Start-Up Funding Sources

An entrepreneurial establishment's capability to attract investment crucially impacts its success. At the same time, various types of investors are looking for profitable and sustainable projects to invest. In Table 2, we summarized the major features of representative types of entrepreneurial investors (Fried & Hisrich, 1988; Mian, 1997; Hisrich et al., 2013; and so on), including self, financial institutions, angel investors, venture capitalists, government programs and institutions, and so on.

Other than the types of traditional investor programs shown in Table 2, in recent years, more and more entrepreneurial projects are receiving funds from crowdfunding platforms. Crowdfunding has emerged as a crucial source of entrepreneurial funding in recent years. At different entrepreneurship development stages, entrepreneurs may seek financial support from different stakeholders such as family and friends, angel investors, venture capitalists, and commercial banks. For many startup firms, fundraising through crowdfunding platforms is a trendy and effective way of funding early-stage company activities. According to Davis et al. (2017), crowdfunding platform refers to "a democratic funding context that enables entrepreneurs to solicit financial capital from the general public in support of a specific purpose, such as developing a new product." There are now a large number of crowdfunding programs in the world including the US. Statista (2020) report shows that the transaction value of US crowdfunding market has reached US$438.2 million in 2020

Table 2 Entrepreneurial financial investment sources (This table is a summary of a series of entrepreneurship fundraising sources reported by Fried & Hisrich, 1988; Mian, 1997; Hisrich et al., 2013)

	Examples	Timing and term	Pros	Cons
Self	Entrepreneurs' family and friends	Mostly short-term loans at the beginning stage of entrepreneurial development. The entrepreneur has more control over the fund usage	Usually easy to get, with low to 0% interest rate, flexible contracts	Small amount of investment or loan; the loose contract may lead to conflicts and harm interpersonal relationship
Financial institutions	Commercial banks	Can be short- or long-term loan, suitable at all development stages; the banks have more control over the funding usage and term of loan	Relatively large amount of investment; professional contract to protect both parties	Need to provide pawns; need to pay for interests; need to go through strict review and screening processes
Angel investors	Private parties	Typically, short-term investments at the beginning stage of the process; the investor has more control over the term of investment	The investment is very helpful for entrepreneurs, and it can be very profitable for the investor	The investment can be risky for the investors
Venture capitalists	Corporations	Can be short- or long-term investments, typically happen at later development stages, both parties need to reach a mutual agreement on the investment terms	Relatively large amount of investment; solid contract to protect both parties	Need to share interest or equity; risking lose control over the firm; need to go through competitive process
Government programs	Small business associations (SBA)	Typically, in form of loans	Low or 0% interest rate; solid contract to protect both parties	Need to go through strict review process, competitive among many others
Institutions	Universities, organizations, and groups	Can be in various forms including equipment, space, knowledge, and small amount of investment; the institutions have more control over the funding usage and term of loan	Low or 0% interest rate; partnership with mentors; other accessible resources	Financially smaller amount of investment; the investors may desire share of interest; need to create positive word-of-mouth for the institution

Third Party Source: Authors' summary of a series of entrepreneurship fundraising sources reported by Fried and Hisrich 1988, Mian 1997, and Hisrich et al. 2013

with a possible annual growth rate of 6.7%. The more established and known U.S. entrepreneurial crowdfunding platforms are Kickstarter, Indiegogo, and GoFundMe.

Entrepreneurial establishments raise funds through crowdfunding in two ways: (a) sharing equity (FTC permitted equity crowdfunding as of October 2016). In this way, entrepreneurs can collect money via trading portions of the company's equity with the investors; (b) product selling, where the main purpose is on bringing up awareness by promoting and selling company's products/services to reach a broader consumer base to gain financial profits.

This chapter focuses on the second way of fundraising via promoting products and/or services. The literature introduces multiple ways to achieve entrepreneurs' fundraising goals on a crowdfunding platform. Fundraising may be proceeded in the following ways per types of returns offered to the investor (e.g., Shneor et al., 2020):

1. The entrepreneur asks for a relatively small amount to invest (say <$10) and offer the investors only ***virtual feedback*** (e.g., subscribe to updates about the ongoing project, virtual hug, and so on).
2. ***Crowd donating*** is another way for entrepreneurs to achieve their fund-raising goals. Entrepreneurs can ask for the backers to donate a "name your amount" or a suggestive amount of money to the project. Such donation builds on the backers' good will to help the entrepreneurs continuing the project under development.
3. The entrepreneur asks for a moderate amount to invest (around $100) and offers the investors a ***personal conversation*** with a member of the entrepreneur team. Such conversations build interpersonal relationship between the investor and entrepreneur, which may lead to further collaborations between the two.
4. The entrepreneur collects prepaid funds from investors' ***preordering*** of product/service, so that the investors were guaranteed to receive the first batch of the product/service rather than obtaining access to the product/service via lottery as other customers.
5. The entrepreneur collects prepaid funds from investors' preordering of product/service with a ***discounted prize***, which are typically unavailable during regular selling cycles.
6. The entrepreneur collects prepaid funds from investors' ordering of the ***beta edition or early access*** to the product/service, which are typically unavailable during regular selling cycles.
7. The entrepreneur collects prepaid funds from investors' ordering of ***customized product/service***, which are typically unavailable during regular selling cycles.
8. Entrepreneurs can also fundraise via ***crowd lending***. Crowd lending also known as P2P lending has emerged recent years as an innovative way for new ventures to get funded. Rather than collecting financial resources from a professional financial agency, the individual lenders are collectively helping business ventures gain necessary financial resources for its future development (Adhami et al., 2019).

Studies on crowdfunding have been popular in recent years. This literature diverges in two streams: one is to understand how business owners can facilitate

successful crowdfunding outcomes, and the other is to understand how crowdfunding investors make their investment decisions. Both parties are looking to obtain utility from this crowdfunding process. In this study, we are primarily interested to see how entrepreneurs facilitate crowdfunding success in the technological crowdfunding area.

From the past studies, the literature about business owners and entrepreneurs have shown that the proposed project quality (Mollick, 2014) and difficulty (Zheng et al., 2014) predicts crowdfunding success (Mollick, 2014), while serial entrepreneurs tend to do a better job compared to novice entrepreneurs (Buttice et al., 2017). Unlike a face-to-face conversation with angel investors or venture capitalists, conversations via crowdfunding platforms lacking multiple cues to build mutual understanding and trust between business owners and investors, which make the description of the project crucial for trust establishment (Gafni et al., 2019) and investment decision-making (Parhankangas & Renko, 2017). Belleflamme et al. (2012) highlighted the importance of tapping on the matching crowd at the early stage of crowdfunding process to build a community with mutual benefits. It was important that the investors and project hosts are able to obtain utility by committing to the project at early stage.

The success of crowdfunding projects can also be studied from the perspective of quantitative vs. qualitative factors in the crowdfunding process. Multiple studies from the past have demonstrated the practices of crowdfunding in the context of new venture projects. Cordova et al.'s (2015) study on determinants of crowdfunding success from technology projects also showed that project funding goals requested by the investor, project durations, average funding amount per person were all significant predictors for determining the success of projects on the crowdfunding platforms. Studies found that the entrepreneurs' demographic characteristics such as ethnicity (Younkin & Kuppuswamy, 2018), gender, and seniority (Sauermann et al., 2019) may also shape their crowd fundraising outcomes. Further, international fundraising studies also confirmed the importance of quantitative elements in entrepreneurial fundraising process is generalizable across cultural and geographic boundaries. Wang et al. (2018) found that in China, [the potential investors'] "comment quantity, comment sentiment, reply length, and reply speed are positively associated with the fundraising success" (Wang et al., 2018, p. 106).

In addition to the aforementioned quantitative and qualitative elements which are often measured in previous studies, there is another stream of literature about "entrepreneurial pitches" which also seem to be relevant to the success of a crowdfunding project. Entrepreneurs may frame the campaign pitches to be more understandable and relatable to the crowdfunding platform users to boost the success of entrepreneurial campaigns (Parhankangas & Renko, 2017). More than that, social relations magnify local altruism and, in turn, gain crowdfunding success (Giudici et al., 2018).

Similar to the concept of shared interests, pitching may amplify the likelihood of idea adoption and success of a project via the proactive effort of crowdfunding hosts. Pitching seems to be different from the concept of shared interests which are often spontaneous and mutually shared, thus less effort from pitchers. As a result, we

believe such qualitative contribution of entrepreneurial pitching in a project can directly affect the success of a project outcome, beyond the assumption of whether there is a shared interest from investors to begin with. Certainly, a commitment of investment may begin with shared interests, but often times these entrepreneurial pitching may provide additional cases of success through the efforts of entrepreneurs. Therefore, in the following section, a deeper discussion of the pitching and the use of language expectancy theory (LET) in hypotheses development will be provided.

2.3 Language Expectancy Theory and Hypothesis Development

As mentioned in the previous section, most of the crowdfunding investment decisions are made based on the entrepreneurial pitches. In terms of entrepreneurial pitches, language used to pitch is the major medium used by the entrepreneur to carry an entrepreneurial project to the crowdfunding investors.

In general, language and usage are considered as a rule-based system where people communicate based on certain rules (Yeheyis et al., 2016). The language usage rules can be simple, for example, witness may find us "nice" when we say "thank you" in response to someone did something good to us, and therefore, they are more likely to engage us in a friendship. On the opposite, they may find us "rude" when such rule is absent, that is, when we fail to say "thank you" in response to someone did something good to us. As a result, they would not form any friendship with us.

Such rules can also be complex, thinking of the negotiation tasks, mock interviews, and business etiquettes students need to learn these specifically as a part of training in the business school. By all means, if the rules of language usage are violated, communication can be either inefficient or troublesome. In the persuasion literature, the language expectancy theory (LET) was proposed by Burgoon (1995) to explain communication strategies, attitudes, and behavioral changes based on the usage of linguistic rules of persuasion. Basically, LET explains how the expectancies of the language usage affect the process and outcome of a persuasion (Burgoon, 1995). In terms of LET, we propose that when processing entrepreneurial pitches, explicit and salient inclusion of advanced technology terms may attract investors and lead them to invest more on those pitches compared to other pitches that failed to explicitly include such terms. Because the explicit featuring of such terms may help investors generate trust (Gafni et al., 2019) and self-justification (Burgoon et al., 2018) toward their investment action. At a higher level, the amount of information and incentives of a project with keywords and relevant content can provide donors excitement and positive anticipation that the project can be rewarding to them.

Entrepreneurship literature has adopted LET in a few scenarios to explain the mechanism of the entrepreneurship pitch information processing. In general, positive rhetoric can signal crowdfunding success (Anglin et al., 2018). Also, novel campaigns are more likely to attract less-frequent, large-sum investors (Horvát

et al., 2018). However, we observe no existing studies on how adoption of particular terms may lead to differences in fundraising outcomes.

H1: Technology crowdfunding projects that explicitly contain advanced technology terms gain more investments from the crowdfunding users.

H2: Technology crowdfunding projects that explicitly contain more advanced technology terms gain excessive investments from the crowdfunding users.

By combining the previously mentioned findings, we decided to conduct analyses on project themes from the key elements (e.g., technology) that entrepreneurs mentioned the project to see if they can help establish more meaningful and better connections via shared interests between successful entrepreneurs and investors. To study the crowdfunding project, we included quantitative measures such as project funding goal and final project funding amounts to help us determine the success of a project. In the crowdfunding platform context, we refer to all project description contents as "entrepreneurial pitches," to give investors a comprehensive understanding of a venture, such pitches may include entrepreneurial story, risk and challenges, entrepreneur profile and credentials, and so on. The "pitching" aspect of a crowdfunding project matches with the discussion of shared interest mentioned previously, so we decided to use the textual analysis from the project description to understand the importance of entrepreneurial pitching. To capture other qualitative aspects of the project, we used both quantitative and qualitative measures such as project duration, project categories, project year, number of investors to serve on the project, and demographic controls.

3 Methods and Data Analysis

In order to understand whether and how specific technology innovation and future technology trends affect the fundraising outcome of entrepreneurial crowdfunding projects, we collected data from the following two sources: (1) consumer electronic show (CES) annual reports and (2) past projects from the two leading crowdfunding platforms—Kickstarter and Indiegogo. After the data collection and necessary data cleaning process using the text mining packages in R, the empirical analyses were then conducted to study our hypotheses. In each of the following sections, we provide a detailed description of the data source, data collection and cleaning process, the key variables used in our empirical models from the project data collected on each of the two crowdfunding platforms, and the final model results.

3.1 Data and Key Variables

We conducted the first step of our data collection by identifying the key innovations and technology trends featured in the annual "tech trends to watch" reports from CES from year 2015 to 2019. The innovations and technology terms highlighted in these annual documents from CES can help provide a credible and universal

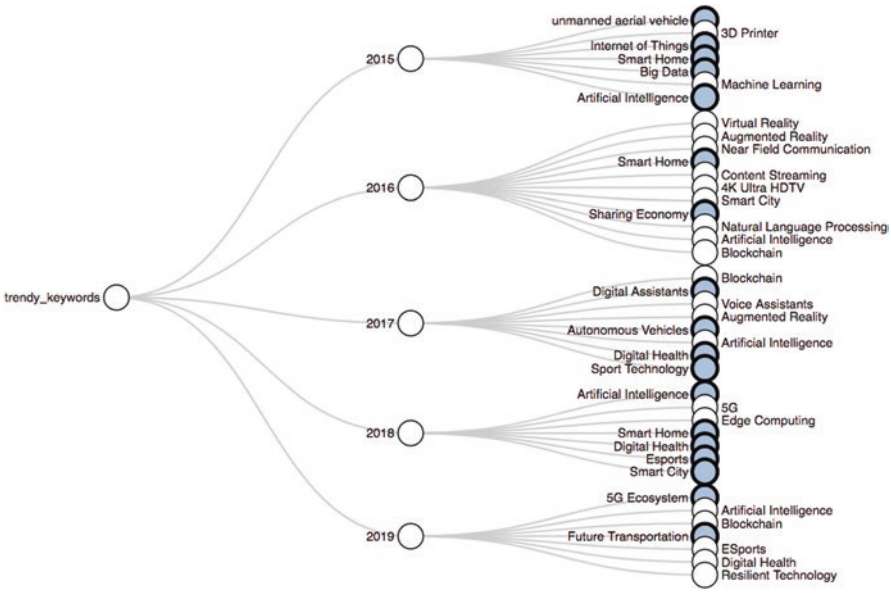


Fig. 1 A keyword tree of technology transformation and trends. (Source: Authors' own work)

standard as to what kind of technological applications have been found trendy in the market across different industries. The keywords highlighted as subtitle of each annual report were first recorded, followed by a careful examination of each paragraph to ensure the content was matched with each keyword. Terms with abbreviations (e.g., internet-of-things as IoT, artificial intelligence as AI) or words with similar expressions or meanings are put into an aggregated level 1 category nested with an additional level of depth. As a result, a total of 27 unique keywords were identified in level 1, and a total of 66 unique keywords in both levels. A tree illustration of these keywords is shown in Fig. 1 below (limited to level 1 to reduce the size of the figure).

After the first step of data collection from CES annual report, we adopted a web crawler using Python to collect past projects (2015–2019) from our two case studies of Kickstarter and Indiegogo crowdfunding platforms. Kickstarter and Indiegogo platforms have been chosen specifically for the following reasons:

1. ***Their overall financial impact***: According to the platform announcements reported by Enventys Partners (2020), Kickstarter and Indiegogo have pledged a total of more than $6.5 billion for the projects hosted by them. Specifically, Kickstarter has raised over $5 billion and Indiegogo has raised over $1.5 billion.
2. ***Geographical and social impact***: Both crowdfunding platforms have provided services to entrepreneurs (e.g., start-ups) and visitors (e.g., investors) not only from different countries and continents but also for profit and nonprofit purposes, which contribute to significant geographical and social impacts. The diversity of projects on both of these platforms also indirectly provides a solid foundation for the generalizability of our study to different countries and organizations.

3. ***Number of technology-related projects hosted***: Both official sites claim that they are the leading platform hosts for start-ups either in terms of the total number of projects or the total number of tech-related projects. While inspecting the number of projects hosted on the platforms, we found that tech-specific categories on both sites ranked as the top two categories in terms of the number of projects.
4. ***Long project phases with detailed information***: Both platforms are similar in terms of phases each project has to go through, and the amount of details required for being hosted on the platforms. The rich amount of description and the transparent information of financial and number of backer support on both platform websites can provide a reliable base for our comparisons between the two platforms.

As to the specific topic categories of the trendy technology applications on both platforms, we decided to first focus on projects from four broad categories: "Tech," "Game," "Design," and "Fashion." These four categories appear to be the most popular and active categories in terms of project number across both platforms. In addition to that, we specifically chose these four categories because they are at the forefront of the latest technologies being adopted, thus projects in these categories would have a higher chance of benefiting from the adoption of latest technology transformation compared to other categories (e.g., "Comics," "Food," "Music"). For each project, we collected the following *Project-level Information* on Kickstarter platform: project link, title, year, number of project durations, number of supporters, the total dollar amount pledged or raised, and the project pitches in texts. Similarly, we also collected projects with similar genres and the same project information from Indiegogo. However, the project duration information from the Indiegogo platform was unavailable.

The data were from around 2000 projects (N = 1984) from Kickstarter, with the project duration of 43 months (October 2015 to April 2019). There was a rather smaller sample of Indiegogo projects (N = 375), compared to that of Kickstarter with the project duration of 40 months (starting 3 months late, January 2016 to April 2019) due to unavoidable data accessibility and verification issues. We chose the specific time range based on both the availability of the data from both websites and the purpose of covering a similar time window of the CES annual reports used in the data collection. A summary of projects data from each platform is provided in Table 3.

Table 3 Description of variables for empirical models

Summary information	Kickstarter platform	Indiegogo platform
Number of projects	N = 1984	N = 375
Project year range	Oct 2015–April 2019	Jan 2016–April 2019
Total money raised	Over $240 million	Over $157 million
Average money raised per project	$121,410	$419,373
Total number of supporters	N = 1,631,472	N = 717,305

Source: Authors' own work

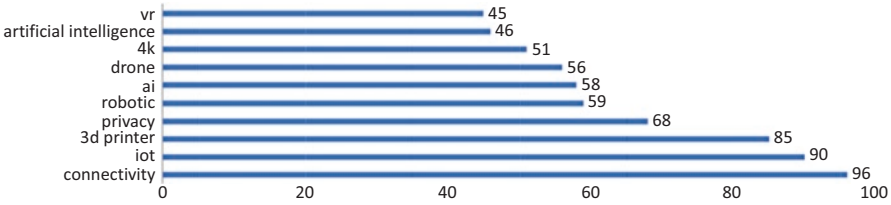


Fig. 2 The top 10 advanced technology terms featured on Kickstarter platform. (Source: Authors' own work)

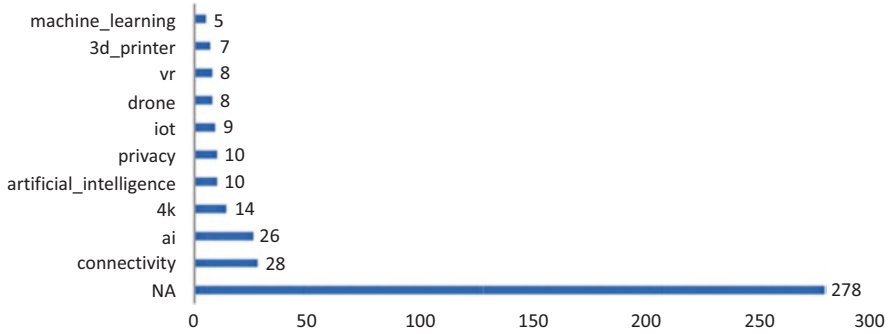


Fig. 3 The top 10 advanced technology terms keywords featured on Indiegogo platform. (Source: Authors' own work)

To understand the frequency of technology transformation keywords mentioned and featured across projects on the two crowdfunding platforms, we provided the top 10 keywords of each platform in Figs. 2 and 3.

We went through data cleaning to remove all the missing data points and errors. For the purpose of extracting and analyzing the content of all the project descriptions across two crowdfunding platforms, we conducted basic text cleaning and mining in R using the "tm" and "SnowballC" package to remove punctuations, whitespace, numbers, common stopwords, and converted all the text into lower case. We then match each of the keywords identified from CES annual reports with the all entrepreneurial pitches to examine the presence of relevant advanced technology keywords.

Consequently, a document-term matrix including the matching of every single keyword with each document row (i.e., project) to identify the frequency of occurrence and whether there is an occurrence of any keyword term in each project. For the purpose of simplicity in future analyses, we created a dummy variable to indicate the presence and absence of keywords per each entrepreneurial pitch, with the minimum of matching frequency at two times (instead of a one-time match to reduce matching of words used for just once or by random chance). In other words, the dummy variable is labeled as "1" if there is a match of any keyword, "0" otherwise. Similarly, for multiple keyword matches, we create another dummy variable

Table 4 Description of variables for empirical models

Data type	Variable name	Variable description
Y_i	Total Amount Raised	Outcome Measure: Total amount raised for a project in dollars ($).
	Additional Amount Raised Over Project Goal	Outcome Measure: Additional amount raised over project goal in dollars ($).
β_i	One Keyword Match	Project Level Variable: 1 = if there is one keyword match, 0 = no, baseline compared to having no match.
	Multiple Keyword Match	Project Level Variable: More than one keyword match dummy variable 1 = if there is one keyword match, 0 = no, baseline compared to having no match.
	Year	Project Level Control Variable: A particular year this project was hosted
C_i	Project Duration	Project Level Control Variable: Number of days a project was on the platform
	Number of Supporters	Project Level Control Variable: Number of supporters indicating how popular a project is and how much support a project is getting from the crowds.

Source: Authors' own work

indicating if there are multiple keyword matches. A description of data variables for the empirical model is provided in Table 4.

3.2 The Models and Results

To test our hypotheses of whether the explicit inclusion of trendy advanced technology terms in a crowdfunding project pitch would help increasing the amount of funds raised, and thus the overall success, we established three linear regression models on the data collected from Kickstarter and Indiegogo platforms.

We established two models for the Kickstarter dataset based on two different dependent variables: the dependent variable for the first model was the "Total Amount Raised ($)" and the dependent variable for the second model was "Additional Amount Raised ($)" beyond the fundraising goal. Given the fact that there was a clear goal established for each crowdfunding project on the Kickstarter platform, we calculated the difference between "Total Amount Raised ($)" and the goal of total amount raised to see how much additional success can be achieved for a project involving trendy technology transformation versus that are not. The importance of additional success is of particular interest, because it reflects a clear marginal effect of technology transformation inclusion on the anticipated success of a project for entrepreneurs.

We ran three linear regression models to examine the hypotheses, and the study results are presented in Table 5.

Table 5 Results of empirical models

	Model 1 Kickstarter	Model 2 Kickstarter	Model 3 Indiegogo
	DV: Total amount raised	DV: Additional amount raised	DV: Total amount raised
Variables	Estimate (S.E.)	Estimate (S.E.)	Estimate (S.E.)
Constant (β_0)	−21,160,000 (1.03E+07)[a]	−25,240,000 (9.91E+06)[a]	415,300,000 (1.30E+08)[b]
Year (β_1)	10,470 (5121)[a]	12,500 (4914)[a]	−205,700 (64,390)[b]
Project Duration (β_2)	1518 (464.1)[b]	1260 (445.4)[b]	
Number of Supporters (β_3)	105.4 (2.137)[b]	102.7 (2.051)[b]	136 (9.582)[b]
One Keyword Match (β_4)	26,510 (12,290)[a]	15,340 (11,790)	56,650 (124,500)
Multiple Keyword Match (β_5)	93,050 (16,300)[b]	69,050 (15,650)[b]	23,580 (16,300)[c]
Number of observations	1984	1984	375
R-squared	0.5744	0.5778	0.400

Note: Standard errors are reported in parentheses
Source: Authors' own work
[a]Indicates significance at the 95%
[b]Indicates significance at the 99%
[c]Indicates significance at the 90%

Across three models, we found a consistent and significant positive effect of adopting advanced technology terms in entrepreneurial pitches across both platforms. Model 1 and Model 2 refer to the Kickstarter platform. In terms of Model 11, the effects of one advanced technology term keyword match ($\beta_4 = 26{,}510$, $p < 0.05$) and multiple advanced technology term keyword matches ($\beta_5 = 93{,}050$, $p < 0.01$) were highly significant, compared to the projects not adopting any of the advanced technology terms in their entrepreneurial pitches. Model 2 further explained the relationship between adopting advanced technology terms and additional dollar amount raised beyond project goal on Kickstarter platform. The results of one keyword match were not significant ($\beta_4 = 15{,}340$, $p > 0.05$) while the multiple keyword matches ($\beta_5 = 69{,}050$, $p < 0.01$) were highly significant, compared to project not featuring any of the advanced technology terms in their project description. For Model 3 refers to the Indiegogo platform, speaking of the funding raised, the result of one keyword match was not significant ($\beta_4 = 56{,}650$, $p > 0.05$) but the multiple keywords match ($\beta_5 = 23{,}580$, $p < 0.1$) was marginally significant, compared to project not featuring any of the advanced technology terms in project pitches.

To control for the right-tail skewness of dependent variables "Total Amount Raised" and "Additional Amount Raised Over Project Goal" in our proposed models, we ran the log transformation (Da Cruz, 2018) on the dependent variables of each proposed models in Table 5. This normalization process via log-transformation on the dependent variables can also help us capture the proportional increase result from the changes in the independent variables. As a standard procedure, we intentionally added 0.001 to any dependent cases containing "0" value to avoid

Table 6 Log transformation results of empirical models

	Model 1 Kickstarter	Model 2 Kickstarter	Model 3 Indiegogo
	DV: Log(Total amount raised)	DV: Log(Additional amount raised)	DV: Log(Total amount raised)
Variables	Estimate (S.E.)	Estimate (S.E.)	Estimate (S.E.)
Constant (β_0)	−145.2 (76.28)[a]	−360.5 (130.6)[b]	2865 (306.9)[b]
Year (β_1)	0.0762 (0.038)[c]	0.1819 (0.06477)[b]	−1.414 (0.1521)[b]
Project Duration (β_2)	0.0361 (0.003)[b]	0.0466 (0.00587)[b]	
Number of Supporters (β_3)	0.0004 (0.00002)[b]	0.00005 (0.00003)[b]	0.0002 (0.00002)[b]
One Keyword Match (β_4)	0.6492 (0.09077)[b]	0.9110 (0.1555)[b]	0.4306 (0.2940)
Multiple Keyword Match (β_5)	1.038 (0.1204)[b]	1.207 (0.2062)[b]	1.554 (0.3354)[b]
No. observations	1984	1984	375
R-squared	0.3085	0.2287	0.3773

Note: Standard errors are reported in parentheses
Source: Authors' own work
[a]Indicates significance at the 90%
[b]Indicates significance at the 99%
[c]Indicates significance at the 95%

undefined value result from the log transformation of "0." The results of log transformation DV model were presented in Table 6. Overall, the results were consistent in direction and significance with the results presented in Table 5. Compared to the second model of "Additional Amount Raised Over Project Goal" in Table 5, the positive effect of one keyword match in the project on the dependent variable turned highly significant ($\beta_4 = 0.91$, $p < 0.05$).

In additional to the independent variable estimates of the model, the relationship between control variables and the dependent variables was also worth noting. On Kickstarter platform, we found positive and significant relationship between the recency, project duration, and the number of supporters on the success of a project, indicating newer projects, projects with longer duration and more supporters are more likely to achieve a higher likelihood of success in crowdfunding. Such results may appear to be intuitive for the first two models, but they provided essential strategic insights on how to successfully establish crowdfunding projects on the Kickstarter platform, especially when it comes to seeking additional support beyond project goals.

Interestingly, we show a negative relationship between project recency and the amount raised of projects on Indiegogo platform, from which we may infer that a newer project is less likely to gain success in crowdfunding when compared to older projects.

4 Discussion

The goal of our study was to examine the strategic placement of the technology transformation on crowdfunding entrepreneurship fundraising. More specifically, whether featuring trendy advanced technology terms in a project pitch can help entrepreneurs raise more funds on typical crowdfunding platforms.

Our hypotheses proposed a positive relationship between the number of advanced technology terms (at one keyword and multiple keyword matches level) mentioned in an entrepreneurial pitch and the crowdfunding outcomes in terms of the dollar amount raised. Through text mining and content analyses of the project pitches across two mainstream U.S. entrepreneurial crowdfunding platforms (Kickstarter and Indiegogo), we were able to match the keywords highlighted in CES annual trendy technology report with the keywords featured in each crowdfunding project pitch. The overall results supported our hypotheses that explicitly featuring advanced technology terms leads to significant increases in the amount of funds raised at the Kickstarter and Indiegogo platforms we studied. We found that entrepreneurial projects featuring these advanced technology terms are more likely to achieve more overall funding amounts (thus enhancing the proposal success rates), compared to projects without such terms.

For Kickstarter, featuring more than one type of trendy technology can further increase the success of crowdfunding proposals; this marginal effect provides important insights on how entrepreneurs can attain sustainable success in their project funding on crowdfunding platform campaigns using additional technology transformation (reflected by the keywords mentioned). The results suggested a strong preference of crowdfunding investors on investing these trendy advanced technology projects featuring these keywords over other projects that are not in the same category. Similar findings were present on the Indiegogo case as well.

4.1 Managerial Implication and Contributions of the Study

Our study contributes to the ongoing research in two ways: (1) exploring future growth trends in strategic technology entrepreneurship and (2) the success factors of strategic crowdfunding operations in entrepreneurial competitions. Here, we note our contribution in both theoretical and managerial facets.

Theoretically, our results add new insights into the crowdfunding literature in the field of strategic entrepreneurship to further enrich this literature stream. Previous literature has indicated that communicating different content frames in crowdfunding pitches may trigger consumer perceptions differently. While our study explicitly specified such findings into the trendy technological crowdfunding context. Our findings shed light on understanding the relationship between trend adoption (signaled by the inclusion of emerging advanced technology terms in the entrepreneurial pitches) and the practical success of entrepreneurship projects in fundraising.

4.2 Adopting Technovation Terms Strategically in Crowdfunding

Practically, the findings of this research also provide strategic guidance to **entrepreneurs pitching** on crowdfunding platforms, as we emphasized that entrepreneurs need to focus on the little details to form a successful pitch. Not only the general message but also the specific terms used in a crowdfunding pitch may have a significant impact on the success of the crowdfunding projects. Specifically, to gain a better crowdfunding outcome, the entrepreneurs should make the technovation terms more explicit and salient in their crowdfunding pitches to effectively communicate the innovativeness of their projects, and leverage the congruence between the positioning of a technology project and the backers' technovation schema.

Moreover, the findings of this research also shed light on how crowdfunding platforms can strategically improve the platform design features to better facilitate project successes. Entrepreneurs rely on a strategically designed crowdfunding platform to better present their projects and gain crowdfunding successes. The study findings show the importance of explicit and salient technovation terms in getting a project funded. Therefore, more crowdfunding platforms can better help entrepreneurs reaching fundraising goals by revamping the platform design. For example, the platforms could utilize the "keywords" function to present the relevant technovation terms saliently on the project page to the backers. To do that, the platform can ask the entrepreneurs to come up with their own technovation terms, or use machine learning to generate automatic technovation terms for different projects. The benefit of doing so is bi-fold. One, intuitively, the platforms could gain more commissions due to hosting more successful entrepreneurial pitches. Two, the platforms that adopted such innovation on platform design may gain more customers including entrepreneurs and backers because of the positive brand image due to professional technovation adoption.

Such findings can also be generalized for entrepreneurs and other crowdfinancing platforms including crowd lending, equity crowdfunding, crowd donating platforms, and so on. Therefore, utilizing specific, salient, and explicit technovation terms may lead to crowdfunding success.

From managerial and practical perspectives, our findings encourage a strategic utilization of technovation terms in crowdfunding pitches and crowdfunding platform design. When entrepreneurs are able to make the technovation terms explicit and salient in their pitches, they are more likely to raise more funds; when a platform can adopt a strategic design and facilitate salient appearance of technovation terms in consumer pitches, the platforms benefit from that as well. Therefore, both entrepreneurs and the crowdfunding platforms gain competitive advantage from making technovation terms more salient, which otherwise may fail to do so. Therefore, our results may guide entrepreneurs' practices in terms of facilitating successful online crowdfunding campaigns by simply incorporating the advanced technology terms in the relevant technological crowdfunding events and communicating through their pitches.

By highlighting the importance of communicating strategic implications through innovation, especially the technovation relevant innovations, the study encourages more STEM relevant crowdfunding funding practice, which benefits the emerging advanced technology industry, and the knowledge economy as a whole keep the vitality and the desirability of wealth creation for the society at large.

More conversations about these trendy technologies should be encouraged when establishing project proposal on different crowdfunding sites. Indeed, the chances for early project and entrepreneurial success seem more feasible when entrepreneurs ride with the trendy technology transformation tide compared to doing otherwise and make those terms visible and salient to the potential investor. Our results highlight the importance of incorporating and communicating the right keywords in a crowdfunding pitch. The investors have certain expectations when they read and process an entrepreneurial pitch, while the explicit presentation of one or more trendy "advanced technology" terms may help with the justification of an investment decision.

There is generally a mutual expectation on an outcome emerging from the establishment of sponsorship between the project investor(s) and project host(s) via an agreement. Along the similar line, we would also encourage the strategic investment plan of the investors and crowds to pay attention to the following key points: (1) The higher likelihood of success of a project is positively correlated with the number of potential investors who can be attracted to the project based on well-communicated descriptions. Thus, investing in projects with trendy technological innovations can naturally increase the likelihood of investor receiving the corresponding return as a result of popularity and bandwagon effect (2). Although not all trendy technological transformations are equally perceived and followed in reality, we were able to see the similar patterns occurring in adjacent years (*see* Fig. 1), meaning that technological innovations can improve and evolve with a more generous time window. From an investment perspective, projects carrying the terms identified in our study based on CES annual report were able to help achieve the successful outcome in the similar way (3). Having multiple focuses and terms highlighted in the description can be a good strategy based on the outcome we observed. There is certainly an additional effect to the success of outcome.

As we have previously discussed, the popularity and similarity of both Kickstarter and Indiegogo platforms as well as the significant impact of our findings may offer insights and new practical solutions to those smaller but similar crowdfunding sites in the crowdfunding platform market. By hosting and supporting projects featuring trendy technologies, platforms can potentially encourage more start-ups and investors to participate in the crowdfunding campaigns. This is particularly meaningful, given the fact that the crowdfunding market and the overall impact of this type of micro-financing practices are becoming increasingly popular in the future. Specifically, for instance, to achieve crowdfunding success, the entrepreneurs may want to explicitly incorporate more trendy or professional terms so that the potential backers may efficiently capture the keywords and justify their investment decisions. Such results may also be generalizable to other contexts and crowdfunding platforms.

4.3 Limitations and Future Research Direction

We adopted the econometric approach to account for alternative explanations; however, randomized experiments or field experiments may bring us closer to causal conclusions (Antonakis et al., 2010). Furthermore, the content analysis of entrepreneurship pitches is based on a fuzzy count of keywords, which can be somehow imprecise.

In addition, two other limitations of our study offer promising directions for future research. On the one hand, we considered only four types of entrepreneurship crowdfunding projects. However, the incorporation of advanced technology may also spillover to more project categories, such as art or film. We have not explored such an effect across project categories on each of the platform in this study. Future research might use crowdfunding data from other categories to dive deeper into investment behaviors in other product contexts and show how such incorporation may differ across different product categories.

Moreover, like many other crowdfunding focused studies, the current study only looks at two of the top U.S. commercial crowdfunding platforms, which may prohibit us from generalizing our results to various crowdfunding platforms around the world. Future research may address practices in other crowdfunding platforms in varied national and sectoral contexts, such as social crowdfunding platforms, equity crowdfunding platforms, across the globe.

5 Conclusion

We conclude that the strategic entrepreneurship pitching by entrepreneurs at crowdfunding platforms will find investors as more likely to invest in emerging advanced technology ventures. Those entrepreneurs presenting their technology projects with explicit and salient inclusion of advanced technology technovation terms will be more successful in acquiring funds through crowdfunding. According to the language expectancy theory, such well-communicated pitches articulating the technology investment perceived as having strategic implications will more likely to signal success and attract investors due to the matching schema thus supporting strategic entrepreneurship.

References

Agarwal, R., & Selen, W. (2006). The impact of technovation and collaboration on strategic service classification in the digital economy. In *Global Conference on Emergent Business Phenomena in the Digital Economy*.

Ahlers, G. K., Cumming, D., Günther, C., & Schweizer, D. (2015). Signaling in equity crowdfunding. *Entrepreneurship Theory and Practice, 39*(4), 955–980.

Adhami, S., Gianfrate, G., & Johan, S. A. (2019) Risks and returns in crowdlending. Available at SSRN: https://ssrn.com/abstract=3345874

Anglin, A. H., Short, J. C., Drover, W., Stevenson, R. M., McKenny, A. F., & Allison, T. H. (2018). The power of positivity? The influence of positive psychological capital language on crowdfunding performance. *Journal of Business Venturing, 33*(4), 470–492.

Antonakis, J., Bendahan, S., Jacquart, P., & Lalive, R. (2010). On making causal claims: A review and recommendations. *The Leadership Quarterly, 21*(6), 1086–1120.

Belleflamme, P., Lambert, T., & Schwienbacher, A. (2012). Crowdfunding: Tapping the right crowd. *Journal of Business Venturing, 29*, 585–609.

Burgoon, M., (1995). Language expectancy theory: Elaboration, explication, and extension. In C. R. Berger & M. Burgoon (Eds.), *Communication and social influence processes* (pp. 29–51). Michigan State University Press.

Buttice, V., Colombo, M. G., & Wright, M. (2017). Serial crowdfunding, social capital, and project success. *Entrepreneurship Theory and Practice, 41*(2), 183–207.

Burgoon, M., & Miller., G. R. (1985). An expectancy interpretation of language and persuasion. In Recent advances in language, communication, and socialpsychology. Giles, H. and R.N. Clair (eds.). 199-229. Lawrence Erlbaum. Associates, London.

Consumer Technology Association (CTA). (2019). *CES 2020*. https://www.innovize.com/event/ces-2020/

Cordova, A., Dolci, J., & Gianfrate, G. (2015). The determinants of crowdfunding success: Evidence from technology projects. *Procedia – Social and Behavioral Science, 181*, 115–124.

Da Cruz, J. V. (2018). Beyond financing: Crowdfunding as an informational mechanism. *Journal of Business Venturing, 33*(3), 371–393.

Davis, B. C., Hmieleski, K. M., Webb, J. W., & Coombs, J. E. (2017). Funders' positive affective reactions to entrepreneurs' crowdfunding pitches: The influence of perceived product creativity and entrepreneurial passion. *Journal of Business Venturing, 32*(1), 90–106.

Deloitte. (2019). *Banking and capital markets outlook—Reimagining transformation*. https://www2.deloitte.com/cy/en/pages/nancial-services/articles/gx-bank-ing-industry-outlook.html

Enventys Partners (2020). *Kickstarter vs. Indiegogo – Which platform should you choose?* https://enventyspartners.com/blog/kickstarter-vs-indiegogo-platform-choose/

Fadahunsi, K. P., Akinlua, J. T., O'Connor, S., Wark, P. A., Gallagher, J., Carroll, C., & O'Donoghue, J. (2019). Protocol for a systematic review and qualitative synthesis of information quality frameworks in eHealth. *BMJ Open, 9*(3), e024722.

Fried, V. H., & Hisrich, R. D. (1988). Venture capital research: Past, present and future. *Entrepreneurship Theory and Practice, 13*(1), 15–28.

Gafni, H., Marom, D., & Sade, O. (2019). Are the life and death of an early-stage venture indeed in the power of the tongue? Lessons from online crowdfunding pitches. *Strategic Entrepreneurship Journal, 13*(1), 3–23.

Giudici, G., Guerini, M., & Rossi-Lamastra, C. (2018). Reward-based crowdfunding of entrepreneurial projects: The effect of local altruism and localized social capital on proponents' success. *Small Business Economics, 50*(2), 307–324.

Gorbatai, A. D., & Nelson, L. (2015). Gender and the language of crowdfunding. *Academy of Management Proceedings, 2015*(1), 15785.

Hisrich, R. D., Manimala, M. J., Peters, M. P., & Shepherd, D. A. (2013). *Entrepreneurship*. McGraw-Hill.

Horvát, E. Á., Wachs, J., Wang, R., & Hannák, A. (2018). The role of novelty in securing investors for equity crowdfunding campaigns. In *Sixth AAAI Conference on Human Computation and Crowdsourcing*.

Indiegogo. (2020). https://entrepreneur.indiegogo.com/how-it-works/

International Data Corporation (IDC). (2019). *Worldwide spending on digital transformation will reach $2.3 trillion in 2023, more than half of all ICT spending, according to a new IDC spending guide*. https://www.idc.com/getdoc.jsp?containerId=prUS45612419

Kickstarter. (2020). https://www.kickstarter.com/help/stats

Lakhani, K. R., & Iansiti, M. (2017). The truth about blockchain. *Harvard Business Review, 95*(1), 119–127.
Link, A. N., Siegel, D. S., & Siegel, D. (2007). *Innovation, entrepreneurship, and technological change*. Oxford University Press on Demand.
Mian, S. A. (1997). Assessing and managing the university technology business incubator: An integrative framework. *Journal of Business Venturing, 12*(4), 251–285.
Millar, C., Lockett, M., & Ladd, T. (2018). Disruption: Technology, innovation and society. *Technological Forecasting and Social Change, 129*, 254–260.
Mollick, E. (2014). The dynamics of crowdfunding: An exploratory study. *Journal of Business Venturing, 29*(1), 1–16.
Nambisan, S., & Sawhney, M. (2007). A buyer’s guide to the innovation bazaar. *Harvard Business Review, 85*(6), 109.
Parhankangas, A., & Renko, M. (2017). Linguistic style and crowdfunding success among social and commercial entrepreneurs. *Journal of Business Venturing, 32*(2), 215–236.
Pomerol, J. C. (1997). Artificial intelligence and human decision making. *European Journal of Operational Research, 99*(1), 3–25.
Quinn, J. B. (1979). Technological innovation, entrepreneurship, and strategy. *Sloan Management Review, 20*(3), 19.
Raval, S. (2016). *Decentralized applications: Harnessing bitcoin’s blockchain technology*. O’Reilly Media.
Rifkin, J. (2011). *The third industrial revolution: How lateral power is transforming energy, the economy, and the world*. Macmillan.
Sauermann, H., Franzoni, C., & Shafi, K. (2019). Crowdfunding scientific research: Descriptive insights and correlates of funding success. *PLoS One, 14*(1), e0208384.
Schumpeter, J. A. (1934). *The theory of economic development*. Oxford University Press.
Shneor, R., Zhao, L., & Flåten, B. T. (2020). *Advances in crowdfunding*. Palgrave Macmillan.
Statista. (2020). *Crowdfunding*. Statista.com. https://www.statista.com/outlook/335/109/crowdfunding/united-states
Tabrizi, B., Lam, E., Girard, K., & Irvin, V. (2019). Digital transformation is not about technology. *Harvard Business Review*. https://store.hbr.org/product/digital-transformation-is-not-about-technology/H04TO3
Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems, 28*(2), 118–144.
Wang, N., Li, Q., Liang, H., Ye, T., & Ge, S. (2018). Understanding the importance of interaction between creators and backers in crowdfunding success. *Electronic Commerce Research and Applications, 27*, 106–117.
Wu, H. K., Lee, S. W. Y., Chang, H. Y., & Liang, J. C. (2013). Current status, opportunities and challenges of augmented reality in education. *Computers & Education, 62*, 41–49.
Yeheyis, M., Reza, B., Hewage, K., Ruwanpura, J. Y., & Sadiq, R. (2016). Evaluating motivation of construction workers: A comparison of fuzzy rule-based model with the traditional expectancy theory. *Journal of Civil Engineering and Management, 22*(7), 862–873.
Younkin, P., & Kuppuswamy, V. (2018). The colorblind crowd? Founder race and performance in crowdfunding. *Management Science, 64*(7), 3269–3287.
Zheng, H., Wan, N., Chen, D., & Wang, T. (2014). Antecedents of project implementation success in crowdfunding. In *PACIS* (p. 318).

Technology-Based Entrepreneurship: Venture Inception, Entrepreneurial Aspirations, and Background

Virginia Simón-Moya, Maria Orero-Blat, and Domingo Ribeiro-Soriano

Abstract Technology-based entrepreneurship has been studied from a range of perspectives. However, this research area still needs further development. We conducted qualitative analysis of seven cases of start-ups in the Spanish entrepreneurial ecosystem. To do so, we have conducted semi-open interviews, the information from which we have contrasted with data from the venture's website in order to triangulate the information. Our aim was to detect relationships between the background and aspirations of entrepreneurs and the inception type of their ventures. Here, inception type refers to the system or structure within which an entrepreneur chooses to develop a venture. The results show that novice entrepreneurs accumulate a strong industry background but lack entrepreneurial experience and business knowledge. Hence, they usually choose to nurture their ventures within a business ecosystem. By contrast, habitual entrepreneurs already have entrepreneurial experience in the sector, so they fit more closely with the theoretical concept of the 'garage' or lone entrepreneur.

Keywords Technology-based entrepreneurship · Entrepreneur's background · Entrepreneur's aspirations · Venture inception

1 Introduction

The study of entrepreneurship is justified by its contribution to the economy (Minniti et al., 2006). In the case of technology-based entrepreneurship (TBE), this contribution seems even stronger. TBE not only influences traditional factors such as employment and GDP but also contributes through a high degree of innovation.

V. Simón-Moya (✉) · D. Ribeiro-Soriano
IUDESCOOP and Business Administration Department, University of Valencia, Valencia, Spain
e-mail: Virginia.simon@uv.es; Domingo.ribeiro@uv.es

M. Orero-Blat
Business Organization Department, Polytechnic University of Valencia, Valencia, Spain
e-mail: morebla@upv.es

N. Faghih, A. Forouharfar (eds.), *Strategic Entrepreneurship*, Contributions to Management Science, https://doi.org/10.1007/978-3-030-86032-5_11

Therefore, the analysis presented in this chapter is justified by the very real and meaningful contribution of TBE to the local, regional and national economy.

From a practical point of view, studies of TBE are an important way to determine the success factors that enable entrepreneurs to overcome the liability of newness and the liability of smallness that new firms usually face (Bruderl & Schussler, 1990). It is thus possible to identify the ventures most in need of help and support or the ones that public administrations should endeavour to promote and nurture. Identifying these ventures is crucial to establish an adequate subsidy system for new companies. From a theoretical perspective, studying TBE is important for the continued advancement of knowledge of entrepreneurship. Nicholls (2010) alluded to the 'preparadigmatic field of research' of social entrepreneurship to encourage research and empirical studies in this area. However, there are so many types of entrepreneurship that the same reasoning may be applied to, one of those being TBE.

Some researches on TBE have addressed the first steps of venture constitution from a theoretical point of view (Hsu, 2008). Others have done so from the perspective of innovation, building on the innovation literature (Ziedonis, 2008). However, there has been little research on TBE from the perspective of its very inception, which refers here to the conditions under which TBE occurs. To help fill this gap in the research, this chapter summarises the core literature and develops a qualitative method in which the central actors of TBE—the entrepreneurs themselves—form the focus of the study.

The first part of the chapter centres on the theoretical framework, providing a literature review of TBE conditions. Two key sets of factors are considered. The first is the entrepreneur's background. In this part, the most important features of entrepreneurs are reviewed. The second part discusses the types of venture inception (lone entrepreneurship vs. entrepreneurship within an ecosystem) and explains the main sources of opportunity discovery. After that, the interview method is described. Finally, the results and conclusions are presented.

2 Theoretical Framework

2.1 Technology-Based Entrepreneurship

Although scholars have not yet agreed on a single definition of TBE, it seems that all new technology-based firms have certain features. For example, they usually have growth potential, need external financing and focus on internationalisation. They also cluster in certain areas, are often spin-offs from other organisations and arise in incubators or science parks. Moreover, they support technology transfer, are created by teams and are run by entrepreneurs who usually have higher education or university studies (Rodríguez-Gulías et al., 2016). The literature also reveals a consensus that TBE entails the recognition and exploitation of opportunities in relation to a technological solution (Ratinho et al., 2015). The most consistent feature of

TBE is its high investment in technology and R&D (Camisón-Haba et al., 2019) and indicators of high innovation performance (Camisón-Haba et al., 2019; Hussain et al., 2019). Hence, this field of study represents a challenge for researchers. When addressing entrepreneurship, the focus is usually on management studies. However, when addressing TBE, the focus is on diverse academic areas (Hsu, 2008). One of these academic areas is, of course, management, but technical areas must also be considered.

One of the central figures in entrepreneurship is the entrepreneur. Entrepreneurs have been studied from different approaches such as their educational background (Van Praag, 2003), their motivation (McMullen et al., 2008; Shane et al., 2003), their personality traits (Marcati et al., 2008) and other factors such as age and gender (Bau et al., 2017). TBE entrepreneurs have been studied from the point of view of their knowledge, with a distinction drawn between commercial and technical knowledge (Hsu, 2008). These two types of knowledge can come from an entrepreneur's education and/or experience, depending on the source of knowledge acquisition (Gray, 2006).

Linked to the background of entrepreneurs, and thus their knowledge, are their entrepreneurial aspirations (Santisteban, 2019). Entrepreneurial aspirations refer to whether the entrepreneur is a novice or habitual entrepreneur (Plehn-Dujowich, 2010). Novice entrepreneurs are those who 'launch a business for the first time' (Plehn-Dujowich, 2010: 377). Habitual entrepreneurs include serial and portfolio entrepreneurs. Serial entrepreneurs are individuals who undertake businesses sequentially, whereas portfolio entrepreneurs run more than one business at the same time (Plehn-Dujowich, 2010).

A separate issue, yet one that is also related to the entrepreneur's background and entrepreneurial activity, is the venture inception, or the conditions surrounding the origin of the venture. This factor refers to the circumstances in which the venture is undertaken. Ventures can be created in isolation, with no financial or advisory support and no network or links to other entrepreneurs. However, ventures can also be founded in an entrepreneurial context—for example, as a spin-off—or within a cluster or business incubator.

Of these three factors, two (background and entrepreneurial aspirations) depend on the entrepreneur, and one (venture inception) is linked to venture context. These three factors form the core of this research. Our main goal is to establish possible relationships amongst these factors in technology-based entrepreneurship (TBE).

2.2 Entrepreneurial Factors

2.2.1 The Entrepreneur's Background

Regardless of the type of entrepreneurship, scholars agree that education and experience are important considerations. Both are usually linked to better recognition of entrepreneurial opportunities (Shane, 2008a, b), which typically leads to superior

performance (Headd, 2003). The knowledge that comes from an entrepreneur's background may be general or specific. General knowledge 'can be used to solve any problem in any area' (Tricot & Sweller, 2013: 266). Specific knowledge, on the other hand, 'can lead to action permitting specified task completion over indefinite periods of time' (Tricot & Sweller, 2013: 266). The relative importance of each is an open question that some authors have attempted to answer (Van Praag, 2003).

This chapter focuses on TBE. In this area, the debate takes place on other terms. It seems that when TBEs are created, two types of specific knowledge are crucial: commercial knowledge and technical knowledge. The relative importance of each one depends on the stage of the start-up (Hsu, 2008). Thus, for a start-up that is in its initial phase, or even in the phase of entrepreneurial intention (GEM, 2020), the relative importance of technical knowledge is high. By contrast, for an established venture, the relative importance of technical knowledge is lower. In this case, commercial knowledge is highly important in relative terms (Hsu, 2008).

Despite considering these two types of specific knowledge separately, it seems reasonable to think of general and specific knowledge not as watertight compartments but rather as a continuum in which knowledge can vary in its degree of specificity. The commercial knowledge needed to create a venture may be common to several businesses. In contrast, technical knowledge is specific for each type of business. Hence, technical knowledge has a higher degree of specificity than commercial knowledge.

The high degree of specificity of technical knowledge in some sectors can be an issue, as is the case in TBE. For Hsu (2008: 372), the bounded rationality of entrepreneurs, combined with certain routines and learning myopia, can locally circumscribe the 'technological search process', which refers to the process of opportunity search in TBE. In addition, the tacit nature of technical knowledge hinders its exchange through social interactions (Hsu, 2008). Business clusters are a good way of dealing with this issue. Geographical proximity helps capture knowledge spillovers from competitors or similar ventures, increasing a venture's absorptive capacity (Cohen & Levinthal, 1990). Aware of its importance, entrepreneurs try to develop their absorptive capacity by increasing their stock of education and experience on the technical side (Gray, 2006). Doing so can help them 'recognize the value of new, external information, assimilate it, and apply it to commercial ends' (Cohen & Levinthal, 1990: 128). Also, by searching out a good partner with whom to form 'learning alliances', entrepreneurs can exploit the knowledge created by others faster than creating knowledge on their own (Lane & Lubatkin, 1998).

In terms of commercial knowledge, regardless of the type of entrepreneurship, one of the most important factors seems to be awareness of the sector. This awareness means knowing how clients and suppliers work and which routines and resources are most valuable to outperform competitors (Hsu, 2008). In this case, just like in the case of technical knowledge, knowledge transfer has a crucial role. The transfer here is more closely related to experience in the same sector, as both an employee and an entrepreneur. Hence, in most cases, successful TBE ventures are spin-offs from successful parent firms (Hsu, 2008). The recombination of

knowledge from the parent firm to the spin-off creates a pool of knowledge that can be very useful in terms of commercial knowledge for new ventures (Kotha, 2010).

2.2.2 Entrepreneurial Aspirations

Entrepreneurial aspirations likewise depend on entrepreneurial characteristics (Santisteban, 2019). When individuals decide to constitute a venture, they do so for some reason. The recognition of entrepreneurial opportunities is 'a complex function of active search, problem solving ability, prior knowledge, and serendipity' (Hsu, 2008: 371). The 'active search' referred to in this statement suggests that finding entrepreneurial opportunities involves the pursuit of those opportunities. The implication is that entrepreneurs have a sort of 'entrepreneurial alertness' (Kirzner, 1979: 11) through which they explore the opportunities that they later exploit. The title of this section, 'Entrepreneurial aspirations', refers to the consensus in the literature that some individuals seek to be entrepreneurs. The reasons why they do so are diverse, although the most common ones are the freedom that comes with starting one's own business, control over one's time, personal wealth, security for oneself and one's family and recognition (Westhead et al., 2005). The greater these motivations are, the more likely an entrepreneur is to start a business. These motivations, together with other entrepreneurial characteristics such as gender and age (Bau et al., 2017), differentiate those who try to constitute a venture just once and those who try repeatedly, despite previous business failures. Clearly, all entrepreneurs start a business for the first time and are thus novice entrepreneurs once (Westhead et al., 2005). However, entrepreneurs may become *habitual* entrepreneurs if they decide to start a venture again. There are two types of habitual entrepreneur: *serial entrepreneurs* and *portfolio entrepreneurs* (Plehn-Dujowich, 2010). The difference lies in whether the businesses are started sequentially or concurrently. Whereas serial entrepreneurs start a new business only once they have exited the previous one (whatever the cause for that exit may be), portfolio entrepreneurs run different businesses at the same time (Plehn-Dujowich, 2010). The importance of studying habitual versus novice entrepreneurs is twofold: the difference in business performance (Plehn-Dujowich, 2010) and the major contribution of habitual entrepreneurs to the total rate of entrepreneurship (Westhead et al., 2005).

First, the study of performance differences is essential. Although the rate of business failure in the early years is not exactly known, it is estimated that just 50% of new ventures survive for 4 years or more (Headd, 2003). This high failure rate early on is known as the liability of newness (Agarwal & Tripsas, 2008; Sarkar et al., 2006). Often, this is compounded by the liability of smallness (Agarwal & Tripsas, 2008; Bruderl & Schussler, 1990) and plays a crucial role in business failure, making the failure rate of nascent entrepreneurship greater than that of established businesses (Headd, 2003).

Regarding the contribution of habitual entrepreneurs to the total rate of entrepreneurship, the study by Westhead et al. (2005) reported that 43.5% of the sampled firms were created by habitual entrepreneurs. However, those authors reported that

this proportion was higher than the one reported elsewhere. For example, Westhead (1988) revealed that, in Wales, 34% of new manufacturing firm founders were habitual entrepreneurs. Taylor (1999) also reported that, across three samples, the country with the most habitual entrepreneurs was Australia, where 49% of surveyed firms were formed by habitual entrepreneurs. One of the most recent studies of the rate of habitual entrepreneurs amongst all entrepreneurs (Bau et al., 2017) showed that 25% of entrepreneurs in the sample were serial entrepreneurs. Nevertheless, the proportion changed by age and gender of the entrepreneur. The moderating effect of these two variables shows that the option of undertaking a business or several businesses depends not only on the discovery of opportunities but also on life motivations. The analysis by Westhead et al. (2005) shows the differences between serial, portfolio and novice entrepreneurs. Their results suggest that whereas habitual entrepreneurs are more driven by motivations such as taking control of their own life, greater flexibility and higher personal wealth, novice entrepreneurs seem to be more driven by necessity (GEM, 2020), since the rate of unemployment in the novice sample was statistically significantly higher than in the habitual entrepreneurship sample.

2.3 Inception Type

Most studies of entrepreneurship take both the venture itself and the venture creation process as their main units of analysis (Westhead et al., 2005). However, a shift in focus is necessary because before the venture, comes the entrepreneur. It is the entrepreneur who decides how the venture should be and determines what type of venture to create. Furthermore, depending on what type of person the entrepreneur is, the context in which the venture is created also varies. Specifically, a venture may be created within a business ecosystem or by a lone entrepreneur in isolation. This choice of where to develop the venture is referred to here as *venture inception type*.

2.3.1 The Lone Entrepreneur

Audia and Rider (2005) published a paper in *California Management Review* entitled ‘A Garage and an Idea: what more does an entrepreneur need?’ The paper analyses the legend of the ‘garage entrepreneur’. The article begins by explaining the origins of Silicon Valley. It then takes a tour through stories of entrepreneurial success such as Hewlett-Packard (HP), Walt Disney, Apple, Mattel and Microsoft, all of which originated in a garage or a similar setting such as a basement, bedroom or kitchen. As the authors explain, the success stories behind their paper help to feed and maintain the garage legend, which ‘evokes the image of the lone individual who relies primarily on his/her extraordinary efforts and talent to overcome the difficulties inherent in creating a new organization’ (Audia & Rider, 2005: 19). The reality, however, is more complex. It has been proven that the creation of a venture is a

process that needs more than a garage and an idea. Specifically, this process requires social relationships (Audia & Rider, 2005; Jenssen, 2001; Kim & Aldrich, 2005). The idea of lone entrepreneurs developing ideas with no other resources than their creativity offers the 'wrong lessons' and 'inculcates an undersocialized view of the entrepreneurial process' (Audia & Rider, 2005: 19). Nevertheless, despite the idealised romantic idea of the lone entrepreneur and even though the process of discovering or creating an opportunity may be viable, it is the exploitation of that opportunity that needs those social relationships. For example, Hewlett-Packard offers an illustrative case. Despite being one of the most paradigmatic cases of lone entrepreneurship, the exploitation of the ideas conceived by William Hewlett and David Packard also involved a social process. The creation of the first product, the audio oscillator, was a lone process. However, as David Packard explains in *The HP Way* (1995),[1] the exploitation of the idea involved several other actors. After his graduation, Packard began working for General Electric. Some years later, William Hewlett designed the first product, an audio oscillator. Shortly afterwards came Walt Disney's order to produce the film *Fantasia*. To continue with production, David Packard had to open a line of credit with Palo Alto National Bank. The great competitive advantage of the company was that it offered the cheapest product in the market of audio oscillators. Their only competitor, the General Radio founder, Melville Eastham, assumed that having two businesses developing the same technology would lend them credibility in the eyes of the customer. Based on this assumption, he provided Hewlett and Packard with valuable advice to develop their idea. One year after its creation, HP had ten employees; just 5 years after that, more than 200 people were working for the company. This tremendous growth occurred during the Second World War, when Hewlett and Packard's company established a bonus system to overcome the wage freezes necessitated by the war effort. This system was the only way to pay workers extra for increasing their productivity. As this example shows, even the paradigmatic case of the garage legend entails a social process involving not only the entrepreneurs themselves but also other key actors.

2.3.2 The Business Ecosystem

The counterpoint to the lone entrepreneur is the collective entrepreneur. These entrepreneurs discover and exploit their ideas in a context of business and relationships designed to constitute and develop a venture. Under this approach, ventures can be created within others or can be created as part of a cluster of ventures. Situations where ventures are created within others through spin-offs supposedly offer the most important source of TBE (Hsu, 2008). The reasons for this are diverse. However, it seems that one of the most widely agreed is summarised by David Audretsch (2008) in the form of the *endogenous entrepreneurship hypothesis*:

[1] All the details of the Hewlett Packard case are taken from *The HP Way: How Bill Hewlett and I built our company (Packard, 2006)*.

> According to the *Endogenous Entrepreneurship Hypothesis*, entrepreneurship is an endogenous response to investments in knowledge made by firms and nonprivate organizations that do not fully commercialize those new ideas, thus generating opportunities for entrepreneurs. Thus, although most of the literature typically takes entrepreneurial opportunities to be exogenous, … they are, in fact, endogenous, and systematically created by investments in knowledge. (Audretsch, 2008: 390)

The author builds on the idea that the knowledge production function does not work in microeconomic analysis. The knowledge production function offers a model in which firms invest in new economic knowledge (the input) to achieve a high degree of innovation (the output). Following this model, the higher the investment in R&D, the higher the degree of innovation. The model has been proven at industry and country level. Nevertheless, although larger firms are able to invest more in R&D than smaller ones, the evidence suggests that the degree of investment is not proportional to business size. Audretsch (2008) draws upon research by Arrow (1962) to explain the characteristics of knowledge resources. These are depicted as resources that are difficult to move and that have high asymmetries between individuals. These characteristics (resource heterogeneity and the difficulty of moving them) form the basis for evaluating the capacity of resources to generate a sustained competitive advantage (Barney, 1991). Furthermore, knowledge can act as an input for the output of entrepreneurship.

> In either case, the knowledge worker will weigh the alternative of starting her own firm. If the gap in the expected return accruing from the potential innovation between the inventor and the corporate decision maker is sufficiently large, and if the cost of starting a new firm is sufficiently low, the employee may decide to leave the large corporation and establish a new enterprise. Since the knowledge was generated in the established corporation, the new startup is considered to be a spin-off from the existing firm. (Audretsch, 2008: 400)

In the context of TBE, entrepreneurs must make a huge effort to invest in new knowledge. Therefore, Audretsch's thesis may offer a possible explanation for the high number of entrepreneurial projects that come from large firms (Hsu, 2008).

Similar reasoning may be applied in reference to business incubators. In such settings, the proximity of firms creates the knowledge input (Audretsch, 2008) or pool of knowledge (Hsu, 2008) necessary to generate and develop ideas. The emergence of private and public business accelerators and incubators in almost every major city around the world has characterised the twenty-first century entrepreneurship (Grimaldi & Grandi, 2005). Start-up incubators offer a new pathway to foster innovation and create new jobs and wealth by working as part of a common project (Guijarro-García et al., 2019). Once these entrepreneurs have a business idea, the exploitation process starts. Throughout this process, the entrepreneurs are supported by an institution and a community of mentors and other entrepreneurs to help guide non-experienced entrepreneurs along their path.

3 Methodology

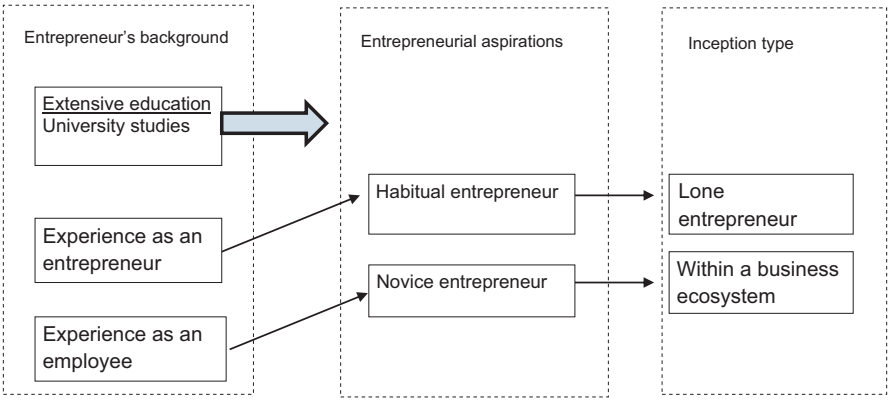
We used a qualitative case study method to study the role of the entrepreneur's background, entrepreneurial aspirations and inception type (Gioia et al., 2013). Seven entrepreneurs were interviewed. In addition, document sources such as business reports were also used. Appendix 2 shows the structure and questionnaire design of the semi-open interviews conducted.

3.1 Sample

Seven successful Spanish technology-based start-ups were chosen for the case studies. The start-ups were randomly selected from websites and news reports discussing their success as technology start-ups. We sought a balance regarding inception type in terms of spin-offs, incubator-based ventures and individual entrepreneurs. The chosen start-ups had existed for less than 5 years. Therefore, they were in the nascent entrepreneurship phase (GEM, 2020). The analysis was carried out from the point of view of the training and background of the entrepreneurial team: motivations to start a business, previous knowledge about the industry, commercial business knowledge, experience in entrepreneurship and the development of entrepreneurial skills. The foundation process and the entrepreneurial team were also studied. Based on this analysis, we can link the inception type of technology-based start-ups with the entrepreneurial profile to generalise to theory (Bansal & Corley, 2011).

The data were collected from complementary primary and secondary sources. We conducted open semi-structured telephone and Skype interviews with the founders and entrepreneurs to investigate their background and collect the data. The average duration of the interviews was 50 min. The data were triangulated using document sources such as the websites and reports of the analysed start-ups, the websites of the incubators of the start-ups, the personal LinkedIn profiles of the entrepreneurs, the Crunchbase database (https://www.crunchbase.com) and comments posted on Glassdoor (https://www.glassdoor.es).

The seven analysed start-ups are technology-based ventures focused either on blockchain technology or on the Internet of Things. They are: Cryptonics Consulting, 2Gether, BlockTac, BI Geek, Solver Machine Learning, Thinger.io and Nearby Computing. The description and history of each venture can be found in Appendix 1.



Source: Authors' own figure

Fig. 1 Model of factors that influence technology-based entrepreneurship. (Source: Authors' own figure)

4 Results

4.1 Case-By-Case Results

This section presents the results of the qualitative analysis. The results for each individual start-up are presented here. We discuss the founding entrepreneurs of each start-up and comment on their motivation, background, technical and business training, experience and skills. Figure 1 summarises the analysis conducted, and common traits and patterns are extracted.

4.1.1 Cryptonics Consulting

Cryptonics Consulting is the blockchain spin-off of the Spanish cybersecurity company S2 Grupo. The CEO and co-founder is a former employee of this organisation. He worked for several years as the R&D Manager of S2 Grupo, doing so in parallel with this blockchain project since 2014. Together with the founding partners of S2 Grupo, he decided to found an independent company focused on blockchain technology in 2019. He holds a PhD in Computer Science and has researched distributed systems since 2004 (pre-Bitcoin). He advises and consults on numerous blockchain and distributed ledger projects throughout Europe and the rest of the world. He has also recently created a Cryptonics Academy course programme, a training platform in distributed systems research, blockchain and cybersecurity. However, although he has held executive positions, he lacks extensive training in business organisation and management. He has learnt about doing business and management by himself thanks to his professional experience and senior positions.

The data indicate that the CEO of Cryptonics is particularly knowledgeable about cybersecurity related to blockchain applications, accumulating excellent know-how, consulting experience, reputation and contacts in the sector. He stresses that the bright side of co-owning a spin-off is sharing resources with an important, well-structured company such as S2 Grupo. Moreover, he receives administrative and financial support with daily activities and duties that are incumbent on all companies but are time-consuming. The trade-off is that belonging to a business group makes some processes slower and longer. A start-up is much more flexible and capable of submitting offers or tenders within 24 h, whereas a larger company needs longer time frames.

4.1.2 2Gether

2Gether was founded in 2016 by the President and his technological partner, whom he defines as 'a technological magician and a born entrepreneur'. In 2018, another member joined the team as the CEO. This coincided with entry to the Lanzadera business accelerator, founded by business owner Juan Roig. The President of the company affirms that the seed of 2Gether has been germinating throughout his professional career, since he has more than 20 years of training and experience in investment banking, quantitative finance and industry and has learnt about new technologies by taking on different positions of responsibility.

He also notes that he has experienced changes in banking in person since the origin of fintech. These changes include regulatory reforms, social changes and the revolution of Bitcoin and smart money in 2008. Founding 2Gether and being faithful to his principles and libertarian values by promoting a free digital bank, he aims to lead change in the entire economic and financial system. Although the President does not have a business family, he has always innovated and engaged in intrapreneurship in all his jobs. The motivation that made him start a business was his frustration with his job. Together with his partners, without whom the existence of 2Gether would be inconceivable, he went to the start-up incubator Lanzadera seeking capital and advice to define his business. He highlights the tremendous support they have received from Lanzadera at all times, as well as contributing to the company concept through the total quality they transmit to their entrepreneurs. This approach has shown them how to deal with problems, take care of the team, use business intelligence, not lose focus and develop a customer-centric idea.

4.1.3 BI Geek

The CEO and founder of BI Geek is a computer engineer by vocation and hobby. His first reality shock was when he started university and saw that the teaching he received was outdated when compared with what he had been learning on his own. At the age of 20, he began working in consulting on system projects for financial entities. Despite not having any training in business, finance or human resources, in

2013, he created his first company as a result of his dissatisfaction with the consulting model where he had been working. Instead, he wanted to found a company based on his principles and way of working. There were no companies at the time doing this, and the learning curve was about 2 years. Then it was time to create another start-up alongside other partners. This start-up specialised in big data technology consulting. Later, he founded two more. The entrepreneur says that he has no formal business training but that he is an active self-learner and is constantly learning by reading books on entrepreneurship and using his experience as a senior consultant. Whenever they have needed business knowledge for their companies (financial, marketing or sales), they have outsourced it.

According to the CEO, the model he has followed in his career as an entrepreneur has always been 'having internal projects and using them as an excuse to start other companies'. He and his partners have followed the 'garage theory' entrepreneurship model (Mathews & Healy, 2008). He has become a portfolio entrepreneur with considerable experience and a strong technical background.

4.1.4 BlockTac

BlockTac's co-founders agree that the origin of the company was a coincidence given the huge opportunity they saw in the market. The start-up was founded by two senior entrepreneurs who, inspired by a genetic thrust and an entrepreneurial temperament, had been developing throughout their entire business, academic and financial management careers. They also have a strong background and extensive technical training, receiving technical degrees and PhDs and holding academic and senior management positions. One of the founders has established several private universities, and the other has held leading management positions in finance and health insurance.

When they launched BlockTac, blockchain technology was relatively unknown, so they had to do some evangelism. They also discovered the start-up ecosystem, something that was unknown to them. BlockTac's CEO says that it was a tedious and sometimes painful experience to secure support from institutions and gain market recognition. On the plus side, their experience with business accelerators had positive outcomes such as visibility and contacts. Despite the difficulties, they were never discouraged and continued to develop their products, shifting their focus whenever necessary.

The experience and know-how accumulated throughout their professional careers has been crucial, although they have also hired and trained people for their company. In short, BlockTac's entrepreneurs have followed the 'garage theory' model, strategically seeking support in the entrepreneurial ecosystem to gain visibility and grow.

4.1.5 Solver Machine Learning

The university spin-off Solver Machine Learning currently has three groups of owners. The first is the Polytechnic University of Valencia, since the origin of the company is research on machine learning and artificial intelligence. The second is the team of the three founding entrepreneurs (two tenured professors and one professor at the Polytechnic University). For all of them, Solver has been their first entrepreneurial experience. The third group are investors who have provided capital and business knowledge, in addition to administrative support. The creation of Solver Machine Learning was serendipitous. Despite the extensive training and research output of the entrepreneurial team, they had not initially planned to commercialise their innovation by offering these personalised solutions to companies.

The entrepreneurs refer to their satisfaction and pride in being a university spin-off. It is a sign of the value of their research and allows them to continue their affiliation with the Polytechnic University, despite being a totally independent company. They are currently in the process of expanding the workforce. Many of the technical employees and project managers are students from the same university.

4.1.6 Thinger.io

Thinger.io was founded by two entrepreneurs with a strong background in computer science, technology and information systems. One of them studied a double degree in computer science and business administration. He had wanted to start a business since he was a child, so he chose that degree to combine these two worlds. The second member of the team had some experience with computer ventures. However, when they decided to launch this IoT project, they saw that they lacked considerable business training, experience and contacts in the entrepreneurial ecosystem. These gaps, combined with their short professional careers, led them to apply to the Tetuán Valley incubator (Madrid, Spain), where they were selected. The CEO only has words of thanks to say about this experience. Being in an incubator ‘opens up the world to you, teaches you skills and how all of this works, plus gives you super valuable contacts’. Tetuán Valley places great value in its community of entrepreneurs and alumni. It prides itself on how the most senior entrepreneurs help and advise those who are starting their projects in every way they can. In addition, it gives them the opportunity to meet investors and clients and create synergies between entrepreneurs, although it might sometimes lead to a counterproductive overload of information.

In his case, the CEO says that although they had a clear vision of their business model from the start, they had a hard time reaching the market. The support of the incubator was critical at this stage.

4.1.7 Nearby Computing

The CEO of Nearby Computing is an entrepreneur by vocation, although he has worked throughout his career in various companies and in the public administration. He is a telecommunications engineer and does not have specific training in business. When he has needed to, he has hired specialists in these areas. He created a consulting company as soon as he finished his degree, when the start-up and entrepreneurship world in Spain was in its infancy. There was neither institutional support nor help in terms of financing or mentoring, which are crucial areas, especially for younger and inexperienced entrepreneurs. He acknowledges that in this first experience, he lacked the perspective and the capacity for synthesis that he has now after a more developed professional career. Ultimately, he had to leave the company for personal reasons.

He recognises that the benefits of being a spin-off of the Barcelona Supercomputing Center (BSC) include the status within the IoT and 5G world because it is associated with quality and offers an endorsement to attract first-time clients and investors. In addition, the founder of Nearby Computer highlights the opportunity that this company has given him to enter a global market for the first time, encounter new challenges in an unknown environment and not stop learning. On a personal level, he has a high level of satisfaction and believes that different factors are defining the success of the spin-off.

Table 1 summarises and synthesises these results. Key findings on the background of the founder, the founder's motivation and aspirations and the start-up's inception type are shown.

4.2 Overall Results

The results of the qualitative analysis seem to reveal different profiles of entrepreneurs and venture inception types, due to the preparadigmatic phase in which technology-based entrepreneurship is settled. However, there are also some similarities between the entrepreneurs. These similarities all stem from the same place, namely the entrepreneur's background, especially the entrepreneur's education. However, these similarities may be because of the specific knowledge required to start a technology-based venture. Therefore, this feature might not be common to all types of entrepreneurship, although we believe that it is one of the key characteristics of TBE. The situation is different in relation to the entrepreneurs' experience. One type of entrepreneur, the habitual entrepreneur, has experience from starting a previous venture. Another type of entrepreneur, the novice entrepreneur, comes from working for another venture as an employee. The conditions under which the venture is nurtured by each type of entrepreneur also differ. Whereas novice entrepreneurs tend to run spin-offs or develop their ventures within business incubators, habitual entrepreneurs take a different approach. They start their ventures as lone entrepreneurs. This approach seems to fit better with the idea of the legend of the

Table 1 Results of the research

Company	Inception type	Founder's background	Founder's entrepreneurial aspirations
Cryptonics Consulting	Spin-off of a private company (S2 Grupo)	– PhD in Computer Science	Novice entrepreneur
		– Vast industry experience	
		– R&D management positions	
		– No business background	
2Gether	Start-up in a business incubator (Lanzadera)	– No entrepreneurial experience	Novice entrepreneur
		– Vast industry experience	
		– Training in blockchain throughout professional career	
BlockTac	Lone entrepreneur	– Senior professional	Serial intrapreneur
		– Vast intrapreneurship experience in public administration and private companies	
		– Combination of business and technical background	
BI Geek	Lone entrepreneur	– Computer engineer	Portfolio entrepreneur
		– Strong technical background	
		– Self-trained in business	
		– Owns 4 start-ups and aims to diversify by creating more ventures	
		– Entrepreneur since being a university student	
Solver Machine Learning	University spin-off (Polytechnic University of Valencia)	– Professors and researchers	Novice entrepreneurs
		– Vast experience and technical background	
		– No experience creating a business	
Thinger.io	Start-up in a business incubator (Tetuán Valley)	– Strong background in computer science and ICT	Novice entrepreneurs
		– Some entrepreneurship experience	
		– Some business background but insufficient to start a firm	
Nearby Computing	University spin-off (Polytechnic University of Catalonia)	– Entrepreneur by vocation	Serial entrepreneur
		– Some entrepreneurship experience	
		– Vast technical background	

Source: Authors' own table

garage entrepreneur. These findings are consistent with the results reported by Westhead et al. (2005), who found that novice entrepreneurs usually seek more advice than habitual entrepreneurs. These results are illustrated in Fig. 1.

Habitual entrepreneurs (Bau et al., 2017) are those who have undertaken several ventures throughout their careers, sometimes motivated by having greater flexibility and control over their lives. They have a greater tolerance for risk and recognise new entrepreneurial opportunities more easily. These characteristics allow them to create start-ups that are fully adapted to the environment, solving the new problems that emerge for society. The founders of Nearby Consulting and BlockTac have accumulated entrepreneurial experience throughout their careers. They have managed to do this by working in both the public and private sector and as freelancers, as well as by generating synergies with the environment. They are serial entrepreneurs. In contrast, the founder of BI Geek has created four companies, each as a separate project. He runs all four firms successfully to diversify risk and increase specialisation. The common factor in all three cases is their considerable training in both business and technical areas and their extensive industry experience. Aided by their knowledge and experience, these ventures are related in terms of their inception type, which usually resembles that of the lone entrepreneur (Mathews & Healy, 2008). Normally, they start their ventures with their own resources, seek steady organic growth and reject excessive help or meddling from entrepreneurship gurus, incubators or accelerators. Given this approach, they lack some of the specific knowledge required to start a successful business. However, in the case of Nearby Computing, being linked to a large company or a university through a spin-off structure is the path chosen by the founder, who considers it successful in this particular case.

In contrast, novice entrepreneurs (Westhead et al., 2005) are those who have not yet gained entrepreneurial experience because they have always worked in employment or because of their youth and the incipient stage of their careers. Although the literature indicates that novice entrepreneurs start businesses out of necessity (GEM, 2020), our analysis shows that they may also do so because of a motivation to run their own business (in the case of Thinger.io), because of serendipity or a business opportunity (in the case of Solver Machine Learning), or as the result of vast accumulated experience in the industry and a motivation to bring more value and wealth to society through their knowledge and skills (in the case of Cryptonics Consulting and 2Gether).

Due to their lack of experience in the world of entrepreneurship and a notable lack of business or commercial knowledge, novice entrepreneurs prefer to develop their companies in accelerators or in the form of a spin-off (either from a big company or a university). They value the support, mentoring, administrative and management assistance, financial investment and contacts and synergies that are created collectively. Therefore, for novice entrepreneurs, it is advisable to seek the success of their business ideas or small projects with the support of organisations, corporations or universities (Audretsch, 2008).

5 Strategic Usage of the Presented Model of TBE

The model presented in Fig. 1 represents the main results of the study. One of the biggest difficulties that entrepreneurs have when they constitute a venture is called liability of newness. This fact produces a great number of failed ventures in the first years of existence (Agarwal & Tripsas, 2008). Thus, dealing with this liability is one of the biggest challenges of entrepreneurship. To do so, it is highly relevant to study the process that entrepreneurs follow when constituting a venture. The model offered in this chapter sheds light on this. According to our study, the separation of the type of experience, as entrepreneur or employee, and of the habitual and the novice entrepreneur may have an influence on the type of inception. At the same time, the type of inception can be related to the success of the venture's first years of existence.

As a model developed after a qualitative study, Fig. 1 may be the first step to understand the inception type and its relationship with the figure of the entrepreneur, and especially his/her experience. Further, the different type of experience will determine the different degree of absorptive capacity, another strategic variable of a venture's success.

6 Research Limitations

The limitations of this study should be highlighted with the aim of recognising the shadows of this research and of motivating researchers to continue enhancing and researching the topic.

First, we worked with a biased study sample because we selected successful Spanish technology-based start-ups. Therefore, it would be advisable to expand the sample to other sectors and a more diverse range of companies. This research is in its initial phases. It would be of interest to carry out a quantitative analysis using a more representative sample of the population to check the validity of the model. It would be equally interesting to introduce the financial results of the start-ups and their potential and growth expectations as additional variables to analyse the link between entrepreneurial aspirations and inception type in greater detail.

7 Conclusion

The entrepreneurship literature is extensive and wide-ranging. There is a broad area of research on the general characteristics of entrepreneurship (Shane et al., 2003), whilst scholars of each individual type of entrepreneurship are also developing their own streams of research. There are specific bodies of literature on social

entrepreneurship (Miller et al., 2012; Santos, 2012), green entrepreneurship (Hockerts & Wuestenhagen, 2010; Menguc & Ozanne, 2005), institutional entrepreneurship, rural entrepreneurship (Shakari & Heydari, 2019; Sudak, 2013) and many other sub-areas. Like other types of entrepreneurship, TBE is developing into its own research stream. This research stream contains studies that examine the role of spin-offs and knowledge spillovers generated within business ecosystems (Audretsch, 2008; Hsu, 2008). There are also studies from a macro perspective that seek to measure the contribution of TBE to the economy (Shane, 2008a, b).

This chapter shed light on this type of entrepreneurship. Given the novelty of this area, we conducted this research using a qualitative method. Accordingly, we collected the data for this study using interviews, supported by secondary sources such as documents. We selected seven successful technology-based start-ups. Although the ventures were chosen based on their success, the model proposed here does not link the approach to venturing with future success. The model only considers the ways in which a TBE can be created and the different profiles of the business founders.

The study showed the common foundations of TBE ventures, namely the high level of education that entrepreneurs in this area have. This is because entrepreneurs who start TBE ventures had university studies, and these studies were usually technical. In this area, it could not be otherwise; TBE requires specific and technical knowledge that would be difficult to acquire in any other ways. This high education level of TBE entrepreneurs was a defining feature of this type of venture. Nevertheless, the most practical type of knowledge is the one that is acquired through experience. In this regard, we found two possible links. The first was between employee experience, novice entrepreneurs and the use of a business ecosystem; the second was the link between entrepreneurial experience, being a habitual entrepreneur and being a lone entrepreneur. These two relationships cannot be viewed in strict terms but must instead be considered as trends. Obviously, all habitual entrepreneurs had once been novice entrepreneurs. Moreover, the concept of the lone entrepreneur was difficult to articulate due to the 'romantic idea' created around it. Similarly, an entrepreneur may have experience both as an entrepreneur and as an employee. Accordingly, it is important to stress that this study presented trends and not strict patterns.

Acknowledgements The authors are grateful for the collaboration and participation of the successful technology-based entrepreneurs who agreed to be interviewed. We deeply value their time and support in this difficult period of global self-isolation.

Appendix 1

Here we present a description and history of each case study used for this research.

Cryptonics Consulting

Cryptonics Consulting was launched in 2019 as a born-global spin-off of the cybersecurity company S2 Grupo de Innovación en Procesos Organizativos, based in Valencia. It was co-founded by three entrepreneurs, who were the CEO and managing partners of S2 Grupo. S2 Grupo had worked with different blockchain projects in the past but finally decided to create a spin-off and separate this side of the business to be more flexible and independent. According to the corporate website, the start-up offers full stack auditing and consulting services to allow clients to build legally compliant systems (Cryptonics Consulting, 2020).

2Gether

2Gether is a collaborative financial platform that extends day-to-day management beyond fiat currencies to new digital assets, including cryptocurrencies. Built on new technologies, it supports its clients' financial management, meeting today's financial needs and the financial needs of emerging economies. This start-up was founded in 2016 by two entrepreneurs with a strong background in investment banking and blockchain. It was incubated in Lanzadera (a business incubator and accelerator based in Valencia), where the entrepreneurs found financial and strategic support (2Gether, 2020).

BlockTac

BlockTac uses blockchain technology to provide inviolability, immutability and open verification features for all its digital certificates. It was founded by a senior entrepreneurial team (holding PhDs) with a strong background in blockchain and medicine and with considerable intrapreneurial experience. It is supported by professionals with experience in Internet technologies and business management. Their clients include universities, business schools, professional associations and food and consumer product companies in Europe and Latin America. Since it was created in 2018, its core mission has been to end the fraud and smuggling of university degrees, certificates of medical devices, food and pharmaceuticals (Blocktac, 2020).

BI Geek

BI Geek was created in 2015 by a group of professional experts in business intelligence. Its main services include business analytics, the design of business intelligence solutions and the development of projects based on big data technologies. It

currently has offices in Madrid, Mexico City and Boston. The objective of the company is to return to the original values of consultancy and offer real-added value to its clients (Bi Geeg, 2020).

Solver Machine Learning

Solver develops predictive models based on machine learning to add value to decision-making processes. Solver was founded by a specialist team from the Polytechnic University of Valencia, with years of experience creating and developing their research in machine learning algorithms. Three researchers at the Polytechnic University of Valencia Pattern Recognition and Human Language Technology (PRHLT) centre co-founded Solver. They have an excellent background in technical training and know-how, and all three are active professors and researchers. They currently work with technologies such as machine learning, natural language processing and computer vision. They also develop algorithms for social network analysis, relationship and content analysis, alarm scheduling and category analysis (Solver Machine Learning, 2020).

Thinger.io

Thinger.io was founded in 2017 by entrepreneurs from the world of computing and technology. Since then, the founders have been working in synergy on their project based on the Internet of Things (IoT). Thinger.io aims to be the WordPress of the IoT, integrating different complex technologies on the same platform so that its clients need to only connect their devices and easily extract the data in exchange. Their infrastructure enables the storage, analysis and sharing of data, as well as the real-time control of devices simply and with a low development cost. Both founders of Thinger.io were clear about the fact that they wanted to be entrepreneurial and had been developing their entrepreneurial skills during their studies and short academic careers. However, they had little experience creating businesses (Thinger.io, 2020).

Nearby Computing

Nearby Computing is a spin-off of the Polytechnic University of Catalonia (UPC). It was born in 2018 from the Barcelona Supercomputing Center (BSC-CNS) and the Nearby Sensors start-up. It is a technology company focused on the IoT and 5G, offering a differential and highly technological product for corporate development. This product is heavily based on the research performed by the BSC and the UPC. It

allows clients (both companies and public administrations) to automate complex processes at the frontier of the IoT and 5G networks, combining different commercial software products and integrating hardware and software components. Nearby Computing is currently jointly owned by the Polytechnic University of Catalonia, the workers, who own some shares, and a group of investment companies, which are providing capital. The founder and CEO of the company is at the heart of the project and is responsible for directing and mediating between the parties.

Appendix 2

The method used has been a semi-open interview in which Questionnaire for case study research process conducted:

1. Tell me about yourself: Your background, what did you study and to which extent do you have business and technical skills.
2. Tell me about your desire and motivation to entrepreneur: How was the story? Why did you decide to entrepreneur? How your background and previous experience influenced this action?
3. Which is your entrepreneurial experience? What did you learn in each step and which factors do you value the most? (team, investors, university, business accelerators …)
4. Which is the story of your current venture? founding entrepreneurs of each start-up and comment on their motivation, background, technical and business training, experience, and skills.
5. To which extent do you value an active entrepreneurial ecosystem? Are you an active member of it? What is your opinion about it?

References

2Gether. (2020). *About 2Gether*. https://www.2gether.global

Agarwal, R., & Tripsas, M. (2008). Technology and industry evolution. In S. Shane (Ed.), *Handbook of technology and innovation management*. John Wiley and Sons Ltd.

Arrow, K. J. (1962). Economic welfare and the allocation of resources for invention. In R. R. Nelson (Ed.), *The rate and direction of inventive activity*. Princeton: Princeton University Press.

Audretsch, D. B. (2008). Knowledge spillover entrepreneurship and innovation in large and small firms. In S. Shane (Ed.), *Handbook of technology and innovation management*. John Wiley and Sons Ltd.

Audia, P. G. & Rider, C. I. (2005). A garage and an idea: What more does an entrepreneur need? *California Management Review, 48*(1), 6–28.

Bansal, P., & Corley, K. (2011). The coming of age for qualitative research: Embracing the diversity of qualitative methods. *Academy of Management Journal, 54*(2), 233–237.

Bau, M., Sieger, P., Eddleston, K. A., & Chirico, F. (2017). Fail but try again? The effects of age, gender, and multiple-owner experience on failed entrepreneurs' reentry. *Entrepreneurship Theory and Practice, 41*(6), 909–941.

BI Geek. (2020). *Quiénes somos*. https://www.bi-geek.com
Blocktac. (2020). *About*. https://www.2gether.global/index.html
Bruderl, J., & Schussler, R. (1990). Organizational mortality: The liability of newness and adolescence. *Administrative Science Quarterly, 35*(3), 530–547.
Barney, J. (1991). Firm resources and sustained competitive advantage. Journal of Management,17(1), 99–120.
Camisón-Haba, S., Clemente-Almendros, J. A., & Gonzalez-Cruz, T. (2019). How technology-based firms become also highly innovative firms? The role of knowledge, technological and managerial capabilities, and entrepreneurs' background. *Journal of Innovation & Knowledge, 4*(3), 162–170.
Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on Learning and Innovation. *Administrative Science Quarterly, 35*(1), 128–152.
Cryptonics Consulting. (2020). *About cryptonics*. https://cryptonics.consulting
Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. *Organizational Research Methods, 16*(1), 15–31.
Global Entrepreneurship Monitor. (2020). *Entrepreneurial behaviour and attitudes*. https://www.gemconsortium.org/wiki/1375
Gray, C. (2006). Absorptive capacity, knowledge management and innovation in entrepreneurial small firms. *International Journal of Entrepreneurial Behaviour and Research, 12*(6), 345–360.
Grimaldi, R., & Grandi, A. (2005). Business incubators and new venture creation: An assessment of incubating models. *Technovation, 25*(2), 111–121.
Guijarro-García, M., Carrilero-Castillo, A., & Gallego-Nicholls, J. F. (2019). Speeding up ventures-a bibliometric analysis of start-up accelerators. *International Journal of Intellectual Property Management, 9*(3–4), 230–246.
Headd, B. (2003). Redefining business success: Distinguishing between closure and failure. *Small Business Economics, 21*(1), 51–61.
Hockerts, K., & Wuestenhagen, R. (2010). Greening Goliaths versus emerging Davids - Theorizing about the role of incumbents and new entrants in sustainable entrepreneurship. *Journal of Business Venturing, 25*(5), 481–492.
Hsu, D. H. (2008). Technology-based entrepreneurship. In S. Shane (Ed.), *Handbook of technology and innovation management*. John Wiley and Sons Ltd.
Hussain, S., Qazi, S., Ahmed, R. R., Vveinhardt, J., & Streimikiene, D. (2019). Innovative user engagement and playfulness on adoption intentions of technological products: Evidence from SEM-based multivariate approach. *Economic Research, 32*(1), 555–577.
Jenssen, J. I. (2001). Social networks, resources and entrepreneurship. *The International Journal of Entrepreneurship and Innovation, 2*(2), 103–109.
Kim, P. H., & Aldrich, H. E. (2005). Social capital and entrepreneurship. *Foundations and Trends in Entrepreneurship, 1*(2), 55–104.
Kirzner, I. M. (1979). Perception opportunity and profit: Studies in the theory of entrepreneurship. Chicago and London: University of Chicago Press.
Kotha, S. (2010). Spillover, spill-ins, and strategic entrepreneurship: America's first commercial jet airplane and boeing's ascendancy in commercial aviation. *Startegic Entrepreneurship Journal, 4*(4), 284-306.
Lane, P. J., & Lubatkin, M. (1998). Relative absorptive capacity and interorganizational learning. *Strategic Management Journal, 19*(5), 461–477.
Marcati, A., Guido, G., & Peluso, A. M. (2008). The role of SME entrepreneurs' innovativeness and personality in the adoption of innovations. *Research Policy, 37*(9), 1579–1590.
Mathews, S., & Healy, M. (2008). 'From garage to global': The internet and international market growth, an SME perspective. *International Journal of Internet Marketing and Advertising, 4*(2–3), 179–196.
McMullen, J. S., Bagby, D. R., & Palich, L. E. (2008). Economic freedom and the motivation to engage in entrepreneurial action. *Entrepreneurship Theory and Practice, 32*(5), 875–895.

Menguc, B., & Ozanne, L. K. (2005). Challenges of the "green imperative": A natural resource-based approach to the environmental orientation-business performance relationship. *Journal of Business Research, 58*(4), 430–438.

Miller, T. L., Grimes, M. G., McMullen, J. S., & Vogus, T. J. (2012). Venturing for others with heart and head: How compassion encourages social entrepreneurship. *Academy of Management Review, 37*(4), 616–640.

Minniti, M., Bygrave, W. D., & Autio, E. (2006). *Global entrepreneurship monitor 2005 executive report*. Babson College and London.

Nicholls, A. J. (2010). The legitimacy of social entrepreneurship: Reflexive isomorphism in a pre-paradigmatic field. *Entrepreneurship: Theory and Practice, 34*(4), 611–633.

Packard, D. (2006). *The HP way: How bill hewlett and i built our company*. Harper Collins Publishers Inc.

Plehn-Dujowich, J. (2010). A theory of serial entrepreneurship. *Small Business Economics, 35*(4), 377–398.

Ratinho, T., Harms, R., & Walsh, S. (2015). Structuring the technology entrepreneurship publication landscape: Making sense out of chaos. *Technological Forecasting and Social Change, 100*, 168–175.

Rodríguez-Gulías, M. J., Fernández-López, S., & Rodeiro-Pazos, D. (2016). Growth determinants in entrepreneurship: A longitudinal study of Spanish technology-based university spin-offs. *Journal of International Entrepreneurship, 14*(3), 323–344.

Santisteban, S. C. (2019). The tech entrepreneur in Colombia: A discussion of actor-network-theory, Lacanian theory and social imaginaries. *Digithum, 23*, 1–13.

Santos, F. M. (2012). A positive theory of social entrepreneuship. *Journal of Business Ethics, 111*(3), 335–351.

Sarkar, M. B., Echambadi, R., Agarwal, R., & Sen, B. (2006). The effect of the innovative environment on exit of entrepreneurial firms. *Strategic Management Journal, 27*(6), 519–539.

Shakari, H., & Heydari, E. (2019). Rethinking rural entrepreneurship in the era of globalization: Some observations from Iran. *Journal of Global Entrepreneurship Research, 9*(1), 1–26.

Shane, S. A. (2008a). *The illusions of entrepreneurship: The costly myths that entrepreneurs, investors, and policy makers live by*. Yale University Press.

Shane, S. (2008b). *Handbook of technology and innovation management*. Wiley.

Shane, S., Locke, E. A., & Collins, C. J. (2003). Entrepreneurial motivation. *Human Resource Management Review, 13*(2), 257–279.

Solver Machine Learning. (2020). *Qué hacemos*. https://www.solverml.com

Sudak, G. (2013). The organizational and economic mechanism of rural entrepreneurship development. *Management Theory and Studies for Rural Business and Infrastructure Development, 35*(3), 432–440.

Thinger.io. (2020). *Thinger.io platform*. https://thinger.io

Tricot, A. & Sweller, J. (2013). Domain-specific knowledge and why teaching generic skills does not work. *Educational Psychology Review, 26*, 265–283.

Taylor, M. (1999). The small firm as a temporary coalition. *Entrepreneurship and Regional Development, 11*(1), 1–19.

Van Praag, C. M. (2003). Business survival and success of young small business owners. *Small Business Economics, 21*(1), 1–17.

Westhead, P., Ucbasaran, D., Wright, M., & Binks, M. (2005). Novice, serial and portfolio entrepreneur behaviour and contributions. *Small Business Economics, 25*(2), 109–132.

Westhead, P. (1988). "Welsh" and "Inmigrant" new firms and new firm founders - are they really different? Cranfield Entrepreneurship Research Center, UK.

Ziedonis, R. H. (2008). Intellectual property and innovation. In S. Shane (Ed.), *Handbook of technology and innovation management*. John Wiley and Sons Ltd.

Innovation Strategies for Strategic Entrepreneurship in Ever-Increasing Turbulent Markets

Mario Coccia

Abstract Strategic entrepreneurship is an activity that enables the firms to take advantage of important opportunities or to cope with consequential environmental threats. Innovation is one of the critical elements of strategic entrepreneurship that supports strategies of firms to achieve and/or sustain competitive advantage in turbulent markets. This contribution presents different innovation strategies for strategic entrepreneurship to increase and/or sustain competitiveness and performance of firms in markets, and also to clarify how strategic entrepreneurship could be accompanied by crisis management.

Keywords Strategic management · Strategic entrepreneurship · Strategies · Strategic change · Innovation strategy · Product innovation · Disruptive innovation · Management of technology · Innovation management · Decision-making · Improvisation · Crisis management

1 Introduction

Markets show a growing dynamism that generates uncertainty and turbulence (Emery & Trist, 1965; Johnson & Scholes, 1988; Coccia, 2019e). In this uncertain and unstable environment, firms—as open systems having activities in interaction with external factors and subjects (Ackoff, 1971)—need strategic perspectives toward entrepreneurship based on organizational innovations and changes to support competitive advantage (Gans et al., 2019; Gioia & Chittipeddi, 1991; Kuratko & Morris, 2018; Kuratko & Audretsch, 2009; Ketchen et al., 2007; McDermott & Taylor, 1982; Mazzei, 2018; Ott & Eisenhardt, 2020; Rosenbusch et al., 2013). Figure 1 shows that strategic entrepreneurship is originated by an interaction of the *entrepreneurship* (the efforts of an organization with effective opportunity-seeking

M. Coccia (✉)
CNR – National Research Council of Italy, Torino, Italy
e-mail: mario.coccia@cnr.it

N. Faghih, A. Forouharfar (eds.), *Strategic Entrepreneurship*, Contributions to Management Science, https://doi.org/10.1007/978-3-030-86032-5_12

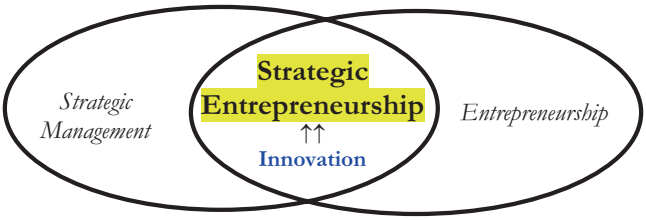


Fig. 1 The origin of strategic entrepreneurship and role of innovation. (*Source*: Author's own figure)

behavior) and the *strategic management* (the efforts of an organization with a competitive advantage-seeking behavior cf., Ireland et al., 2003; Mazzei, 2018; Teece et al., 1997).

Strategic entrepreneurship of firms generates extensive competitive advantage if driven by innovation and new technology (Coccia, 2016a, 2020b; Stevenson & Gumpert, 1985). In fact, innovation supports strategic entrepreneurship of firms in ever-changing and competitive markets in order to achieve and/or sustain superior performance by incremental and radical innovations (Coccia, 2017c; Hitt et al., 2011; Kuratko & Audretsch, 2009). Strategic entrepreneurship of firms intends to explore new opportunities—*opportunity-seeking*—but also to exploit current or new markets and advantages—*advantage-seeking*—(Hitt et al., 2002; March, 1991; Mazzei, 2018; Tushman & O'Reilly, 1996). Ott and Eisenhardt (2020) argue that the formation of strategies and organizational innovations in entrepreneurial settings have basic aspects to seize new opportunities, achieve and sustain competitive advantage in turbulent markets. In particular, innovation strategy in strategic entrepreneurship involves product, process, and organizational innovations directed to a strategic change to take advantage of important opportunities or to cope with consequential environmental threats amid the turbulent markets (Gioia & Chittipeddi, 1991; Coccia, 2020b). Thus, a critical innovation strategy for strategic entrepreneurship requires interagency as well as inter-organizational coordination (Kogut & Zander, 1996; Mazzei, 2018). As a matter of fact, new innovation strategies of strategic entrepreneurship in turbulent markets require collaboration of the personnel of different departments, presence of organizational flexibility, and also the breaking and/or changing of current routines. Despite a growing interest in these topics, innovation strategies for strategic entrepreneurship of firms are hardly systematized to provide a clear theoretical framework for the strategic change with the intention of achieving and/or sustaining competitive advantage in markets (Gioia & Chittipeddi, 1991). Therefore, this contribution endeavors to explain and systematize main innovation strategies for the kind of strategic entrepreneurship applied in competitive markets and also the kind of strategic entrepreneurship that goes along with crisis management.

2 Literature Review

Strategic entrepreneurship of firms is based on critical innovation strategies for strategic change (Gioia & Chittipeddi, 1991) and for sustaining and safeguarding extant competitive advantage as well as superior performance in turbulent markets (Teece et al., 1997). On the one hand, strategic entrepreneurship of firms with innovation strategies is expected to reduce organizational uncertainty in markets and provide an authoritative account of problems, goals and solutions. On the other hand, innovation strategies of strategic entrepreneurhip can generate a competition between management and stakeholders that have different positions and interests, suggesting various solutions and actions to cope with complex problems (Venette, 2003). In general, vital factors for innovation strategies of strategic entrepreneurship are (cf., Seeger et al., 1998; Shrivastava et al., 1988; Bundy et al., 2017):

1. New opportunities or consequential environmental threats.
2. Innovation alternatives.
3. Entrepreneurial choice process and strategic decisions to solve problems or achieve goals.

In particular, the formulation of innovation strategies for strategic entrepreneurship is based on the following sequential activities (cf., Linstone, 1999):

- *Definition* of a complex problem (Pr) or goal (*G*) from volatile environment, and the implicit assumption that the problem can be solved and the goal can be achieved. After that, it is important to gather information for possible solutions of the problem Pr and for the achievement of the predefined goal G.
- *Reductionism*, the study of complex problems and goals in terms of a very limited number of variables and critical interactions among them.
- *Identification* of the purpose of innovation strategy related to the complex problem Pr or goal *G*.
- *Evaluation* of alternative innovation strategies in respect to the solution of complex problem Pr and/or the achievement of the goal *G*.
- *Selection* of the optimal innovation strategy, or the best solution in a short time.
- *Implementation* of the innovation strategy and evaluation of the results.

In short, the starting point of innovation strategy for strategic entrepreneurship is the solution of complex problem or the achievement of strategic goal over a predetermined period. The complex problem or the goal could have several solution concepts (Sl), each of which could lead to several consequential problems or goals (Pr' or *G*') and solutions (Sl'). A innovation strategy for *strategic entrepreneurship* can be schematically summarized by a tree structure of decision-making with sequential levels of Pr or *G*, and Sl (Fig. 2).

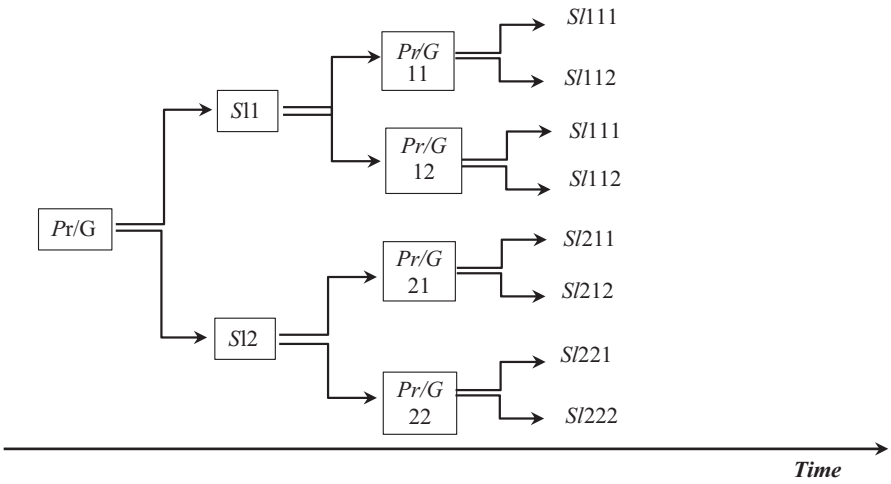


Fig. 2 The problem-solution tree for innovation strategy in strategic entrepreneurship. *Note*. Pr or *G* = problem or goal; Sl = solution. The increasing number from left to right indicates the sequence of decisions we are going to cope with in consequential problems and/or for achieving our predefined goals. (*Source*: Author's own figure)

3 Discussion on Types of Innovation Strategy for Supporting Strategic Entrepreneurship in Turbulent Markets

General Concepts

Strategic entrepreneurship is based on innovations and subsequent organizational changes that support competitive advantage (Coccia, 2017c, 2020a, b, c, d). Abernathy and Clark (1985, p. 4*ff*) states that:

> Innovation is not a unified phenomenon: some innovations disrupt, destroy and make obsolete established competence; others refine and improve. Further, … different kinds of innovation require different kinds of organizational environments and different managerial skills. … An innovation is the initial market introduction of a new product or process whose design departs radically from past practice. It is derived from advances in science, and its introduction makes existing knowledge in that application obsolete. It creates new markets, supports freshly articulated user needs in the new functions it offers, and in practice demands new channels of distribution and aftermarket support.

Strategic entrepreneurship for sustaining or achieving the competitive advantage of firms can be driven by different innovations: *incremental innovations* (progressive modifications of existing products and/or processes); *radical innovations* (drastic changes of existing products/processes to satisfy established or new needs or solve established or new problems); *technological systems* (clusters of innovations that are technically and economically interrelated, e.g., biotechnology, nanotechnology, etc.); and *technological revolutions* (pervasive technical changes affecting many branches of the economy, such as artificial intelligence technologies

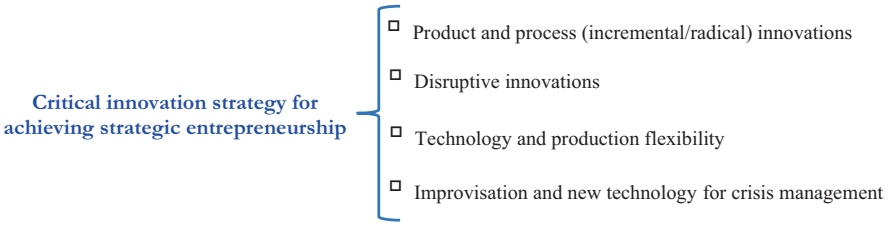


Fig. 3 Innovation strategies for supporting the strategic entrepreneurship of firms. (*Source*: Author's own figure)

having technological dynamism and a pervasive use in a wide range of sectors; cf., Coccia, 2005b, 2017b, d, e, 2018a, b, c, 2019c, 2020f, g, h; Coccia, 2021a; Coccia and Bellitto, 2018; Coccia & Wang, 2016).

Morris et al. (2008, p. 660) consider strategic entrepreneurship as any organizationally consequential innovations that do not require the creation of a new business. Instead, Luke et al. (2011) consider strategic entrepreneurship as a distinct process for bringing something new to a market, based on a combination of innovation, opportunity identification, and business growth. Hence, innovation is an essential component of strategic entrepreneurship and represents the means through which market opportunity is capitalized by firms. The different types of innovations just mentioned support strategic entrepreneurship of firms with new strategies, products, processes, dynamic capabilities, or business models (Coccia, 2017b, c, d; Morris et al., 2008; Teece et al., 1997). In this context, strategic entrepreneurship, seen as a combination of opportunity - and advantage-seeking behaviors, can be driven by different innovation strategies directed to support superior performance of firms in markets (Calabrese et al., 2005; Coccia, 2005a, 2014a, b; Kuratko & Audretsch, 2009; Simsek et al., 2017).

Critical innovation strategies of strategic entrepreneurship can be schematically summarized as in Figure 3.

3.1 Strategic Entrepreneurship (SE) of Firms Based on Product and Process Innovations

Strategic entrepreneurship can improve firms' profitability by an increased penetration of current markets or expansion into new markets (Coccia, 2015, 2019g). This strategy can be based a series of new product/process innovations for sustaining a competitive advantage in turbulent markets and uncertain environments (Coccia, 2016a). In particular, this innovation strategy has main implications for the growth of firms and their profit levels in new or established markets. This strategy for strategic entrepreneurship has to consider that product/process innovations have a life cycle in markets (Coccia, 2020i). The evolution of life cycle of new product/process innovations changes from one market to another (Coccia, 2017a, 2019a, b; Coccia

& Watts, 2020). Studies show that the life cycle of product innovations in turbulent markets has been becoming shorter, generating a high organizational pressure on strategic entrepreneurship to develop continuously new product or process innovations and/or acquire incremental or path-breaking innovations from other firms for sustaining and safeguarding extensive competitive advantage (cf., Coccia, 2014a, p. 742; Coccia, 2016a, 2017c, 2020i). Critical strategies of product/process innovation for strategic entrepreneurship in markets can be based on:

- The introduction of an innovation similar to existing one that is becoming obsolete to overlap the life cycle of product/process (Coccia, 2020i).
- The extension of the life cycle of existing product/process either by incremental innovations that improve the product/process or by new applications (Coccia, 2020i).
- The change of the production technology to increase the competitive value of the product/process itself.

In particular, strategic entrepreneurship has to generate product innovations as efficiently as possible besides developing the relevant process technology, such as using information and communication technologies (ICTs) or artificial Intelligence technologies that have a major impact on production process of manifold businesses (Coccia, 2020f). As a matter of fact, strategic entrepreneurship has to focus, for the growth of firm, on shifts of innovations from product-related technologies in the starting phase to process technologies in the maturity phase of life cycle to minimize production costs, such as semiskilled and unskilled labor (Coccia, 2019a, b, 2020i). This strategy of incremental or radical innovation for strategic entrepreneurship is driven by learning by doing and learning by using (Coccia and Cadario, 2014; Coccia, 2017c, 2020a, b, d; cf., Dicken, 2011). However, more and more turbulent markets generate radical transformations driven by disruptive innovations with main implications for strategic entrepreneurship of firms as explained in the next section (cf., Coccia, 2017d, e, 2018a, 2020i; Coccia & Finardi, 2012, 2013; Coccia & Wang, 2015; Si et al., 2020).

3.2 Strategic Entrepreneurship of Firms Based on Disruptive Innovations

Markets can undergo a creative destruction with new technologies that disrupt an industry's existing competitive conditions and/or create new markets (Coccia, 2020i; Kuratko & Audretsch, 2009; Shane & Venkataraman, 2000). Christensen (1997) states that disruptive innovations generate significant shifts in markets (cf., Henderson, 2006). Kilkki et al. (2018) maintain that a disruption is an event in which firms can redesign their strategies to survive a change in the turbulent environment (cf., Coccia, 2017b; Gilbert, 2003). In this context, strategic entrepreneurship of firms can exploit new profitable opportunities, allowing for resources,

capabilities, and know-how to be deployed in brand new and unique ways as means of developing new technology and as a consequence growth of profit (Ireland et al., 2003; Mazzei, 2018). Si et al. (2020) argue that: "disruptive innovation and disruptive innovation-based entrepreneurship are increasingly becoming a strategic means for achieving sustainable company growth and competitiveness." Schuelke-Leech (2018, p. 261) argues that disruptive innovations can have a *minor* impact localized to a market or industry or a *major* effect on many industries and institutions generating a socioeconomic change (Coccia, 2016b, 2019d). In fact, two levels of disruptive innovation in strategic entrepreneurship are: (1) localized disruption within a market or industry and (2) disruption with larger influences, generating corporate, industrial and economic change (cf., Van de Ven & Garud, 1994; Coccia, 2019d). Abernathy & Clark (1985, pp. 12–13) claim that this type of innovation: "disrupts and renders established technical and production competence obsolete … The reciprocating engine in aircraft, vacuum tubes, and mechanical calculators are recent examples of established technologies that have been overthrown through a revolutionary design …. It thus seems clear that the power of an innovation to unleash Schumpeter's 'creative destruction' must be gauged by the extent to which it alters the parameters of competition, as well as by the shifts it causes in required technical competence." Christensen (1997) argues that disruptive technologies enable a new set of product/process features associated with mainstream technologies (cf., Coccia, 2020f). Initially, strategic entrepreneurship of firms with disruptive technologies can serve niche segments. Subsequently, strategic entrepreneurship of firms with disruptive technologies increases the technical performance to satisfy mainstream customers (cf., Coccia, 2020c; Vecchiato, 2017). Christensen et al. (2015) claim that disruptive innovations can be generated by the strategic entrepreneurship of small firms with fewer resources that successfully challenge the established incumbent businesses (cf., Coccia, 2019f). Baker and Nelson (2005) argue that the concept of bricolage can explain strategic entrepreneurship of small firms that create something from nothing by exploiting physical, social, or institutional inputs that other firms rejected or ignored. The entrepreneurial bricolage can be a model for firm growth, overcoming the limitations imposed by resource environments. Moreover, incumbents focus on improving their products and services for profitable markets, whereas the strategic entrepreneurship of firms entrants endeavors to develop disruptive technologies in specific market segments, delivering the market performance that incumbents' mainstream customers require (Christensen et al., 2015; Christensen, 1997; cf., Lumpkin & Dess, 1996; Morris et al., 2008; Rosenbusch et al., 2013). Firms with a strategic entrepreneurship based on disruptive innovations grow more rapidly than other ones (Abernathy & Clark, 1985; Tushman & Anderson, 1986, p. 439; Meyer & Heppard, 2000). In general, strategic entrepreneurship of firms can simultaneously embody competence-destroying and competence-enhancing because some firms can either destroy or enhance the competence existing in industries (cf., Tushman & Anderson, 1986; O'Reilly & Tushman, 2004; Coccia, 2020f, i). As a matter of fact, strategic entrepreneurship of new firms tend to generate competence-destroying discontinuities with disruptive innovations, whereas incumbents focus mainly on competence-enhancing

discontinuities. Strategic entrepreneurship based on disruptive innovations can generate main effects both for consumers and producers in markets and society (Markides, 2006, pp. 22–23; Coccia, 2016b). Especially, strategic entrepreneurship based on disruptive innovations can change habits of consumers in markets and undermine the competences and complementary assets of existing producers. Moreover, strategic entrepreneurship with disruptive innovations causes an upheaval in the existing market structure by cheaper, simpler, and more convenient technologies/products/processes than established ones (Coccia, 2017c, 2020i). Hence, the strategic entrepreneurship of firms based on disruptive innovations disturbs the business models of incumbents that have to counter mobilized human and economic resources to sustain their competitive advantage in the presence of market change (Garud et al., 2015). Vecchiato (2017) explores why the strategic entrepreneurship of incumbent firms fails in the presence of disruptive innovations and why incumbents lose their leadership; Vecchiato (2017) argues that a reason is the inability to recognize either the rising "social" market, where customers use products for fulfilling their need for friendship, or the "esteem" market, where customers use products for fulfilling their need for achievement (cf., Reinhardt and Gurtner, 2018; Coccia, 2016b).

Other main aspects of strategic entrepreneurship, based on disruptive technologies, are a novel mix of attributes compared to the established technologies. Adner and Zemsky (2005) showed that the threat of disruption can increase in the number of new-technology firms, the relative size of primary segment, the primary segment's utility from new-product, and the marginal costs of established firms. Adner and Zemsky (2005, p. 230*ff*) also showed that the threat of disruption can decrease in the number of established-technology firms, the secondary segment's utility new-technology product, the primary segment's utility from established-technology product, and the marginal costs of new-technology firms. In general, disruption occurs when strategic entrepreneurship of new-technology firms pursues a high-volume and low-price strategy that allows for breaking into the primary segment. However, the lower the costs of established-technology firms, the lower the threat of disruption. In addition, Adner and Zemsky (2005) found that on the one hand, the lowest-cost firm had the highest margins among new-technology firms, which favors output expansion and hence disruption in markets. On the other hand, the lowest-cost firm had the highest market share in the secondary segment and hence the most to lose from the fall in price that comes with disruption. In short, Adner and Zemsky (2005) suggested that technology improvement of strategic entrepreneurship could lead to disruption and highlighted the importance of market structure. Adner and Zemsky (2005) also explained that concentration in markets tended to increase with disruption because the effect of cost asymmetries on market share was amplified by the increased number of competitors. Finally, strategic entrepreneurship of large companies tends to support established technologies that have a vital role in the market, underinvesting in new technologies (Coccia, 2020c). However, strategic entrepreneurship based on research alliances and acquisitions may help incumbents to overcome the *inertia* both in the initial stage of research and in the later stage of the development of new technology (Adner, 2002; Coccia, 2014a,

2020c). In general, disruptive innovations highlight the danger posed to strategic entrepreneurship of incumbent firms from too quickly dismissing new technologies interpreted as inferior and therefore irrelevant to their market positions.

3.3 Strategic Entrepreneurship of Firms Based on Technology and Production Flexibility

Strategic entrepreneurship of firms has to be also strategically flexible, willing to strategic change—to achieve greater success in markets—by leveraging existing knowledge and by importing new knowledge to alter their product mix, extend product platforms, or transform their production processes (Kazanjian et al., 2002). Critical aspects of the strategic entrepreneurship directed to production flexibility are based on the extensive application of ICTs. Instead, the strategy of flexible technologies for production in strategic entrepreneurship of firms can be based on following three three elements:

- Information intensity, rather than energy or material intensity in production.
- Flexibility of production based on the following substrategies:
  - A high productivity driven by a diversified set of low-volume products rather than a high volume of output.
  - New-technology focused on segmented rather than mass markets in order to tailor products to specific markets and needs.
- Shift towards multitasking rather than narrow labor specialization; and a greater emphasis on team-working and personalized payment systems.

In addition, production flexibility for strategic entrepreneurship can be increasingly based on (Dicken, 2011):

- High degree of specialization in many production processes, enabling their fragmentation into a number of individual operations.
- High standardization of operations, permitting smaller production runs, increasing product variety, and changing the way production and labor processes are organized.
- High modularity of production based on "Lego model" (Berger, 2005), involving a network of firms (cf., Sturgeon, 2002).

In general, the increasing application of innovation strategies in strategic entrepreneurship is due to the complex and integrated system of communication networks based on information and communication technologies (ICTs).

In addition, a mix of the following characteristics of the innovation strategies can support technological flexibility for strategic entrepreneurship of firms in markets:

- *Induced-innovation* based on *change variant*, associated with a rise in the relative price in one factor that leads to technological innovations sparing that factor,

and *level variant* that even at constant relative factor price levels, new technologies are developed and adopted to save relatively expensive factors (cf., Coccia, 2020d).

- *Learning by doing* that depends on the acquisition of practical experience for the solution of consequential problems. In particular, learning by doing is governed by a process of cumulative knowledge and experience that supports the evolution of technology for competitive advantage of firms in markets (Coccia, 2014a, 2019a, 2020b, d).
- *Learning via diffusion* that the increased adoption of a technological innovation paves the way for the improvements of its characteristic direct to competitive advantage (Coccia, 2019b; Coccia & Watts, 2020).
- *Specialization via scale* that is associated with factors of the physical nature of technology itself. For instance, technological advances in electricity generation have been made possible by an increase in the scale of electricity transmission network: the reason is that capacity increases with the square of the voltage (Coccia, 2020d).
- *Path-dependence* induces the persistence of the structure of specific products that affects the competitive directions of strategic entrepreneurship of firms.

3.4 Strategic Entrepreneurship of Firms Based on Improvisation and New Technology for Crisis Management

Planning can reduce uncertainty of firms in turbulent markets, but even the most carefully devised plans may have to be abandoned or modified in the face of unanticipated changes or turbulence in markets and environment (cf., Coccia, 2021, 2021b, 2022; Coccia, 2020e, j, k). In unexpected situation, improvisation in strategic entrepreneurship is one of approaches that stands outside the rational models of decision-making to take advantage of important opportunities or to cope with consequential environmental threats. Improvisation is a combination of behavioral and cognitive activity that requires consequential creativity under tight time constraint to meet performance objectives of firms (Mendonça & Fiedrich, 2006, p. 350). Thus, improvisation, also using new technology, carries an immediate answer for a need/problem in the presence of environmental threats or immediate opportunity (Lee, 1995). Improvisation in strategic entrepreneurship can be a way of taking advantage of important and unexpected opportunities and/or for reducing risk factors without formal plans or systematic procedure (Sharkansky & Zalmanovitch, 2000). While rational planning of innovation strategy aims to control a situation by reducing the uncertainty, improvisation is a reaction to a novel situation in market/environment and a way of working within uncertain and complex settings (cf., Coccia, 2020e, j, k). Moreover, while rational planning is directed at *optimal* solutions, improvisation aims at dealing with *satisficing* solutions of problems rather. In

short, improvisation in strategic entrepreneurship, also supported by new technology, may be applied to overcome the limitations of rational planning in situation of crisis (Klein, 1993; cf., Coccia, 2020e, j, k). A two-stage process for improvisation in strategic entrepreneurship can be:

1. The organization recognizes either that no plan applies to the current situation or that plan cannot be executed.
2. The responding organization has to develop and deploy one or more new procedures.

Mendonça and Fiedrich (2006, p. 350) argued that:

> The improvisation may range from substitution (e.g., using a close substitute resource for one that is unavailable) to the construction of new procedures (e.g., developing an entirely new procedure). In the case of substitution, the responding organization 'mixes and matches' existing procedures and/or the materiel used in them. At the other end of the spectrum, the organization must develop new procedures and possibly find new material for use in those procedures. More radically, it may also entail changing the goals of the response (e.g., deciding in the field that the real problem to be solved is providing shelter in place rather than evacuating).

The question of *when* to improvise in strategic entrepreneurship for a critical decision may be conceptualized as a choice problem that is influenced by a number of factors. The question of *how* to improvise may be conceptualized as a search and assembly problem, which is influenced by the degree of risk in the environment, and the results of prior decisions. In short, strategic entrepreneurship has to learn, in turbulent environment, how to develop and deploy new procedures, technologies, and critical decisions under time constraint; after that, it is important to make inferences about the present and likely future states of environment (Weick, 1993, 1998). Indeed, training has proven capable of improving human ability to recognize salient similarities and differences between current and past situations for supporting critical decisions—even at a very fine-grained level (Klein, 1993). Gavetti et al. (2005) argue that "analogical reasoning, …, may be helpful, allowing managers to transfer useful wisdom from similar settings they have experienced in the past." Hence, improvisation in strategic entrepreneurship involves the ability to act in real time, when the need arises, and to find an action and/or new technology in a short run (also exapted, i.e., co-opted for a use other than the one for which has originated; cf., Ardito et al., 2021) when none of the established alternatives/techniques appear to be practical (Coccia, 2020e). Improvisation in strategic entrepreneurship is useful when there is high uncertainty in markets/environments, few precedents, or few reliable facts and suitable routines, and when there is a pressure to act in a short time and/or with insufficient resources, such as during the COVID-19 global pandemic crisis (Ardito et al., 2021; Coccia, 2020j, k). Thus, unpredictable and rapidly changing markets are probably more likely to promote improvisation and new technological innovation in strategic entrepreneurship than stable environments. In short, improvisation for strategic entrepreneurship may be more likely when there is not enough time, information, knowledge, or material resources to plan, consider, and document an optimal response. Hence, strategic entrepreneurship of firms based on

improvisation such as technological exaptation, is likely to occur in emergencies, crises, and novel situations, and when the problem or goal to address is perceived to be intractable with current approaches and/or technologies (Ardito et al., 2021; Coccia, 2020j, k). However, improvisation has inherent drawbacks. It may generate consequential improvisations to cope with recurring unstable environments and effects of previous improvisations.

4 Conclusion and Prospects

The decision rule and mechanism of innovation strategies for strategic entrepreneurship, change according to the situations and the markets. Firms can plan to achieve different goals in turbulent markets and have to choose among different entrepreneurial strategies. Gans et al. (2019) argue that under conditions of high turbulence, firms cannot be able to yield a single best strategy but several equally attractive strategic alternatives (cf., Coccia, 2021b, 2022).

Innovation strategies for strategic entrepreneurship presented here, of course, were not covering all possible strategies of firms that enable them to take advantage of important opportunities or to cope with consequential environmental threats. In addition, it is also important to consider *bounded rationality* of decision-makers in strategic entrepreneurship, i.e., rationality is limited because of the cognitive limitations of the mind, and the limited time available to make a specific decision. Firms, having a *bounded rationality*, aim to the behavior of *satisficing* rather than maximizing the critical decisions in strategic entrepreneurship in order to take advantage of important opportunities or cope with consequential environmental threats in the presence of highly restricted time and limited resources (Simon, 1947, 1957; Gigerenzer & Selten, 2002). In this context, the approach *ecological rationality* shows *how* the rationality of a decision depends on circumstances in which it takes place, so as to achieve one's goals in a specific environment. A rational approach under the theory of rational choice, it might not always be considered rational one under the theory of ecological rationality. In particular, rational choice theory puts a premium on internal logical consistency of decision, whereas ecological rationality supports the decision of firms considering the external performance in markets (cf., Kahneman et al., 1982; Gigerenzer & Todd, 1999; Simon, 1955).

Overall, then, innovation strategies for strategic entrepreneurship of firms deal with problems and goals that are choice situations in which what is done makes a significant difference to those who make the choice (Ackoff & Rovin, 2003, p. 9). Problems and goals of strategic entrepreneurship can be treated in different ways (Ackoff & Rovin, 2003, pp. 9–10):

- *Resolution* is when strategic entrepreneurship applies similar behaviors previously used in similar situations, adapted if necessary, so to obtain an outcome that is good enough. This approach is based on the past experience, trial and error, and a common sense.

- *Solution* means that strategic entrepreneurship discovers or creates a behavior that yields approximately the best possible outcome, one that optimizes.
- *Dissolution* means that strategic entrepreneuship redesigns either the organization that has the problems/goals or the environment, thus enabling the firms to do better in the future than the best it can do today.

To conclude, the innovation strategy for supporting strategic entrepreneurship of firms can be based on a mix of different approaches, discussed in the chapter, in the presence of increasingly turbulent markets, with stupendously uncertain and volatile environments. However, we know, *de facto*, that other things are often not equal over time and space in turbulent markets. Hence, identifying a comprehensive innovation strategy for strategic entrepreneurship of firms within industrial competition in rapid change is a nontrivial exercise.

References

Abernathy, W. J., & Clark, K. B. (1985). Innovation: Mapping the winds of creative destruction. *Research Policy, 14*(1), 3–22. https://doi.org/10.1016/0048-7333(85)90021-6

Ackoff, R. (1971). Towards a system of systems concepts. *Management Science, 17*(11), 661–671. http://www.jstor.org/stable/2629308

Ackoff, R. L., & Rovin, S. (2003). *Redesigning society*. Stanford University Press.

Adner, R. (2002). When are technologies disruptive: A demand-based view of the emergence of competition. *Strategic Management Journal, 23*, 667.

Adner, R., & Zemsky, P. (2005). Disruptive technologies and the emergence of competition. *The Rand Journal of Economics, 36*(2), 229–254.

Ardito, L., Coccia, M., & Messeni Petruzzelli, A. (2021). Technological exaptation and crisis management: Evidence from COVID-19 outbreaks. *R&D Management, 51*(4), 381–392. https://doi.org/10.1111/radm.12455

Baker, T., & Nelson, R. E. (2005). Creating something from nothing: Resource construction through entrepreneurial bricolage. *Administrative Science Quarterly, 50*(3), 329–366.

Berger, S. (2005). *How we compete: What companies around the world are doing to make it today's global economy*. Doubleday.

Bundy, J., Pfarrer, M. D., Short, C. E., & Coombs, W. T. (2017). Crises and crisis management: Integration, interpretation, and research development. *Journal of Management, 43*(6), 1661–1692. https://doi.org/10.1177/0149206316680030

Calabrese, G., Coccia, M., & Rolfo, S. (2005). Strategy and market management of new product development: Evidence from Italian SMEs. *International Journal of Product Development, 2*(1–2), 170–189. https://doi.org/10.1504/IJPD.2005.006675

Christensen, C. M. (1997). *The innovator's dilemma*. Harvard Business School Press.

Christensen, C., Raynor, M., & McDonald, R. (2015). What is disruptive innovation? *Harvard Business Review*, 44–53.

Coccia, M. (2005a). A taxonomy of public research bodies: A systemic approach. *Prometheus, 23*(1), 63–82. https://doi.org/10.1080/0810902042000331322

Coccia, M. (2005b). Measuring Intensity of technological change: The seismic approach. *Technological Forecasting and Social Change, 72*(2), 117–144. https://doi.org/10.1016/j.techfore.2004.01.004

Coccia, M. (2014a). Converging scientific fields and new technological paradigms as main drivers of the division of scientific labour in drug discovery process: The effects on strategic man-

agement of the R&D corporate change. *Technology Analysis & Strategic Management, 26*(7), 733–749. https://doi.org/10.1080/09537325.2014.882501

Coccia, M. (2014b). Steel market and global trends of leading geo-economic players. *International Journal of Trade and Global Markets, 7*(1), 36–52. https://doi.org/10.1504/IJTGM.2014.058714

Coccia, M. (2015). Spatial relation between geo-climate zones and technological outputs to explain the evolution of technology. *International Journal of Transitions and Innovation Systems, 4*(1–2), 5–21. https://doi.org/10.1504/IJTIS.2015.074642

Coccia, M. (2016a). Radical innovations as drivers of breakthroughs: Characteristics and properties of the management of technology leading to superior organizational performance in the discovery process of R&D labs. *Technology Analysis & Strategic Management, 28*(4), 381–395. https://doi.org/10.1080/09537325.2015.1095287

Coccia, M. (2016b). The relation between price setting in markets and asymmetries of systems of measurement of goods. *The Journal of Economic Asymmetries, 14*(Part B), 168–178. https://doi.org/10.1016/j.jeca.2016.06.001

Coccia, M. (2017a). Varieties of capitalism's theory of innovation and a conceptual integration with leadership-oriented executives: The relation between typologies of executive, technological and socioeconomic performances. *International Journal Public Sector Performance Management, 3*(2), 148–168. https://doi.org/10.1504/IJPSPM.2017.084672

Coccia, M. (2017b). The Fishbone diagram to identify, systematize and analyze the sources of general purpose technologies. *Journal of Social and Administrative Sciences, 4*(4), 291–303. https://doi.org/10.1453/jsas.v4i4.1518

Coccia, M. (2017c). Sources of technological innovation: Radical and incremental innovation problem-driven to support competitive advantage of firms. *Technology Analysis & Strategic Management, 29*(9), 1048–1061. https://doi.org/10.1080/09537325.2016.1268682

Coccia, M. (2017d). Sources of disruptive technologies for industrial change. *L'industria –Rivista di economia e politica industriale, 38*(1), 97–120. https://doi.org/10.1430/87140

Coccia, M. (2017e). Disruptive firms and industrial change. *Journal of Economic and Social Thought, 4*(4), 437–450. https://doi.org/10.1453/jest.v4i4.1511

Coccia, M. (2018a). Disruptive firms and technological change. *Quaderni IRCrES-CNR, 3*(1), 3–18. https://doi.org/10.23760/2499-6661.2018.001

Coccia, M. (2018b). Theorem of not independence of any technological innovation. *Journal of Economics Bibliography, 5*(1), 29–35. https://doi.org/10.1453/jeb.v5i1.1578

Coccia, M. (2018c). The origins of the economics of Innovation. *Journal of Economic and Social Thought, 5*(1), 9–28. https://doi.org/10.1453/jest.v5i1.1574

Coccia, M. (2019a). A theory of classification and evolution of technologies within a generalized Darwinism. *Technology Analysis & Strategic Management, 31*(5), 517–531. https://doi.org/10.1080/09537325.2018.1523385

Coccia, M. (2019b). The theory of technological parasitism for the measurement of the evolution of technology and technological forecasting. *Technological Forecasting and Social Change, 141*, 289. https://doi.org/10.1016/j.techfore.2018.12.012

Coccia, M. (2019c). Comparative theories of the evolution of technology. In A. Farazmand (Ed.), *Global encyclopedia of public administration, public policy, and governance*. Springer. https://doi.org/10.1007/978-3-319-31816-5_3841-1

Coccia, M. (2019d). Comparative institutional changes. In A. Farazmand (Ed.), *Global encyclopedia of public administration, public policy, and governance*. Springer. https://doi.org/10.1007/978-3-319-31816-5_1277-1

Coccia, M. (2019e). Why do nations produce science advances and new technology? *Technology in Society, 59*, 101124. https://doi.org/10.1016/j.techsoc.2019.03.007

Coccia, M. (2019f). Metabolism of public research organizations: How do laboratories consume state subsidies? *Public Organization Review: A Global Journal, 19*(4), 473–491. https://doi.org/10.1007/s11115-018-0421-y

Coccia, M. (2019g). Intrinsic and extrinsic incentives to support motivation and performance of public organizations. *Journal of Economics Bibliography, 6*(1), 20–29. https://doi.org/10.1453/jeb.v6i1.1795

Coccia, M. (2020a). Multiple working hypotheses for technology analysis. *Journal of Economics Bibliography, 7*(2), 111–126. https://doi.org/10.1453/jeb.v7i2.2050

Coccia, M. (2020b). Comparative concepts of technology for strategic management. In A. Farazmand (Ed.), *Global encyclopedia of public administration, public policy, and governance*. Springer. https://doi.org/10.1007/978-3-319-31816-5_3970-1. ISBN: 978-3-319-20927-2, online ISBN 978-3-319-31816-5.

Coccia, M. (2020c). Destructive technologies for industrial and corporate change. In A. Farazmand (Ed.), *Global encyclopedia of public administration, public policy, and governance*. Springer. https://doi.org/10.1007/978-3-319-31816-5_3972-1

Coccia, M. (2020d). Comparative hypotheses for technology analysis. In A. Farazmand (Ed.), *Global encyclopedia of public administration, public policy, and governance*. Springer. https://doi.org/10.1007/978-3-319-31816-5_3973-1

Coccia, M. (2020e). Comparative critical decisions in management. In A. Farazmand (Ed.), *Global encyclopedia of public administration, public policy, and governance*. Springer. https://doi.org/10.1007/978-3-319-31816-5_3969-1

Coccia, M. (2020f). Deep learning technology for improving cancer care in society: New directions in cancer imaging driven by artificial intelligence. *Technology in Society, 60*(February), 1–11. https://doi.org/10.1016/j.techsoc.2019.101198

Coccia, M. (2020g). The evolution of scientific disciplines in applied sciences: Dynamics and empirical properties of experimental physics. *Scientometrics, 124*, 451. https://doi.org/10.1007/s11192-020-03464-y

Coccia, M. (2020h). How does science advance? Theories of the evolution of science. *Journal of Economic and Social Thought, 7*(3), 153–180. https://doi.org/10.1453/jest.v7i3.2111

Coccia, M. (2020i). Asymmetry of the technological cycle of disruptive innovations. *Technology Analysis & Strategic Management, 32*, 1462. https://doi.org/10.1080/09537325.2020.1785415

Coccia, M. (2020j). Factors determining the diffusion of COVID-19 and suggested strategy to prevent future accelerated viral infectivity similar to COVID. *Science of the Total Environment, 729*, 138474. https://doi.org/10.1016/j.scitotenv.2020.138474

Coccia, M. (2020k). An index to quantify environmental risk of exposure to future epidemics of the COVID-19 and similar viral agents. *Theory and Practice. Environmental Research, 191*, 110155. https://doi.org/10.1016/j.envres.2020.110155

Coccia M. (2021). The relation between length of lockdown, numbers of infected people and deaths of Covid-19, and economic growth of countries: Lessons learned to cope with future pandemics similar to Covid-19. *Science of The Total Environment, 775*, article n. 145801, https://doi.org/10.1016/j.scitotenv.2021.145801

Coccia M. (2021a). Technological Innovation. The Blackwell Encyclopedia of Sociology. Edited by George Ritzer and Chris Rojek. John Wiley & Sons, Ltd. https://doi.org/10.1002/9781405165518.wbeost011.pub2

Coccia M. (2021b). Pandemic Prevention: Lessons from COVID-19. Encyclopedia 2021, 1, 433–444. MDPI, Basel, Switzerland, Encyclopedia of COVID-19, open access journal, https://doi.org/10.3390/encyclopedia1020036

Coccia M. (2022). Preparedness of countries to face covid-19 pandemic crisis: Strategic positioning and underlying structural factors to support strategies of prevention of pandemic threats, Environmental Research, vol. 203, n. 111678, https://doi.org/10.1016/j.envres.2021.111678

Coccia M., Bellitto M. (2018). Human progress and its socioeconomic effects in society. *Journal of Economic and Social Thought, 5*(2), 160–178. http://dx.doi.org/10.1453/jest.v5i2.1649

Coccia, M., & Finardi, U. (2012). Emerging nanotechnological research for future pathway of biomedicine. *International Journal of Biomedical Nanoscience and Nanotechnology, 2*(3–4), 299–317. https://doi.org/10.1504/IJBNN.2012.051223

Coccia, M., & Finardi, U. (2013). New technological trajectories of non-thermal plasma technology in medicine. *International Journal of Biomedical Engineering and Technology, 11*(4), 337–356. https://doi.org/10.1504/IJBET.2013.055665

Coccia, M., & Cadario E. (2014). Organisational (un)learning of public research labs in turbulent context. *International Journal of Innovation and Learning, 15*(2), 115–129. https://doi.org/10.1504/IJIL.2014.059756

Coccia, M., & Wang, L. (2015). Path-breaking directions of nanotechnology-based chemotherapy and molecular cancer therapy. *Technological Forecasting and Social Change, 94*(May), 155–169. https://doi.org/10.1016/j.techfore.2014.09.007

Coccia, M., & Wang, L. (2016). Evolution and convergence of the patterns of international scientific collaboration. *Proceedings of the National Academy of Sciences of the United States of America, 113*(8), 2057–2061. www.pnas.org/cgi/doi/10.1073/pnas.1510820113

Coccia, M., & Watts, J. (2020). A theory of the evolution of technology: Technological parasitism and the implications for innovation management. *Journal of Engineering and Technology Management, 55*, 101552. https://doi.org/10.1016/j.jengtecman.2019.11.003

Dicken, P. (2011). *Global shift* (6th ed.). Sage.

Emery, F. E., & Trist, E. L. (1965). The causal texture of organizational environments. *Human Relations, 18*(1), 21–32.

Gans, J. S., Stern, S., & Wu, J. (2019). Foundations of entrepreneurial strategy. *Strategic Management Journal, 40*(5), 736–756.

Garud, R., Simpson, B., Langley, A., & Tsoukas, H. (2015). *The emergence of novelty in organizations*. Oxford University Press.

Gavetti, G., Levinthal, D. A., & Rivkin, J. W. (2005). Strategy making in novel and complex worlds: The power of analogy. *Strategic Management Journal, 26*(8), 691–712.

Gigerenzer, G., & Selten, R. (2002). *Bounded rationality*. MIT Press.

Gigerenzer, G., & Todd, P. M. (1999). Ecological rationality: The normative study of heuristics. In G. Gerd, M. Todd Peter, & The ABC Research Group (Eds.), *Ecological rationality: Intelligence in the world* (pp. 487–497). Oxford University Press.

Gilbert, C. (2003). The disruption opportunity. *MIT Sloan Management Review, 44*, 27–33.

Gioia, D. A., & Chittipeddi, K. (1991). Sensemaking and sensegiving in strategic change initiation. *Strategic Management Journal, 12*(6), 433–448. https://doi.org/10.1002/smj.4250120604

Henderson, R. (2006). The innovator's dilemma as a problem of organizational competence. *Journal of Product Innovation Management, 23*, 5–11.

Hitt, M. A., Ireland, R. D., Camp, S. M., & Sexton, D. L. (2002). *Strategic entrepreneurship: Creating a new mindset*. Blackwell.

Hitt, M. A., Ireland, R. D., Sirmon, D. G., & Trahms, C. (2011). Strategic entrepreneurship: Creating value for individuals, organizations and society. *Academy of Management Perspectives, 25*(2), 57–75.

Ireland, R. D., Hitt, M. A., & Sirmon, D. G. (2003). A model of strategic entrepreneurship: The construct and its dimensions. *Journal of Management, 29*(6), 963–989.

Johnson, G., & Scholes, K. (1988). *Exploring corporate strategy*. Hemel Hempstead.

Kahneman, D., Slovic, P., & Tversky, A. (1982). *Judgment under uncertainty: Heuristics and biases*. Cambridge University Press.

Kazanjian, R. K., Drazin, R., & Glynn, M. A. (2002). Implementing strategies for corporate entrepreneurship: A knowledge-based perspective. In M. A. Hitt, R. D. Ireland, S. M. Camp, & D. L. Sexton (Eds.), *Strategic entrepreneurship: Creating a new mindset* (pp. 173–199). Blackwell.

Ketchen, D. J., Ireland, R. D., & Snow, C. C. (2007). Strategic entrepreneurship, collaborative innovation, and wealth creation. *Strategic Entrepreneurship Journal, 1*(3–4), 371–385.

Kilkki, K., Mäntylä, M., Karhu, K., Hämmäinen, H., & Ailisto, H. (2018). A disruption framework. *Technological Forecasting and Social Change, 129*, 275–284.

Klein, G. A. (1993). A recognition-primed decision (RPD) model of rapid decision making. In G. A. Klein, J. Orasanu, R. Calderwood, & C. E. Zsambok (Eds.), *Decision making in action: Models and methods* (pp. 138–147). Ablex Publishing Corp.

Kogut, B., & Zander, U. (1996). What firms do? Coordination, identity, and learning. *Organization Science, 7*(5), 502–518.

Kuratko, D. F., & Audretsch, D. B. (2009). Strategic entrepreneurship: Exploring different perspectives of an emerging concept. *Entrepreneurship Theory and Practice, 33*(1), 1–17.

Kuratko, D. F., & Morris, M. H. (2018). Corporate entrepreneurship: A critical challenge for educators and researchers. *Entrepreneurship Education and Pedagogy, 1*(1), 42–60.
Lee, J. M. (1995). The reorganization of the British Council: Management improvisation and policy uncertainty. *Public Administration (London), 75*(3), 339–355.
Linstone, H. A. (1999). *Decision making for technology executives. Using multiple perspectives to improve performance*. Artech House.
Luke, B., Kearins, K., & Verreynne, M.-L. (2011). Developing a conceptual framework of strategic entrepreneurship. *International Journal of Entrepreneurial Behavior & Research, 17*(3), 314–337.
Lumpkin, G. T., & Dess, G. G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of Management Review, 21*(1), 135–172.
March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science, 2*(1), 71–87.
Markides, C. (2006). Disruptive innovation: In need of better theory. *Journal of Product Innovation Management, 23*, 19–25.
Mazzei, M. J. (2018). Strategic entrepreneurship: Content, process, context, and outcomes. *The International Entrepreneurship and Management Journal, 14*, 657–670. https://doi.org/10.1007/s11365-018-0512-9
McDermott, R. I., & Taylor, M. J. (1982). *Industrial organisation and localization*. Cambridge University Press.
Mendonça, D., & Fiedrich, F. (2006). Training for improvisation in emergency management: Opportunities and limits for information technology. *International Journal of Emergency Management, 3*(4), 348–363.
Meyer, G. D., & Heppard, K. (Eds.). (2000). *Entrepreneurship as strategy: Competing on the entrepreneurial edge (Entrepreneurship and the management of growing enterprises)*. Sage.
Morris, M. H., Kuratko, D. F., & Covin, J. G. (2008). *Corporate entrepreneurship and innovation* (2nd ed.). Thomson South-Western.
O'Reilly, C. A., & Tushman, M. L. (2004). The ambidextrous organization. *Harvard Business Review, 82*(4), 74–81.
Ott, T. E., & Eisenhardt, K. M. (2020). Decision weaving: Forming novel, complex strategy in entrepreneurial settings. *Strategic Management Journal, 41*(12), 2275–2314.
Reinhardt, R., & Gurtner, S. (2018). The overlooked role of embeddedness in disruptive innovation theory. *Technological Forecasting and Social Change, 132*, 268–283.
Rosenbusch, N., Rauch, A., & Bausch, A. (2013). The mediating role of entrepreneurial orientation in the task environment–performance relationship: A meta-analysis. *Journal of Management, 39*(3), 633–659.
Schuelke-Leech, B.-A. (2018). A model for understanding the orders of magnitude of disruptive technologies. *Technological Forecasting and Social Change, 129*, 261–274.
Seeger, M. W., Sellno, T. L., & Ulmer, R. R. (1998). Communication, organization and crisis. *Communication Yearbook, 21*, 231–275.
Shane, S. A., & Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *Academy of Management Review, 25*(1), 217–226.
Sharkansky, I., & Zalmanovitch, Y. (2000). Improvisation in public administration and policy making in Israel. *Public Administration Review, 60*(4), 321–329.
Shrivastava, P., Mitroff, I. I., Miller, D., & Miclani, A. (1988). Understanding industrial crises. *Journal of Management Studies, 25*(4), 285–303. https://doi.org/10.1111/j.1467-6486.1988.tb00038.x
Si, S., Zahra, S. A., Wu, X., & Jeng, D. J.-F. (2020). Disruptive innovation and entrepreneurship in emerging economics. *Journal of Engineering and Technology Management, 58*, 101601.
Simon, H. A. (1947). *Administrative behavior: A study of decision-making processes in administrative organization*. The Free Press.
Simon, H. A. (1955). A behavioral model of rational choice. *The Quarterly Journal of Economics., 69*(1), 99–118. https://doi.org/10.2307/1884852

Simon, H. A. (1957). *Models of man*. John Wiley.
Simsek, Z., Heavey, C., & Fox, B. C. (2017). (Meta-)framing strategic entrepreneurship. *Strategic Organization, 15*(4), 504–518.
Stevenson, H. H., & Gumpert, D. E. (1985). The heart of entrepreneurship. *Harvard Business Review, 85*(2), 85–95.
Sturgeon, T. J. (2002). Modular production networks: A new American model of industrial organization. *Industrial and Corporate Change, 11*, 451–496.
Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal, 18*(7), 509–533.
Tushman, M., & Anderson, P. (1986). Technological discontinuities and organizational environments. *Administrative Science Quarterly, 31*(3), 439–465.
Tushman, M. L., & O'Reilly, C. A. (1996). Ambidextrous organizations: Managing evolutionary and revolutionary change. *California Management Review, 38*(4), 8–30.
Van de Ven, A., & Garud, R. (1994). The coevolution of technical and institutional events in the development of an innovation. In J. A. Baum & J. V. Singh (Eds.), *Evolutionary dynamics of organizations* (pp. 425–443). Oxford University Press.
Vecchiato, R. (2017). Disruptive innovation, managerial cognition, and technology competition outcomes. *Technological Forecasting and Social Change, 116*(2017), 116–128.
Venette, S. J. (2003). *Risk communication in a high reliability organization: APHIS PPQ's inclusion of risk in decision making*. UMI Proquest Information and Learning.
Weick, K. E. (1993). *The collapse of sensemaking in organizations: The Mann Gulch disaster* (pp. 628–652). Administrative Science Quarterly.
Weick, K. E. (1998). Improvisation as a mindset for organizational analysis. *Organization Science, 9*(5), 543–555.

Growth Loops: From Perceptions of Growth to Motivations for Growth in High-Growth Women-Led Entrepreneurial Firms

Renaud Redien-Collot

Abstract The growth of a firm depends on its adaptability (Barringer et al., J Business Ventur, 20(5): 663–687, 2005), or, in other words, on the evolution of its business model and its capacity to generate a flow, if not of innovations, then at least of innovative suggestions shared throughout the employee corpus (Foss & Saebi, J Manag, 43: 200–227, 2017). Amongst the factors at the origin of this flux, we should mention, in particular, the entrepreneurs' regulatory role, and interactions between the head of the firm and employees based on the way in which they steer the company (Redien-Collot & Radu, Handbook of research on strategic management in small and medium enterprises, 2014; Fust et al., Entrepreneur Res J, 8(2): 1–11, 2018). The entrepreneurs' growing cognitive skills in applying performance monitoring systems are rarely questioned. This study concludes that, for a significant sample of women founders and heads of high-growth firms, there are three steering options generating three types of fairly remarkable swathes of innovative propositions on the part of employees. Two of these steering models present fairly radical socio-cognitive breaks with traditional models. In view of these results, it is impossible to see female leadership as a single (repressed) alternative to masculine models of entrepreneurial success. Women entrepreneurial emancipation has several implications in the understanding of the strategic deployment of their firms. This research explores how the spirit of emancipation drives women's entrepreneurship, including their strategic choices and the freedom to innovate experienced by their employees.

Keywords Women entrepreneurship · Strategic deployment of entrepreneurial firms · Innovation · Inter-subjective strategic steering

R. Redien-Collot (✉)
Entrepreneurship & Innovation, Ecole de Management Léonard de Vinci, Pôle Universitaire Léonard de Vinci, Courbevoie, France
e-mail: renaud.redien-collot@devinci.fr

N. Faghih, A. Forouharfar (eds.), *Strategic Entrepreneurship*, Contributions to Management Science, https://doi.org/10.1007/978-3-030-86032-5_13

1 Introduction

In his founding work on rapidly expanding firms, Penrose (1959) poses the question of how to measure growth in SMEs and, above all, of how to measure the perception of growth on the part of heads of companies. In effect, while it is important for a firm's stakeholders to follow its progress in order to be able to grant it trust and support, it is yet more important for entrepreneurs to use indicators to take decisions and maintain growth. In their founding articles, Delmar (1997) highlight the importance of quantitative indicators of SME growth, including turnover, margins, market share, sales, return on equity, and return on assets. They also place a great deal of emphasis on more qualitative indicators, such as internal development, changes within the company, and levers of innovation. In the mid-1980s, some authors began to point out that, while quantitative indicators encourage heads of firms to follow their strategic growth plans, they do not incentivize them to foster more growth or identify new approaches liable to generate additional growth (Gupta & Govindarajan, 1984). Lau and Busenitz (2001) observe that growth indicators are not enough to encourage entrepreneurs to foster expansion. A thorough quantitative and qualitative study carried out by Achtenhagen et al. (2010) confirms this point of view call upon the community of researchers to identify the kind of signals that, in regard to entrepreneurs' perceptions of the growth of their firms, motivate them to focus on generating additional growth and, above all, on developing a strategy and a discourse designed to engage their personnel. According to the authors, there are appropriate times that, from a psychological point of view, can be described as loops, in which entrepreneurs are sufficiently vigilant to be able to perceive signals from within the firm and outside it that encourage them to seek additional growth. Monti et al. (2007) suggest that women are more likely than men to use these signals to boost their growth projects.

According to Kirkwood (2016), female and male entrepreneurs weigh the criteria for entrepreneurial success equally, balancing financial and personal success, objective and subjective approaches of growth. We present the hypothesis that, between the interpretation of these indicators and the emergence of decisions that lead to additional growth, women entrepreneurs explore a series of socio-cognitive schemas that have yet to be studied in depth and which deserve further analysis and, ultimately, the development of a model. This chapter focuses on the social and cognitive character of the motivation to boost growth amongst a very specific group of entrepreneurs made up of women heads of high-growth firms. According to Achtenhagen et al. (2010), and also to Delmar (1997), it is here, and not in a generic group of entrepreneurs at the head of average-growth firms, that we should look if we want to understand how this kind of motivation is socially constructed. Whether they admit it or not, women entrepreneurs at the head of high-growth firms encounter more challenges in their careers than most of their male counterparts (Ahl & Marlow, 2012). We refer to the tradition of social sciences practiced in the United States by Peter Berger (1993) and in France by Moscovici (1984), who demonstrate that active minorities innovate in the psychological and social spheres in order to

overcome obstacles that are much larger than those encountered by average populations who observe traditional norms. We also refer to recent research on persistence according to which entrepreneurial resistance and endurance are sources of cognitive creativity (Cardon et al., 2009; Baron et al., 2016). Methodologically and epistemologically, we do take the view that more or less stigmatized populations display a relatively greater motivation to explore areas other than organizational norms as defined by activity monitoring indicators.

This study is based on research carried out by Achtenhagen et al. (2010). After addressing the theoretical foundations of the measurement of growth, its link to entrepreneurial vigilance associated with discrimination, and its character as a social construct in the organizations concerned, the research question and its associated hypotheses are defined and then the results of the study are presented. The research objective is to observe the interaction between women entrepreneurs' strategic steering and their employees' propensity to innovation. The initial research question is as follows: what are the steering motives that generate the greatest number of beliefs and, consequently, motivations to change the business model in women-led high-growth firms? The second research question is: how does a woman at the head of a high-growth company take advantage of the cognitive challenges that she has experienced to propose one or more growth motives for herself and her employees?

The research design is qualitative and organized in two phases. We have interviewed 30 female business owners of high-growth SMEs that were listed in the annual national Index entitled Women Equity for Growth (WEG) ranking (Appendixes 1 and 2). Then, we have interviewed a panel of their employees.

In the discussion section, we shall analyze the results in the light of cognitive theories in the field of entrepreneurship, as well as of theories of the construction of subjectivity and gender. Via a thorough analysis of one sample made up exclusively of women entrepreneurs, we shall attempt to promote a broader vision of female leadership that is not merely an alternative to dominant masculine leadership. Lastly, we shall propose a critical approach to leadership and the growth of entrepreneurial firms that can be applied in tandem with strategic theories and tools.

2 Literature Review

This chapter attempts to understand entrepreneurial growth as a behaviour characteristic of a group of firms observed at a given moment in time, rather than as a phenomenon that can be studied from a longitudinal point of view. We focus on a specific group of firms, leaders, and subjectivities. As Gibb (2000) recalls, an overly generic view of entrepreneurship tends to reduce the field to an application of major strategic approaches. We apply a socio-constructivist approach that addresses the firm's attitude to growth in the light of two types of dialogue, namely dialogue between employees and the heads of the firm, and the dialogue that the heads of the firm have with themselves. Of course, by reconstituting these two types of dialogue,

we restore a relatively longitudinal aspect to them. But the approach in this study is primarily characterized by the fact that we have placed less emphasis on entrepreneurs' ability to rationalize day-to-day activities and more on their capacities in the field of entrepreneurial vigilance, which, according to the cognitive literature on entrepreneurship, explains the performances of entrepreneurs and, more particularly, of entrepreneurs at the head of high-growth companies (Barringer et al., 2005; Xie & Lv, 2016). Entrepreneurial alertness is not only the result of a particular posture linked to a specific environment but is also linked to entrepreneurs' experience. If entrepreneurs have had to fight against certain stereotypes or certain types of discrimination, they are more likely to monitor the solidity and effectiveness of social links that facilitate the kind of dialogue that can be constructed with employees (Essers & Benschop, 2007; Sappleton, 2018). Similarly, the experience of discrimination encourages individuals to develop certain interpretation grids providing access to alternatives to traditional rational and instrumental schemas (Redien-Collot, 2009).

2.1 Understanding Entrepreneurship from the Point of View of Growth

This study on growth in SMEs is articulated around two types of approach. Entrepreneurship can be defined as a unique phenomenon involving the maintenance of an entrepreneurial spirit throughout the different stages of business development (Soriano & Martınez, 2007). In this perspective, growth is perceived as one or several phases in the deployment of an initial project. Growth can also be defined as a (relatively sustainable) characteristic of a group of companies and entrepreneurs whose behaviours are studied and compared. The first approach clearly has a temporal aspect, since it presents a scenario in which several phases in the process, ranging from an initial state to a very advanced phase of development, can be compared and contrasted; with the second approach, a comparison is made between firms whose results at a given moment are similar, but whose behaviours can present certain differences (Gartner, 2004).

From an epistemological point of view, these two approaches present both advantages and disadvantages. Even though corporate growth is presented as the norm in terms of strategy and political economy, in statistical terms, it is an abnormal state (Achtenhagen et al., 2010). Reflecting what happens in the sphere of fashion, beauty, and bodily appearance, the media, supported by numerous interest groups, promote certain models for corporate growth, whether in regard to large innovative groups, agile start-ups, or virtuous SMEs. Following Barringer et al. (2005), we assume that growth is an objectively desirable state for all firms, but that it can, nevertheless, be a transitory state, a significant experience for the company which eventually gives way to a more mediocre period in terms of performance. Growth is a specificity that is neither an anomaly nor the result of chance.

There is a debate today on entrepreneurs' motivations to embark on the path of growth. The current academic literature contrasts measured and perceived growth (Angel et al., 2018). However, Angel and his colleagues (2018) have shown that the practice of performance monitoring is informed by entrepreneurs' representation of their success. However, entrepreneurs are not alone in identifying avenues for growth, especially when their business has reached a reasonable size. Entrepreneurs and their teams can discuss the interpretation of data as well as situations to anticipate what may change in the business model of the company. It can be the object of a conscious and unconscious tension (towards growth) among the firm's leader and employees (Redien-Collot & Radu, 2014). In order to address the issue of growth as a potentially transitory event, rather than as an ideal that should be pursued by all firms, we take the view that, instead of conducting a longitudinal study of a success story, we should focus on an endogenous group of firms. According to Delmar (2006) and Moreno and Casillas (2007), the endogenous character of a group of high-growth firms should correspond to objective criteria (turnover, profits, return-on-investment, etc.) over a relatively period (at least 2–3 financial years).

Of course, this approach to high-growth entrepreneurial firms tends to ignore their exceptional nature, which is beyond discussion. But this type of analysis makes it possible to distinguish between what is idiosyncratic and what, within the network of certain social and mental processes, is recurrent. The approach invites us to consider growth as a behavioural modality that individuals can learn (rather than imitate) to deploy (rather than transfer), with the proviso that modalities of application or transference in a given firm in a specific sector and a given economy are discussed.

2.2 Understanding Entrepreneurship in Function of the Regimes of Discrimination and of Cognitive Vigilance/Acuity of Entrepreneurs

The distinctive value produced by entrepreneurs is linked to their capacity to respect and break the rules (Schumpeter, 1939). Entrepreneurs seem to articulate two major objectives, namely conformity and differentiation regarding market norms and, more generally, to social expectations (Navis & Glynn, 2011). To be capable of a degree of "creative destruction," or of more or less notable innovation, all entrepreneurs need to manage ambiguous situations in which they have to elaborate viable and feasible projects, or, in other words, to conform to socially shared practices and expectations, while at the same time propose a differentiated offer, or, in other words, a project involving the creation of values that serve as a vehicle for change and originality (Navis & Glynn, 2011). This kind of ambivalence can be stimulated by certain methods of support and, as have established, is a source of innovation and growth.

In their thoroughgoing study of immigrant women entrepreneurs, Essers and Benschop (2007) highlight the fact that entrepreneurs who are victims of stereotypes have more chance of applying this praxeological ambivalence, which simultaneously respects and calls into question established rules. Yang et al. (2012) demonstrate that female (and male) immigrant entrepreneurs find alternative ways of accessing resources that their lack of legitimacy would otherwise deny them. This enables them to develop innovative combinations of resources that are expressed in new approaches to production and distribution that deliver decisive competitive advantages. In their discussion of the strategic aspects of minority entrepreneurship, Calás et al. (2009) highlight the fact that entrepreneurs exposed to varying kinds of stereotyping and discrimination (of varying degrees of intensity) articulate the elements of the propositions and architecture of value inherent in their offers in a highly original manner applying original perspectives associated with learning processes, politics, and the market or organizational issues. In her comparison of the successes of firms headed by majority male Caucasian Americans and firms headed by women and members of ethnic minorities, Bruner (2011) demonstrates that problems linked to discrimination stimulate a high degree of persistence in minority entrepreneurs, who are able gradually to enrich their modes of analysis and experiences of the entrepreneurial approach. This kind of persistence is at the origin of their perceptual acuity, as well as of the opportunities that they recognize and exploit, and of the original ways in which they develop them in order to elaborate a relevant idea for creating value (Smith-Hunter & Boyd, 2004; Redien-Collot, 2009). To describe the notion of entrepreneurial vigilance, Gaglio and Katz (2001) point out how the cognitive persistence of individuals helps them to elaborate mental schemas capable of capturing opportunities that others fail to perceive.

We can, therefore, link research on the entrepreneurial persistence of discriminated populations, more specifically female populations, with research on entrepreneurial vigilance (Tang et al., 2012). From there, we can infer that the experience of discrimination has, on the one hand, an impact on the perception of the components and combinations of the entrepreneurial process, and, on the other, on the perception of what constitutes the core of that process, namely opportunity. Of course, once the firm has been set up and developed, entrepreneurs are faced with organizational and strategic challenges in their sector and environment. Nevertheless, unlike entrepreneurs who use norms to manage their companies, the women entrepreneurs in the sample have learned to apply certain cognitive pathways characterized by their capacity to generate mental (heuristic) short cuts regarding syntheses of information that trigger certain signals underpinning entrepreneurial vigilance (Tang et al., 2012). As highlighted by Sappleton (2018), women entrepreneurs not only apply objective indicators but also the kind of modes of perception that their unplanned career experiences and/or their personal desires enable them to deploy. It is important to know the relative degrees of attention paid by entrepreneurs at the head of high-growth firms to traditional indicators and perceived signals. It is even more important to verify how they share them.

2.3 Approaches to Growth of Varying Degrees of Interactivity

The cognitive aspect is important in terms of understanding how women entrepreneurs apply certain schemas of perception, analysis, and decision-making. Nevertheless, the structure of the decision-making process is socially constructed. It is strongly influenced by the kinds of social interactions encouraged by women entrepreneurs amongst their entourages. Collective/organizational and interindividual relations as well as soliloquies convoking a (real and ideal) privileged interlocutor provide opportunities for heads of firms to interpret and evaluate what they perceive (Redien-Collot & Léger-Jarniou, 2018). Organizational theory provides a certain number of frameworks for measuring how entrepreneurs socially structure their approach to steering their firms, an approach at the origin of corporate growth. In regard to this line of questioning, one type of literature focuses on inputs, or, in other words, on the ways in which heads of firms structure their steering approach and on the effects they hope to achieve. A second type of literature analyses tangible effects on employees. The first kind of literature, which is close to this problematic, does not always directly address the question of steering, but instead proposes a more holistic approach by focusing on entrepreneurs and their socio-cognitive priorities (perception, sought after meanings, modes of interpretation, etc.) (Wach et al., 2016). The second type of literature focuses on the question of the outcomes of steering and management in terms of innovation (López & Hiebl, 2015).

Discussing the cognitive priorities of the entrepreneur, Haynie et al. (2010) suggest that the heads of high-growth firms are not content just to organize the extraction of factual information characterizing their firms and compare it with other sources of information. In fact, they also pass that information through a set of subjective and normative dimensions according to the formal and informal sequences that they have tested over the long term. Of course, from an organizational point of view, these types of leaders can interact with employees as agents of validation and co-explorers of their own intuitions. Rather than persuading employees of the value of a certain type of change (turnings to be made, new objectives, etc.), heads of companies sometimes elaborate tempered, top-down approaches that make it possible to gain the support of their employees in appropriating changes to be made (Fontana & Musa, 2017). But heads of companies can also encourage certain bottom-up dynamics that not only transform employees into (creative) levers for new ideas but also into sources of ideas for change and innovation. As Achtenhagen et al. (2010) clearly demonstrate, time spent analysing performance indicators is time spent by entrepreneurs and employees on exchanging ideas and information. This time is used to guide certain changes within the firm. But, in the day-to-day life of the firm, entrepreneurs negotiate between a concern with expressing certain of their own motivations, and the prospect of integrating those of their employees, whether they converge or diverge from their own. According to this literature, entrepreneurs at the head of SMEs, even high-growth SMEs, place a great deal of emphasis on interactions with their employees in the short-, medium-, and long-term. Fust et al. (2018) refer to the notion of inter-subjective strategic steering to describe the

entrepreneur's willingness to go back and forth between the quantified facts that characterize the company and the consideration of the views of the co-workers of the entrepreneurial team.

In this context, they must encourage interactions between and suggestions from employees (Yukl, 2002). This type of incentive is mirrored by the fact that structure generates innovations in the form of relatively elaborate suggestions, ranging from the formulation of ideas to the elaboration of innovative projects, and including the reform and transformation of processes (Denti & Hemlin, 2012; Kesting et al., 2016). In certain cases, the head of the firm will apply a minimalist form of management to ideas, thereby creating a high level of dynamism (Pedersen & Johansen, 2012). In other cases, entrepreneurs oversee the emergence of incremental innovations, or even (though more rarely) radical innovations that lead to the renewal of the business model (Doz & Kosonen, 2010). Naturally, not all innovations lead to such changes. For this to happen, a swath of innovative propositions and initiatives delivered over a relatively long period of time is required (Foss & Saebi, 2017).

3 Research Design and Methodology

All growth is underpinned by strong motivations. But, as Stiegler (1994) suggests, all motivations in the sphere of innovation and growth are based on motives, or, in other words, by codified surfaces with a social use that encourage psychic projections. These motives generate narratives that engender beliefs amongst entrepreneurs and their personnel (Hjorth & Steyaert, 2005) and play an important role in strategic steering (Foss & Saebi, 2017). Potential motives range from the most generic and collective (indicators) to the most personalized and focused on the entrepreneur (a dream, an intuition). Nevertheless, the neutrality of generic motives can be no more than apparent: the entrepreneur's interpretation of them can affect their objective nature, especially if the firm is relatively small and the culture of the sector and/or the national culture in which it operates places an emphasis on the authority of the leader (Lubatkin et al., 2006). Even if entrepreneurs are relatively prudent in terms of their interpretation of information, their experience and subjectivity have a significant impact on structuring the motives that guide the future strategic development of their firms. The initial research question is as follows: what are the steering motives that generate the greatest number of beliefs and, consequently, motivations to change the business model in women-led high-growth firms? In other words, based on two of the most extreme motives, namely indicators and the elaboration of a personal vision, we intend to identify the nature and structure of the most frequently shared motives in firms directed by women. Furthermore, these motives can be hybrid—neither fully objective nor fully subjective. It is precisely the form of this (possible) hybridization applied by an entrepreneur in a high-growth context that we shall focus on. In effect, Fontana and Musa (2017) point out that the personality of the entrepreneur, especially if she has faced challenges in a learning context, will favour such hybridization. As Sequeira and Rasheed (2006) and Sappleton

(2018) underline, people living in the shadow of stereotypes are cognitively more challenged than those who fit in with the dominant norms. The second research question, associated with the first, will thus be: how does a woman at the head of a high-growth company take advantage of the cognitive challenges that she has experienced to propose one or more growth motives for herself and her employees? In the first field of observation in this study, we use the image of the loop to summarize the fact that the motive retained and developed by the entrepreneur and her personnel is of value in two different ways. In effect, when they constitute both a link between a before and after in the strategic development of the firm, and a bridge between norms and differences in regard to the firm and its offer, these motives can be considered as "loops" characterized by a genuine, dynamic power to effect change (McKelvie et al., 2017).

This is a qualitative study. It comprises two set of interviews, one with female company directors alone, the other with a small panel of each female respondents' co-workers. In the first phase, we conducted interviews with 30 women entrepreneurs to understand their perception of their firms' development and the role they attribute to the performance monitoring system. There are four sections in this first interview. We encouraged the respondents to give a brief description of their firms' evolution. Then, they were supposed to identify the most significant changes in this evolution. In the third section of the interview, we asked them to clarify the role of the performance monitoring system to anticipate these changes. Finally, they were invited to enlist the most important innovations that had occurred during the evolution of the firm.

In the second series of interviews conducted with women entrepreneurs' employees, we used the same format of questionnaire. We wanted to observe whether they had convergent or divergent views from their bosses about the firm's evolution and changes; interviewees were presented with structured, semi-directive questionnaires.

The first sample is drawn from the only French index to date, Women Equity for Growth, which has measured and ranked the 300 best-performing entrepreneurial SMEs headed by women every year since 2010. For at least the 6 years prior to the elaboration of each annual index, the selected companies are supposed to publish their data every year and are ranked on the basis of a series of financial and strategic indicators (*see* Appendix 1). We selected the respondents for the 2017 WEG ranking (*see* Appendix 2) (Neergaard, 2007). The age range of the respondents is comprised between 30 and 55 years. The majority of the businesses are located in the service sector. We asked the interviewed female business owners to select a representative but diversified panel of their co-workers so that we can interview them.

Each interview lasted between 1 ½ and 2 h. The interviews were then transcribed. A content analysis was applied to both series of interviews. We codified the approaches of the women entrepreneurs in the sample, depending on whether they described themselves or were described with and by their employees. We used five categories developed by Yukl (2002) to classify their behaviour. Although Yukl's model (2002) includes 14 categories, we preferred to apply the simplified model suggested by De Jong and Den Hartog (2007), which retains only five key elements

of leadership, which, in our view, describe steering actions. Those five categories were monitoring, consulting, delegating, recognizing, and rewarding. Meanwhile, we classified the initiatives of employees associated with various modes of steering in function of three categories suggested by Damanpour and Wichnevsky (2006): suggestions for ideas, reforms of processes, and the implementation of innovations.

In interpreting the interviews, we attempted to see whether:

- The entrepreneur describes her usual steering approach based on precise indicators (first interview).
- The entrepreneur focuses on certain signals and, if so, in function of what organizational dynamic (top-down, bottom-up, or mixed)? (first interview).
- The entrepreneur articulates indicators-based objective and signal-based intersubjective information (Fust et al., 2018) shared with co-workers to steer her firm and elaborate her strategic plans during the last 6 years (first interview).
- Employees either follow or/and criticize their director's steering style and how they react to it (second interview).

4 Results

The results will be presented with a view to highlighting whether female entrepreneurs consider that they use either objective and/or inter-subjective motives to steer their firms. We shall then present the various types of entrepreneurs' hybridization of the objective and subjective approach to steering growth. Lastly, we will see how co-workers react to their respective directors' steering style.

4.1 Objective and Subjective Motives for Steering Growth

A very important proportion of interviewees (90%) declared that they used clear-cut indicators, for example, turnover and margins, and the evolution of the client portfolio linked to the degree of satisfaction. These indicators are discussed regularly in executive committees and presented on a bi-annual basis at general staff meetings. By means of regular comparisons between two families of data concerning revenue and sales, women entrepreneurs not only monitor targets but also organize small committees to analyze positive trends that they never take for granted. To deflate unreasonably high hopes, they apply not only methodical doubt but also humour. They also discuss reinvesting profits a long way upstream. As well as this monitoring procedure, which, as many of the interviewees point out, resembles a conversation, women entrepreneurs apply a personal analysis of their sector, encompassing the regulation and behaviour of competitors.

Women entrepreneurs spend a good deal of time monitoring facts and figures relating to the firm and the sector in which it operates. However, 60% of the

interviewees mentioned that they were not content merely to compare data. They also compare perceptions that they monitor on a relatively frequent basis (once or twice a month). Half of them include in their analysis what their salespeople think about the progress made by their competitors (new products, sales forces, etc.), as well as comments made to those salespeople by clients. Similarly, they expect their employees to suggest ideas and introduce debate following the presentation of the firm's results in general assemblies. The same proportion appreciate requests for clarification, counter-proposals, comparisons between global points of view, and perspectives from the ground. They like to discuss both good and bad times with their employees to see how they deliver the value proposition inherent in the firm's offer. It is very often in discussions with employees, and later with clients about the value of the offer that women entrepreneurs are able to develop new activities. They also say that they frequently organize meetings with their executive committee to discuss the link between the value proposition in the offer and the way in which it can be developed, particularly in terms of distribution channels, customer relations, and structural costs. Lastly, most of them regard debates between salespeople and production personnel as an important source of inspiration. Some of them even encourage such debates, while a few of them exploit such debates to explore potential perspectives in innovation. However, in the interviewees' firms, other than in general assemblies, these perceptions are not formalized. In most cases, women entrepreneurs apply an active perspective, which they share with top management and certain heads of department. Half of the 60% of the sample who granted a substantial degree of importance to combinations of different points of view, or, in other words, 30% of the interviewees state that they grant more importance to this type of approach to strategic steering than to an approach based on indicators. Furthermore, in reference to the five categories developed by Yukl (2002) that describe the key initiatives of women entrepreneurs in terms of steering, two-thirds of the interviewees favour internal consultation, while one-third of them privilege monitoring. In their approach to business management, the latter place internal consultation in second or third position after formal monitoring. We interpret these results as symptomatic of sustained interaction between directors and employees.

4.2 What Kinds of Hybridization Are Linked to Female Entrepreneurs' Growth Motives?

A good third of the interviewees in the sample focus on monitoring managerial and strategic indicators. Just under a third of the sample continues to use them, even though they prefer certain combinations of perceptions. Lastly, a third of the sample systematically uses both methods.

Those who clearly prioritize formal indicators aim, first and foremost, to avoid falling short in terms of targets, viewing those targets as promises to be respected both for themselves and their employees. Some of them state that they take a

rigorous approach to ensuring that their employees continue to believe that their firms are "on the right road". According to a director (Nelly): "In my monitoring approach, I check whether we have really satisfied the customers; if so, it means that we have kept our promise and that we can go further together!" This attitude is markedly different from an abstract monitoring of indicators. On the contrary, their highly developed dialogue concerning indicators enables them to maintain confidence within their firms and even to use it as a lever. "Well, when we discuss figures and results, we analyze them to find out whether or not we're going in the right direction. But that's not all. We also verify the stock of confidence and the stock of confidence of the clients. And this is what makes it possible for all of us, me and the employees, to share genuinely original ideas, without being afraid to formulate them". Indicators can be used to wage war on doubt and to dismantle false evidence. But they also enable those who use them to overcome certain fears, ensuring that those fears do not prevent them from spontaneously expressing new propositions and, sometimes, incremental innovations. According to one director (Gaëlle), "[…] my job is to analyse turnover and its underbelly; it's thanks to this analysis that my employees and I are able to make changes to our strategy and move the business forward". One of the objectives of this dynamic but formal use of indicators is to enlighten and train personnel. For these women entrepreneurs, using indicators to verify axes of feasibility serves to motivate the desire to move forward and authorizes the exploration of certain strategic modifications, such as focusing on new client segments and distribution channels.

Women entrepreneurs, who are clearly sceptical about the use of indicators and who focus instead on observing and verifying what is happening on the ground, highlight the degree to which their firms are in a continuous state of flux. They are wary of the possibility of applying an overly defined and limiting vision of their companies. As one of these directors (Albane) says: "Indicators provide a useful photo of the firm's situation in a given point in time. This kind of photo helps us to keep a cool head; we're able to say that we'll arrange this, retouch that, etc. But this doesn't mean that you can do corporate forecasting as if you were writing some kind of photo romance! All that's a thing of the past!" From this point of view, current results do not determine the future. A number of forces co-exist, and it is necessary to capture not only results indicating major trends but also those revealing antagonistic forces. For these women entrepreneurs, the evolution of the firm is not only based on a dialogue between individuals and figures but also between groups of actors who serve as the vectors of perceptions that are not always convergent. Therefore, these women entrepreneurs do not seek to address and resolve potential divergences within the organization by using figures and indicators; they seek to observe and apply what they think of not as antagonisms to be placated, but as examples of the dynamism characterizing all enterprises. According to one of them (Marguerite): "I give myself time to examine the figures and make sure that everyone's going in the right direction. But the most important thing is to keep on top of everyday tensions. When clients tell us that they're unhappy, we have to try to understand why. Similarly, if a salesperson brings back a disappointing customer satisfaction report, we should consider it calmly, because, while it might point to

problems, it also highlights opportunities. For example, some trends can be turned around by discussing and redesigning the product. And the best indicator in the world can't give you that kind of information". The women entrepreneurs in the sample also, on occasion, examine the tensions and contradictions characterizing their firms. "I had a boss who said that it was important to put your finger where it really hurts … That's not what I try to do, but, when I receive a number of signals indicating that things are not going too well, I attempt to analyse all the rumours and comments associated with them, while also trying to take into account things that aren't said. Sometimes silence is a way of avoiding problems; sometimes it masks serious antagonisms. I try to weigh up these kinds of situations and I often make the right choice. But my aim is not to resolve conflicts; it's to distinguish between what could cause long-term harm to the firm and what, on the contrary, could create a kind of positive tension" (Isabelle). According to the interviewees, indicators tend to over-promote a consensus focused on positive results. To balance this global vision, they consciously conduct a series of one-off observations. When asked what guides them in this more analytical approach, they mention the fact that such observations help them not only to take mental shortcuts in regard to their perception of their firms but also reveal what was previously invisible, or, in other words, what they are usually unable to see and which are at the origin of weak signals.

Surprisingly, the interviewees who express as much confidence in indicators as they do in observations and personal correlations speak relatively spontaneously not only about their visions for the firm but also about their dreams and intuitions and those of their employees. Like the women entrepreneurs of the first group we studied, they spoke at length about their approach to indicators. And like the women entrepreneurs in the second group, they accord a great deal of importance to comparing and contrasting different perceptions. However, their priority is not to raise doubts or to analyze the intrinsic tensions within their firms. They affirm their desire to produce motivations and link them to one another. The offer is frequently at the heart of this network of motivations: "We have a whole range of indicators for verifying that we are selling what we should in the way we should; this means that salespeople and production teams can compare notes and decide what needs to be changed. But the most interesting thing is when we remind each other why we love to sell our products. And it's when we remind each other formally, or even mention it in the corridor, that we come up with the best ideas" (Athenaïs). This group of women entrepreneurs articulates indicators and exchanges points of view in order to renew objective and subjective discourses about the firm's offer and, in the final analysis, rebuild the structure of desire linking the employees to that offer. Since they take the view that the objective and subjective aspects of what makes the firm comprehensible are complementary, they give employees the opportunity to deploy new subjective discourses about their commitment to what they do. "We talk in a very open way about our results and the problems we encounter, but there's always a point when some employees take a step back from the debate about resources and performances and ask what pushes them forward and encourages them to do better. And that's where we all win. We're happy to say what motivates us and what we have to change to be even more motivated. Sincerely, it's almost always at that point

that we put our collective finger on what needs to be improved, and this is something that an army of consultants and auditors would never have been able to do" (Jeanne). Unlike the preceding group, these women entrepreneurs do not attempt to keep their distance by applying an overly objective framework; instead, they elaborate, in a fairly spontaneous way, a collective short-circuit based on explicit confrontations between objective and subjective points of view. This is one of the advantages enjoyed by small companies, a fact underlined by the interviewees: "To be honest, I shift several times a day, and even several times an hour, from a highly circumscribed and rational discourse to a very personal kind of dialogue. That's because I'm lucky enough to be at the head of a company that's not too big. This kind of flexibility is good for everybody. We can focus on a project, a point of view, or a task and then abruptly move on to something else. This is where we see what could be improved and what, often, is a question of nuance. But, strangely, when we make a U-turn, it acts like an electric shock that encourages us to take a closer look at things" (Priscilla).

4.3 Beliefs Generated

The employees in the sample are highly receptive to the motives underpinning the approaches of their bosses. This receptivity not only translates into an alignment with the steering motive chosen by their female bosses but also into effective outcomes that are supported to a greater or lesser degree in the field of innovation. Clearly, this mixed steering model generates the largest number of suggestion and initiatives capable of changing the business model.

Employees whose bosses focus on indicators in order to steer their firms claim that they are very much aware of the risks—market risks and quality risks—associated with their activities. Some of them also mention strategic risks, particularly in terms of the capacity to maintain a competitive advantage in situations in which imitation or even counterfeiting is possible. In most cases, these risks were mentioned in conjunction with indicators that serve to allay a substantial number of doubts, to continue with or begin their projects anew with added confidence, and to come up with new ideas and discuss (for a relatively short period of time) their feasibility. Furthermore, in their analyses, the discourse of their female bosses is depicted as a return to the reality principle arbitrating between different interpretations of risks to be taken and values to be upheld. In this scenario, the woman entrepreneur maintains or re-establishes consensus. In other words, she is the guarantor of beliefs in legitimacy. According to her employees, her priority is to analyze indicators with a view to comparing the usefulness of certain practices (processes and procedures) and results, with a view to abandoning, revising, or boosting those practices. She manages a virtuous circle that enables employees to boost their belief in efficacity and, therefore, efficiency. The comments of a substantial percentage of these employees reveal a certain pleasure at having been able to ask the right questions, reformulate certain problems, and initiate certain solutions.

In companies in which female entrepreneurs combine the use of indicators with an emphasis on the various point of view expressed by staff members, employees are invited to discuss intra-firm tendencies in an open and forthright manner. For example, according to one employee: "In a lot of firms, people throw figures and results around to hide or sideline certain discrepancies between production and market demand. With Anabelle, we really get to grips with these kinds of problems; we're also sensitive to certain differences of opinion, even latent ones. At our firm, we are not afraid to admit it when we don't agree with one another: differences in perspectives present risks as well as opportunities. In most cases, this kind of approach is preferable to using an unwieldy quality control process. It is enough to define rules for exchanging ideas and to mull over whatever's suggested". According to employees, these women entrepreneurs help to combine, without depriving them of their originality, various points of view concerning an entire range of expectations and priorities. This approach enables firms to define a scale ranging from the most to the least controllable perspectives. The notion of monitoring and aligning practices is thus relative. According to one employee, the interventions of the head of the firm serve to regulate certain imbalances: "We like to air our views and differences. Rolande is good at listening to what we have to say. She trusts us not to moan too much. But there are times, every year, when critical situations crop up, and she demands a little discipline. At these times, we drop our discussions and concentrate on the problem at hand". The practice of dissensus is, therefore, subject to a number of adaptations that the leader administers with dexterity. According to one employee: "She listens, she makes notes, she often points out the flaws in our arguments and, above all, she is able to re-establish consensus very quickly because we know that she will take what we say into account". It is thanks to this approach to what is controllable and predictable that employees are able to find a space for innovative initiatives. One employee identified the gaps that make innovation possible. "We know that, if we respect the procedures, we can reach targets in a way that we all understand. But employees don't always agree about how to achieve results. We note down all the suggestions, select one of them and, when the time comes to review the situation, we always discuss the route that we've taken. And it's always in this kind of scenario that we find new processes that save us ourselves lots of time and money. If the boss didn't leave us this room for manoeuvre in terms of analysis, and the time to do it, we would be less creative and efficient". These women entrepreneurs promote beliefs in accessibility based on memories and discussions of practices, as well as on analyses of available resources. Employees feel able to make suggestions on their own, or with a colleague, or as part of a team with a view to modifying processes and implementing and evaluating changes.

Employees whose directors adopt a systematic mixed approach to steering their firms appreciate the quality of their vision. According to one employee: "We know that we have to meet targets, but we understand what we're contributing to by attaining them. The service we provide has a great deal of value and she knows how to remind of us that". In effect, such values make it easier to integrate different points of view. "In our field, we not only have to satisfy clients but also keep all kinds of collaborators within the company happy; it's a long chain and Zora helps to

highlight our complementarities. I really appreciate that. In my previous job, employees were unnecessarily frustrated because they had no clear perception of the interdependence of various functions and departments. It's more flexible here because Zora discusses all that stuff with the employees". This type of women entrepreneur creates normative beliefs in the sense that she invites all the firm's collaborators to discuss rules and develop a critical approach. Referring to a dispute with the sales force, one employee explains: "[…] We've had a lot of problems with this kind of process because it penalizes salespeople who wanted to make quicker sales. After a number of trials over a 2-year period, we discussed results and, at a general meeting, Wanda [the director] suggested a introducing a game and rewarding the men or women who discover the winning solution. In fact, we found three solutions and developed a team to implement them. That's why we have a more interactive CRM and effective contacts between production units and salespeople who can react to orders within 2 h". In this type of company, internal and external values (and therefore norms) are combined on the basis of interactions between different points of view. Employees regularly reappraise all the processes in the firm, develop new ones, and implement incremental, and sometimes radical, innovations.

5 Discussion

The fact that women entrepreneurs are on the same page as their employees encourages those employees to present a wide range of innovative suggestions. Most of their firms have developed quality control levers for exploring potential approaches to developing innovations. Others focus on R&D, while a small minority concentrate on managing ideas. These levers are regulated by steering choices of women entrepreneurs that have, apparently, been favourably accepted by their staff. One of the secrets of combining innovations with the development of business models and the generation of growth resides in what many entrepreneurs regard as their expertise in the field of harmonization.

The existence of such a dialogue between the head of the firm and her employees raises several questions. This kind of dialogue is dependent on a highly advanced model of leadership, namely transformational leadership (Rubin et al., 2005). This model is the fruit of a substantial number of iterations and adjustments. Using our approach, we have, in effect, photographed a phenomenon that has taken a considerable amount of time to emerge and which, in the sample, is not exempt from cognitive bias. Of course, this kind of cohesion can be correlated with the positive performances of the firms studied. It is possible to conclude that this type of leadership is at once authentic and the result of a good deal of work and thought (Bass & Avolio, 1993). Furthermore, whichever of the three strategic postures adopted by the women entrepreneurs, they get the same feedback, which takes account of women's successes in the field of entrepreneurship (Eagly & Carli, 2007). These successes provide more than just one alternative to masculine models. However, while the first, indicator-based approach to steering implies a passive loyalty on the part of

employees, the other two approaches grant them a substantial amount of leeway in terms of their capacity to strike an objective stance. The second approach even invites employees to express their (critical) distance and inscribe it within the culture of the firm. The third approach invites employees to think about the mechanisms governing critical distance from and loyalty to the head of the firm. In an initial phase of this discussion, we shall compare the strategic and managerial advantages of each of these three approaches and verify their respective coherence with a view to confirming the congruence of the dialogue not only between women entrepreneurs and their collaborators but also between the three types of cognitive loops. In a second phase, we shall explore how the interviewees play either the conformity or non-conformity card regarding gender rules applied to women entrepreneurs in France in each of the three approaches in order to keep a dialogue going with employees.

5.1 Looping the Loop: Coherent Dialogues Between Women Entrepreneurs and Their Employees in High-Growth Firms

In the presentation of the results, we have made a psychological distinction between the three modes of steering adopted by the women entrepreneurs in the sample by applying three different approaches, one objective, one inter-subjective, and one mixed. However, based on these psychological stances, the presentation of the firm's results concluded with a dialogue between women entrepreneurs and their employees, a dialogue producing values and beliefs and, above all, new cognitive schemas expressed in suggestions for new ideas and processes. Moreover, in the comments of employees, cognitive outcomes and new perspectives on innovation seem to be more radical when women entrepreneurs apply inter-subjective and mixed approaches to steering their firms. In effect, steering based on indicators and on the comparison of different points of view culminates in the development of new ideas, inter-subjective and mixed steering both lead to experimentation with new ideas and the elaboration of new processes, with employees at least becoming aware of the need to implement new concepts. As Achtenhagen et al. (2010) suggest, the indicator-based approach produces fewer (openly enacted) innovations, which explains why, in the sample, two-thirds of interviewees opt for alternative approaches (some of them uninterruptedly for 10 years) that produce positive results. In all three cases, there is a clear dialogical training dynamic involving two families of indicators referring to the head of the firm and her employees, as described not only in transformational leadership theory (Rubin et al., 2005; Redien-Collot & Radu, 2014; Fontana & Musa, 2017) but also in the theory of the sustainability of entrepreneurial spirit (Haynie et al., 2010; McKelvie et al., 2017) (Table 1).

- Indicators characterizing the leader: Mode of steering, leadership objectives, strategic objectives, on the one hand.

Table 1 Three modes of steering applied by women heads of high-growth firms and their results ("authors' own table")

Mode of steering	Leadership objectives	Strategic objectives	Company culture	Beliefs produced	Swathes of employees' innovations
Monitoring indicators (**objective approach**)	Maintaining confidence	Checking risks and talking about opportunities	Limiting beliefs that create fear	Beliefs in legitimacy	– Asking the right questions
					– Reformulating certain problems
					– Initiating certain solutions
Comparing points of view and perceptions (**inter-subjective approach**)	Taking divergences and differences on board	Identifying opportunities based on tensions and contrasts within the firm	Developing beliefs that encourage self-confidence	Beliefs in accessibility	Individual or group suggestions for
					– Redesigning processes
					– Implementing changes
					– Evaluating changes
Systematic mixed steering	Supporting motivations/ commitment	Identifying motivations that make it possible to explore/ exploit opportunities	Understanding the production of organizational beliefs	Reflexive approach to beliefs, meta-beliefs	– Ensemble of processes regularly revisited
					– Invention of new processes
					– Implementing innovations that are at least incremental

- Indicators characterizing the personnel, namely perceived company culture, beliefs at the origin of innovative postures, swathes of innovations generated, on the other hand.

As we have seen from the presentation of the results, the inter-subjective steering approach, which is based on a combination of the points of view of the actors of the firm, is a reaction to the first, namely the orthodox monitoring of indicators. The objective approach is a defensive posture that sees the environment as a relatively hostile or ambiguous place in which serious risks need to be addressed. In the inter-subjective approach, the women entrepreneurs concerned express a high degree of scepticism in regard to all forms of anticipation concerning the environment. In their view, other than providing reassurance, or otherwise, about the health of the firm, data garnered about the company has little to do with the macro-economic data broadcast by the media and by economic bodies. Since these kinds of correlations appear to be relatively unconvincing, they prefer to focus on consolidating the firm's strong points while encouraging convergences and synergies and identifying the potential inherent in divergences. In other words, their approach differs in two ways from women entrepreneurs who focus on indicators. Firstly, they concentrate on risks within the firm by attempting to transform those risks into opportunities. Their awareness of a rupture in terms of the informational correlation between the firm and its environment leads them to modify their strategic outlook in two ways. Their cognitive perception makes them more creative—and even iconoclastic—in that at least some of them state that they prefer to take on board divergences amongst their personal, rather than seek to transcend them (superficially). When we observe that their employees develop the kind of beliefs in accessibility that Radu and Redien-Collot (2008) describe as beliefs underpinning the dynamics of concretization of the entrepreneurial spirit taking the form of innovative initiatives carried out in an entrepreneurial context, we can say that things have really come full circle. Beliefs in accessibility guide individuals towards an approach based on resources (created by the tensions within the firm), which are used to elaborate new ideas. These beliefs promote an effectual approach that plays on contingencies characteristic of a specific environment or firm and stimulate situated forms of innovation effectively adapted to the firm's specific needs and issues (Brettel et al., 2012).

The third steering option—the mixed option—is perhaps the most reflexive of the three in that the head of the firm seeks to summarize objective and subjective points of view projected onto the firm. In their replies, all the women entrepreneurs who choose this option are aware of the fact that, rather than elaborating a collage or a superposition of two types of perspectives, they attempt to establish correlations between what is measured and what they perceive themselves and in interactions with their employees. Furthermore, these women entrepreneurs accord a good deal of importance to self-analysis, the source *par excellence* of reflexivity (Redien-Collot & Léger-Jarniou, 2018). In this cognitive loop, employees are indirectly encouraged to analyze their own practices using, in a relatively balanced way, objective and subjective data that the head of the firm does not seek to hierarchize. In the presentation of the results, we note that this type of steering approach

generates beliefs concerning the legitimacy of norms. These beliefs interrogate the determinist character of norms in firms, or, in other words, the way in which those norms are naturalized, becoming a routine and then a culture (Cooke & Szumal, 1993). This reflexive approach to norms often calls into question routines and the beliefs by which they are underpinned. It is apparent from the comments of the employees of these firms that the reflexive approach encourages them to become involved in a dynamic critique of the norms underpinning beliefs and, *in fine*, to subject those beliefs to a form of recycling. This is a relatively thoroughgoing approach to innovation that invites participants to analyze their beliefs. In this regard, one of the employees said: "Very often, in our job, we are clearly able to see that if we respect certain indicators, we have the impression that we are doing things well, or, at least, doing them well enough to hit target. But they don't necessarily help us to improve how we do things. But since we've been having monthly inter-departmental meeting—in addition to the departmental meeting—where we discuss our feelings how we can improve our approaches, we've been able to entirely reappraise some of our processes and, above all, ask ourselves why we continue to do things the way we do …". In the ten cases studied, mixed steering seemed more likely than other types of steering to encourage the emergence of organizational initiatives that continuously seek to question routines—inter-departmental meetings, creativity groups, managing ideas, critiquing processes, etc.

5.2 Women Entrepreneurs and Conformity to Gender Rules

The three modes of steering examined above take into account a broad diversity of approaches to leadership taken by women heads of SMEs in France today. They also reflect the impressive cognitive creativity of these women entrepreneurs. In examining certain of their comments, we shall attempt to understand how they chose their approach to steering their firms and the cognitive options that characterize that approach. In the field of entrepreneurship, as in the field of leadership, gender theory rarely encompasses systems of representations of the self, gendered representations, and cognitive choices (Bussey & Bandura, 1999; Campbell et al., 2004). What links these three notions is the management of dominant norms. Studies on women in leadership positions reveal that the most common approach to managing dominant norms is negotiation (Babcock & Laschever, 2003; Ely et al., 2011). The results of such studies demonstrate that there are two other types of approach that, in terms of subjective steering, are clearly transgressive and, in terms of mixed steering, lead to the production of alternative normative frameworks. To broaden the analysis of these two postures, both of which have received little attention in the field of gender studies in leadership, we have taken inspiration from the research carried out by Nicky Le Feuvre (2008) who, in his numerous studies on the sociology of work, highlights how, when they face a challenging professional situation, women deploy three types of attitudes, namely an attitude of normative integration designed to integrate dominant norms and "work them into shape"; an

attitude of strategic transgression designed to modify certain rules of the game; and a more radical attitude subverting pre-established systems of thought and developing new socio-political paradigms and new modes of intra- and inter-organizational political relationships.

The three modes of steering and their socio-cognitive consequences, as described above, correspond to the three types of relationship that women leaders have with norms, as described by Le Feuvre (2008). Women entrepreneurs who base their steering approach on indicators negotiate with the dominant norms of corporate management. As Ely et al. (2011) suggest, this posture often results from substantial pressure exerted by stakeholders who, despite good results, are relatively wary of women entrepreneurs. Bussey and Bandura (1999) note that, following multiple experiences of mistrust of this kind, heads of firms deploy certain processes of interiorization that help them maintain a defensive approach that, in our case, translates into strategic steering designed to neutralize all forms of risk. Nevertheless, this type of steering is a source of success and satisfaction for employees who find that it delivers a genuine sense of serenity. In the second approach, inter-subjective steering corresponds, in our view, to a form of transgression assumed by women entrepreneurs applying dominant management norms. Lastly, the third, mixed, approach focuses on innovation and the production of new rules and new organizational frameworks favouring that innovation.

In this study, the comments of two-thirds of the interviewees were characterized by a reflexive stance in terms of their choice of steering approach. All the interviewees mentioned the options available to them, as well as certain variants on those options. It is therefore possible to conclude that an important proportion of respondents made their choice in an agentive way, or, in other words, that they elaborated it on the basis of a flexible approach to the construction of norms in an organizational context in which they believed they could exert a decisive influence (McNay, 2013). In contrast, women entrepreneurs adopting the objective steering, that is one-third of the sample, frequently acknowledge that setting up or acquiring a firm and then developing it placed them in contingent situation that influenced their choice of steering approach. Nevertheless, in a substantial number of cases, agency does not exclude the interiorization of dominant norms and of their corollaries, namely stigmata (McNay, 2013). In other words, women entrepreneurs can agentively adopt a transgressive steering posture and yet not feel liberated from the influence of masculine models of leadership. Transgression is not always a symptom of emancipation. It is often located in the shadows of what one wants to escape from in order to affirm or reaffirm one's integrity. Rachel, who takes a relatively inter-subjective steering approach to steering, takes this ambiguity into account: "I don't believe in the myth of the happy little company protected by its boss. A company is a place in which everything is organized, but the fact that it is organized does not prevent, or, rather hide debate. Everyone has to be exposed to that debate. Of course, even if I encourage debate, I have to calm the waters if things get a little out of hand. And that's where I'm still, to a degree, behind the arc in regard to some entrepreneurs who I've known …". In this analysis, the entrepreneur is aware of having assumed a stance that exposes her and on which she is willing, pragmatically, to backtrack.

She also admits the incomplete character of her emancipation from dominant norms. According to another interviewee (Nathalie): "If I had to do it again, I would; it's an exciting, exhausting experience, but I still have a spark of freedom in me, and I try to pass a little of it on to the people who work with me. But, in order to keep that spark of freedom alive, I have to keep my guard up. And some days—and this is great—it's the initiative and imagination of my collaborators that help me to move forward. I also know that being a free entrepreneur and a free woman is not always exactly the same thing!". The interviewee assumes the fact that her leadership focuses as much on emancipating her employees as it does on emancipating herself, even if the two kinds of emancipation, while remaining distinct, are based on similar beliefs. The quest for individual emancipation is extended to encompass a certain form of collective freedom that, in spite of everything, partially dilutes the quest for the self, for a feminine identity, which is always socially constructed as a distributed identity. This is the last persisting ambiguity in the comments of the interviewees. Although they have attained a very advanced level in terms of self-accomplishment, and although their socio-economic contributions are relatively original, they do not always know whether they are playing a role that not only escapes them but also respects the rules that they seek to infringe. According to one interviewee (Clarisse): "I always need to go a little further in terms of developing the firm. Of course, these developments say a lot about what can be achieved by a woman, and I need to repeat that any woman, not just me, can do it". As Essers and Benschop (2007) observe in their research on immigrant entrepreneurs who have overcome many challenges to achieve their ends, women—even those who succeed in going beyond normative limits—are always subject to a profound doubt. At the same time, their comments express a feminine trans-narcissism which, perhaps, helps women entrepreneurs to articulate a care of the self with a care of others, without being caught up in the posture of the postmodern "vestal" of care (Butler, 1990).

6 Conclusion

The steering choices adopted by the sample of women entrepreneurs that we studied have proved effective not only in generating sustained growth but also in encouraging employees to develop a broad range of innovative proposals capable of modifying corporate business plans. In designing their steering approach, indicators play a central role for only one-third of the interviewees. Two other approaches to steering correspond to postures that are overtly critical of or simply intended to reform the rational, indicator-based approach to steering the firm. It is interesting that such a high proportion of women entrepreneurs at the head of such dynamic firms do not apply canonical strategies. The fact that their firms are relatively small has enabled them to test out the strategic models that Achtenhagen et al. (2010) consider inappropriate in terms of the organizational challenges and cognitive issues that characterize the life of SMEs today.

We postulate that, due to their status as women and their experience of being either directly or indirectly stigmatized in their professional careers, female entrepreneurs tend to develop personalized solutions to the problems associated with steering an SME. Nevertheless, three models emerge from this study. The interviews with employees reveal that these three models generate three ever-broader and deeper ranges of innovative suggestions. These three models correspond to three different degrees of dissidence regarding normative models of strategic steering applied by heads of firms. However, this form of dissidence also reveals an entrepreneurial vigilance equalled only by the lucidity of female leaders about their own roles. As well as the cognitive loops that unite women entrepreneurs and employees in the task of renewing business models, there is a reflexive analytical loop that prompts, in a recurrent fashion, these entrepreneurs to compare their power of agency (their individual power) with the influence exerted by normative determinism on all those whose behaviours do not mirror the dominant model and whose freedom continues to be limited.

Intent on going beyond the definition of growth based exclusively on the performances of the organization within its ecosystem, this study was also designed to address two overlapping issues, namely the freedom of action of employees and their bosses, in an attempt to discern, or otherwise, the existence of a dialogue capable of generating meaning (Kesting et al., 2016). We found that such a dialogue does indeed exist and that it is of an undeniably valuable nature. Additional research should be carried out into several aspects of this topic. In effect, a longitudinal study would make it possible to better gauge the effective impacts of swathes of innovations on changes to the business model. In regard to the biographical narratives of the women entrepreneurs in the sample, the various stages of the construction of entrepreneurial vigilance and its links to experiences in which persistence is required should be examined more closely. It would also be of interest to see how women entrepreneurs share their attitude of persistence with employees involved in developing innovative suggestions. Lastly, it would be of interest to examine how women entrepreneurs apply, or otherwise, entrepreneurial vigilance and the point to which a spirit of entrepreneurship is shared by employees.

More generally, within the framework of the Gartnerian paradigm (2004) in which the entrepreneur plays the role of an agile arbitrator between psycho-social postures of conformity and distinctiveness, it is urgent to reintroduce the question of the experience of gender and the stereotypes associated with it, and the way in which female entrepreneurs activate or disactivate the kind of feelings aroused by certain stigmata characterizing their activity. We should, therefore, pursue research on the way in which memories and constructs of self-perceived subjectivity can be reprogrammed in order to boost socio-cognitive efficiency in an entrepreneurial context.

Appendix 1

The Methodology of the Women Equity for Growth (WEG) Index

The WEG Index developed the first database with statistics on high-growth SMEs led by women, producing an annual index every year since 2010. The most recent index was presented to the press in December 2016.

Based on the Diane database of 40,000 French companies, the WEG database collects information about all SMEs that have been in existence at least 5 years at the time they are identified and have had an annual turnover of at least 4 million Euros on a continuous basis for each of the 3 preceding years. These companies must of course have had published and registered accounting data for at least 3 years. Out of this first group of companies, branches, cooperatives, semi-public companies, and franchises are then excluded. This leaves a total of 2500 companies that claim to be run by women, which is verified. These 2500 companies are then ranked according to their average results for five performance indicators:

- Growth in turnover in the last year.
- Average growth in turnover in the last 3 years.
- Increase in turnover value in the past year.
- Profitability in the past year (GOS/turnover).
- Average growth of GOS over the last 3 years.

The programme has strong institutional support, namely from the General Assembly of the Council of Europe (Resolution 55—March 2011), which encouraged support for the Women Equity initiative through better funding for women-led high-growth companies.

Appendix 2 (Table 2)

Table 2 list of interviewed entrepreneurs' companies extracted from the Index ("authors' own table")

Activity	Growth in turnover N/N-1	Growth in turnover N/N-3	Turnover in 2016 in millions of Euros	Entrepreneurial situation	Business owners' coded name
Editing and distribution of film scenarios and transfer of copyrights	9%	15%	107	Creation in 2001	Nelly
Studies, creation, realization, marketing of all processes of printing and publishing of authors by all processes	11%	17%	7	Family Transmission in 2011	Gaëlle

(continued)

Table 2 (continued)

Activity	Growth in turnover N/N-1	Growth in turnover N/N-3	Turnover in 2016 in millions of Euros	Entrepreneurial situation	Business owners' coded name
Conferences, congresses, training courses relating to the management and organisation of private or public companies or communities	6%	12%	29	Creation in 2007	Marianne
Insurance and reinsurance brokerage	14%	24%	78	Création en 1999	Anna
Consulting in the pharmaceutical industry	8%	19%	65	Takeover in 1995	Ludmila
Sale of equipment and services related to internet access and computer technology	11%	33%	75	Creation in 2001	Carla
Multidisciplinary teaching with a national and international vocation	3%	10%	2	Creation in 2003	Carine
Asset management	6%	18%	15	Takeover in 2012	Coralie
Purchase, semi-wholesale, or retail sale of delicatessen products	10%	24%	97	Takeover in 2008	Adrienne
Import and sale of electronic equipment	12%	21%	36	Takeover in 2006	Noémie
Sales and marketing of beauty products	15%	36%	47	Creation in 2011	Albane
Eco-responsible installation service for telephone and information systems	10%	18%	57	Takeover in 2005	Marguerite
Consulting in eco-responsible insulation—large public and private worksites	20%	45%	66	Takeover 2008	Isabelle
Sales and marketing of all computer hardware, management and information processing solutions	9%	19%	6	Creation in 1999	Annabelle
Organization of scientific missions and trips	11%	28%	53	Takeover in 2015	Rolande
Consulting and data analyst in appliance marketing	9%	17%	80	Creation in 2003	Rachel

(continued)

Table 2 (continued)

Activity	Growth in turnover N/N-1	Growth in turnover N/N-3	Turnover in 2016 in millions of Euros	Entrepreneurial situation	Business owners' coded name
Purchases and sales of automotive parts and industrial supplies	6%	22%	21	Creation in 2006	Nathalie
Chain of thalassotherapy centres	22%	67%	99	Takeover in 2012	Oriane
Design, organization, animation, and management of all training activities	10%	22%	82	Creation in 2001	Jacqueline
Provision of services, advice, assistance, audit, and training in the IT and peri-computing fields	7%	24%	72	Takeover in 2015	Aymone
Rental of land and prestigious real estate	12%	19%	28	Takeover 2011	Caroline
Wholesale and semi-wholesale pet food distribution	15%	25%	24	Creation in 1991	Athenais
Consulting and distribution of products in the field of health and nutrition	7%	26%	10	Takeover in 2003	Jeanne
Sale and distribution of European handicraft products in half wholesales	5%	17%	18	Takeover in 2005	Zora
Creation, manufacturing, and marketing of high-end fabrics	10%	32%	92	Creation in 1999	Wanda
Management of the sale of the business	11%	19%	59	Creation in 2008	Clarisse
Repair of communication equipment in artistic activities	9%	37%	106	Creation in 2006	Emma
Sales, as such or after processing, of eco-friendly agricultural products	18%	29%	89	Takeover in 2001	Constance
Organisation of trade fairs, exhibitions, exhibitions, symposia, congresses, etc.	16%	31%	41	Takeover in 2010	Eulalie
Production of information and informational and editorial content and direct or indirect exploitation of this content	22%	45%	77	Creation in 2008	Claude

References

Achtenhagen, L., Naldi, L., & Melin, L. (2010). Business growth – Do practitioners and scholars talk about the same thing? *Entrepreneurship Theory and Practice, 34*(2), 312–336.

Ahl, H., & Marlow, S. (2012). Exploring the dynamics of gender, feminism and entrepreneurship: Advancing debate to escape a dead end? *Organization, 19*(5), 543–562.

Angel, P., Jenkins, A., & Stephens, A. (2018). Understanding entrepreneurial success: A phenomeno-graphic approach. *International Small Business Journal, 36*(6), 611–636.

Babcock, L., & Laschever, L. (2003). *Women don't ask – Negotiation and the gender divide*. Princeton UP.

Baron, R. A., Franklin, R. J., & Hmieleski, K. M. (2016). Why entrepreneurs often experience low, not high, levels of stress: The joint effects of selection and psycho-logical capital. *Journal of Management, 42*(3), 742–768.

Barringer, B., Foard, J., & Neubaum, D. (2005). A quantitative content analysis of the characteristics of rapid-growth firms and their founders. *Journal of Business Venturing, 20*(5), 663–687.

Bass, B., & Avolio, B. (1993). Transformational leadership and organizational culture. *Public Administration Quarterly, 17*(1), 112–121.

Berger, B. (Ed.). (1993). *Esprit d'entreprendre, cultures et sociétés*. Maxima.

Brettel, M., Mauer, R., Engelen, A., & Küpper, D. (2012). Corporate effectuation: Entrepreneurial action and its impact on R &D project performance. *Journal of Business Venturing, 27*(2), 167–184.

Bruner, D. (2011). Identifying and comparing characteristics of successful minority and majority businesses. *McNair Scholars Research Journal, 3*(1), 1–24.

Bussey, K., & Bandura, A. (1999). Social cognitive theory of gender development and differentiation. *Psychological Review, 106*(4), 676–713.

Butler, J. (1990). *Gender trouble*. Routledge.

Calás, M., Smircich, L., & Bourne, K. (2009). Extending the boundaries: Reframing "entrepreneurship as social change" through feminist perspectives. *The Academy of Management Review, 34*(3), 552–569.

Campbell, A., Shirley, L., & Candy, J. (2004). A longitudinal study of gender-related cognition and behaviour. *Developmental Science, 7*(1), 1–9.

Cardon, M., Wincent, J., Singh, J., & Drnovesk, M. (2009). The nature and experience of entrepreneurial passion. *Academy of Management Review, 34*(3), 511–532.

Cooke, R., & Szumal, J. (1993). Measuring normative beliefs and shared behavioral expectations: The reliability and validity of organizational culture inventory. *Psychological Reports, 72*(3), 1299–1339.

Damanpour, F., & Wichnevsky, J. (2006). Research on innovation in organizations: Distinguishing innovation-generating from innovation-adopting organizations. *Journal of Engineering and Technology Management, 23*(4), 269–291.

De Jong, J., & Den Hartog, D. (2007). How leaders influence employees' innovative behaviour. *European Journal of Innovation Management, 10*(1), 41–64.

Delmar, F. (1997). Measuring growth: Methodological considerations and empirical results. In R. Donckels & A. Miettinen (Eds.), *Entrepreneurship and SME research: On its way to the new millennium* (pp. 199–216). Ashgate.

Delmar, F. (2006). Measuring growth: Methodological considerations and empirical results. In P. Davidsson, F. Delmar, & J. Wiklund (Eds.), *Entrepreneurship and the growth of firms*. E. Elgar.

Denti, L., & Hemlin, S. (2012). Leadership and innovation in organizations: A systematic review of factors that mediate or moderate the relationship. *International Journal of Innovation Management, 16*(3), 37–57.

Doz, Y., & Kosonen, M. (2010). Embedding strategic agility: A leadership agenda for accelerating business model renewal. *Long Range Planning, 43*(2–3), 370–382.

Eagly, A. H., & Carli, L. L. (2007). Through the labyrinth. In *The truth about how women become leaders. Leadership for the common good*. Harvard Business School Press.

Ely, R., Ibarra, H., & Kolb, D. (2011). Taking gender into account: Theory and design for women's leadership development programs. *Academy of Management Learning & Education, 10*(3), 474–493.

Essers, C., & Benschop, Y. (2007). Enterprising identities: Female entrepreneurs of Moroccan and Turkish origin in the Netherlands. *Organization Studies, 28*(1), 49–69.

Fontana, A., & Musa, S. (2017). The impact of entrepreneurial leadership on innovation management and its measurement validation. *International Journal of Innovation Science, 9*(1), 2–19.

Foss, N. J., & Saebi, T. (2017). Fifteen years of research on business model innovation. *Journal of Management, 43*, 200–227.

Fust, A. P., Jenert, T., & Winkler, C. (2018). Experiential or self-regulated learning: A critical reflection of entrepreneurial learning process. *Entrepreneurship Research Journal, 8*(2), 1–11.

Gaglio, C. M., & Katz, J. A. (2001). The psychological basis of opportunity identification: Entrepreneurial alertness. *Small Business Economics, 16*(2), 95–111.

Gartner, W. B. (2004). Achieving critical mass in entrepreneurship scholarship. In J. A. Katz & D. Sheperd (Eds.), *Advances in entrepreneurship, firm emergence, and growth* (pp. 199–216). Elsevier.

Gibb, A. A. (2000). SME policy, academic research and the growth of ignorance: Mythical concepts, myths, assumptions, ritual and confusions. *International Small Business Journal, 18*, 13–35.

Gupta, A., & Govindarajan, V. (1984). Business unit strategy, managerial characteristics, and business unit effectiveness as a strategy implementation. *Academy of Management Journal, 27*, 25–41.

Haynie, J. M., Shepherd, D., Mosakowski, E., & Earley, P. C. (2010). A situated metacognitive model of the entrepreneurial mindset. *Journal of Business Venturing, 25*(2), 217–229.

Hjorth, D., & Steyaert, C. (Eds.). (2005). *Narrative and discursive approaches in entrepreneurship*. E. Elgar.

Kesting, P., Ulhøi, J. P., Song, L. J., & Niu, H. (2016). The impact of leadership styles on innovation-a review'. *Journal of Innovation Management, 3*(4), 22–41.

Kirkwood, J. (2016). How women and men business owners perceive success. *International Journal of Entrepreneurial Behavior & Research, 22*(5), 594–615.

Lau, C.-M., & Busenitz, L. W. (2001). Growth intentions of entrepreneurs in a transitional economy: The People's Republic of China. *Entrepreneurship Theory and Practice, 26*, 5–19.

Le Feuvre, N. (2008). La féminisation des professions masculines: Enjeux sociaux et approches sociologiques. In Y. Guichard-Claudic, D. Kergoat, & A. Vilbroad (Eds.), *L'inversion du genre: Quand les métiers masculins se conjuguent au féminin et réciproquement*. Presses Universitaires de Rennes.

López, O. L., & Hiebl, M. R. W. (2015). Management accounting in small and medium-sized enterprises: Current knowledge and avenues for further research. *Journal of Management Accounting Research, 27*(1), 81–119.

Lubatkin, M., Simsek, Z., & Ling, Y. (2006). Ambidextry and performance in small-to medium sized firms: The pivotal role of top management team behavioral integration. *Journal of Management, 32*(5), 646–672.

McKelvie, A., Brattström, A., & Wennberg, K. (2017). How young firms achieve growth: Reconciling the roles of growth motivation and innovative activities. *Small Business Economics, 49*(2), 273–293.

McNay, L. (2013). *Gender and agency, reconfiguring the subject in feminist and social theory*. Polity Press.

Monti, D., Ryan, A., Brush, C., & Gannon, A. (2007). Civic capitalism: Entrepreneurs, their ventures and communities. *Journal of Developmental Entrepreneurship, 12*(3), 353–375.

Moreno, A., & Casillas, J. (2007). High growth SMEs versus non-high-growth SMEs: A discriminant analysis. *Entrepreneurship and Regional Development, 19*(1), 69–88.

Moscovici, S. (1984). *Psychologie sociale*. PUF.
Navis, C., & Glynn, M. A. (2011). Legitimate distinctiveness and the entrepreneurial identity: Influence on investor judgments of new venture plausibility. *Academy of Management Review, 36*(3), 479–499.
Neergaard, H. (2007). Samplings in entrepreneurial settings. In H. Neergaard & J. Uhloi (Eds.), *Handbook of qualitative research methods in entrepreneurship* (pp. 253–278). E. Elgar.
Pedersen, A. R., & Johansen, M. B. (2012). Strategic and everyday innovative narratives: Translating ideas into everyday life in organizations. *Innovation Journal, 17*(1), 2–18.
Penrose, E. T. (1959). *The theory of the growth of the firm* (3rd ed.). Oxford University Press.
Radu, M., & Redien-Collot, R. (2008). The social representation of entrepreneurs in the French press: Desirable and feasible models. *International Small Business Journal, 26*(3), 259–298.
Redien-Collot, R. (2009). Female entrepreneurs' authority: Is the creative aspect of authority a masculine fiction in managerial and entrepreneurial paradigms? *Journal of Enterprising Culture, 17*(4), 419–441.
Redien-Collot, R., & Léger-Jarniou, C. (2018). Retard de la RSE des PME françaises ? La prudence et le discours éthique hybride des dirigeantes de PME de forte croissance. *Revue de l'Entrepreneuriat, 17*(2), 7–33.
Redien-Collot, R., & Radu, M. (2014). SME's leaders: Building collective cognition and competences to trigger positive strategic outcomes. In K. Todorov & D. Smallbone (Eds.), *Handbook of research on strategic management in small and medium enterprises* (pp. 143–158). IGI Global.
Rubin, R., Munz, D., & Bommer, W. (2005). Leading from within: The effects of emotional recognition and personality on transformational leadership behaviour. *Academy of Management Journal, 48*, 845–858.
Sappleton, N. (2018). Gender and business performance: The role of entrepreneurial segregation. In S. Y. Yousafzai, A. Fayolle, A. Lindgreen, C. Henry, S. Saeed, & S. Sheikh (Eds.), *Women entrepreneurs and the myth of 'underperformance': A new look at women's entrepreneurship research*. Edward Elgar Publishing.
Schumpeter, J. A. (1939). Business cycles. In *A theoretical, historical, and statistical analysis of the capitalist process*. McGraw-Hill Book Company.
Sequeira, J. M., & Rasheed, A. (2006). Start-up and growth of immigrant small businesses: The impact of social and human capital. *Journal of Developmental Entrepreneurship, 11*(4), 357–362.
Smith-Hunter, A. E., & Boyd, R. L. (2004). Applying theories of entrepreneurship to a comparative analysis of white and minority business owners. *Women in Management Review, 19*(1), 18–28.
Soriano, D. R., & Martınez, J. M. (2007). Transmitting the entrepreneurial spirit to the work team in SMEs: The importance of leadership. *Management Decision, 45*(7), 1102–1122.
Stiegler, B. (1994). *La Technique et le Temps: La Faute d'Epiméthée*. Galilée.
Tang, J., Kacmar, K. M., & Busenitz, L. (2012). Entrepreneurial alertness in the pursuit of new opportunities. *Journal of Business Venturing, 27*, 77–94.
Wach, D., Stephan, U., & Gorgievski, M. (2016). More than money: Developing an integrative multi-factorial measure of entrepreneurial success. *International Small Business Journal, 34*, 1098–1121.
Xie, X., & Lv, J. (2016). Social networks of female tech-entrepreneurs and new venture performance: The moderating effects of entrepreneurial alertness and gender discrimination. *International Entrepreneurship and Management Journal, 12*(4), 963–983.
Yang, X., Yi-Hsuan, E., & Chang, A. (2012). Integrating the resource-based view and transaction cost economics in immigrant business performance. *Asia Pacific Journal of Management, 29*, 753–772.
Yukl, G. (2002). *Leadership in organizations*. Prentice Hall.

Rethinking Strategic Entrepreneurial Succession: Unfolding Hidden Aspects of the Entrepreneurial Families' Iceberg

Roberta Fenech

Abstract This chapter elaborates on the metamorphosis from the traditional family enterprise to the strategically innovative family enterprise. The shift from a traditional understanding of succession to a more innovative way of understanding succession is also addressed in this chapter. Succession is not analysed from a rational, conscious and objective perspective, but rather from an innovative, reflective, open and creative one. The chapter concludes with a recommendation to rethink the widely adopted iceberg analogy used in understanding the perceivable and hidden processes in succession. The strategically innovative thinker in an era of new Renaissance, who places the individual person at the forefront embracing creative ignorance, flips the traditional iceberg bringing all that is not visible to the forefront, placing human beings and the family subsystem at the centre of comprehension and knowledge.

Keywords Strategic succession · Entrepreneurial families · Innovation · Family business · Iceberg analogy

1 Introduction

Entrepreneurship is an economic phenomenon resulting from the presence of opportunity and enterprising individuals that has a central role in economic development, wealth creation and evolutionary change. The entrepreneurial economy replaced the managed economy. Whilst the latter is characterized by stability, continuity and homogeneity, the former is characterized by turbulence, diversity and heterogeneity. In the entrepreneurial economy, competitive advantage is based on innovative activity (Steier, 2001).

The entrepreneurial family enterprise refers to a type of organization with characteristics that facilitate or constrain entrepreneurial activities. Whilst family enterprises constitute the majority of companies in most countries, they lack a reputation

R. Fenech (✉)
Higher Colleges of Technology, Abu Dhabi, UAE
e-mail: rfenech@hct.ac.ae

N. Faghih, A. Forouharfar (eds.), *Strategic Entrepreneurship*, Contributions to Management Science, https://doi.org/10.1007/978-3-030-86032-5_14

of engaging in entrepreneurial behaviours. Whilst a few do act entrepreneurially, and do so across multiple family generations, these are very much the minority (Jaskiewicz et al., 2015). Whilst small family enterprises were followers in the managed economy, they have to emerge as engines of growth in the entrepreneurial economy, if they want to be regarded as entrepreneurial family enterprises, lest they lose competitive advantage in this new dynamic (Audretsch & Thurik, 2004).

Generational transitions are critical in maintaining entrepreneurial impetus in a family enterprise. In today's economic environment, family enterprises need to change into strategically innovative family enterprises. The quotations in this chapter are from interviews carried out with incumbent and next-generation business leaders across five family enterprises in the jewellery sector, including owner managed and sibling partnerships, who are experiencing generational transitions.

Interviewees were purposively selected based on their relevance. Relevance was established on the overlap between the ownership and management systems; interviewed family business owners also manage their family business on a day-to-day basis. The jewellery sector was selected as it is a sector that is characterized by family businesses and a long tradition. The family businesses purposively selected span of six generations making it possible to compare younger to more mature businesses. Participants consisted of five current family business leaders and eight next-generation family business leaders.

2 Literature Review

2.1 Entrepreneurial Family Firms

Entrepreneurial family firms around the globe are successful across generations when they combine their unique family resources and capabilities with their entrepreneurial orientation (Audretsch & Thurik, 2004). The family is the source of competitive advantage when they risk venturing into the innovative and unbeaten tracks of entrepreneurship. Family dynamics should be considered as one of the most important influences on both opportunity recognition and the ability of an entrepreneurial team to exploit an opportunity and to create a viable business. Different stages in the entrepreneurial process are impacted by the family's access to resources, such as financial and social capital, as well as its specific norms, attitudes and values (Aldrich & Cliff, 2003). Entrepreneurs in family businesses are family members steering a business, in harmony or disharmony, with an array of other family members.

Understanding succession in the traditional way, relying solely on knowledge, leadership and relational management, does not uncover all its complexities. We need to appreciate the facts, truths and theories of not only the existing studies on succession in a great manner but also to add another layer of understanding

navigating into the unconscious, unmeasurable, unobservable and subjective experiences of entrepreneurial families. The individual's experience is given priority, such as in the cultural and intellectual movement of humanism in the Renaissance; the focus is not so much on the business practices, but on human experiences, emotions, unconscious processes and complexities.

2.2 Strategic Succession in Entrepreneurial Families

Entrepreneurial families are a unique synthesis of ownership, strategic influence and concern for family relationships and a dream of continuity (Poutziouris et al., 2006). The main objective of strategic succession is to efficiently and fairly distribute ownership from older to younger generations; in a way that ensures effective business leadership and maintains family harmony. The smoother the succession, the higher the return on equity, net profits and business growth (Cropanzano et al., 2001). Successful succession is an evolutionary process arising from careful planning and the artful management of expectations over a period of years (Aronoff et al., 2011). Despite empirical evidence that family firms are less entrepreneurial, there exist family firms who compete by repeatedly engaging in entrepreneurship, often across multiple generations (Lunenburg, 2011; Miller & Rice, 1976).

"Preparing to pass the family enterprise on to the next generation is perhaps the toughest and most critical challenge facing the business ownership" (Aronoff et al., 2011, p. 89). In an entrepreneurial economy, a large number of firms are set up each year, but only a few survive beyond a decade, and an even fewer number grow sufficiently to challenge the incumbents ("It's almost a miracle if the next generation carry on"). The process of succession is, however, intrinsically an opportunity to preserve lasting institutions that reflect the family's ideals and goals (Aronoff et al., 2011).

However, once founders release ownership and control to the next generation, enterprises often become less innovative and less entrepreneurial (Block et al., 2013). One theory is that the founders' entrepreneurial orientation (EO), which involves preferences for autonomy, innovativeness, risk-taking, pro-activeness and competitive aggressiveness, is lost as later generation family members become involved (Lee et al., 2013; Lumpkin & Dess, 1996). The next generation adopt more of a managerial role. Whilst the enterprise still remains a family enterprise, it no longer is entrepreneurial. Subsequent generations may adopt the original entrepreneurial orientation, and the enterprise may return to its entrepreneurial nature ("I dream that I will remain in the company but I will have something new").

3 Discussion

Succession is a time of transformation, transition and metamorphosis as the family enterprise moves from a traditional to a more innovative one. Change within the entrepreneurial family enterprise is a challenge to achieve as this often entails a change in culture. Change in family enterprises is a time of abandoning traditional old habits and experimenting with innovative ones. Innovative capability is necessary for gaining and sustaining competitive advantage across generations. As it transforms from the traditional to the strategically innovative, the family enterprise becomes more professional and diversified; within the family, communication structures also change to accommodate the next generation's views on parenting and leadership development. All these changes occur within the context of an ever-changing society and entrepreneurial economy. Professionalization, the drive towards role clarity, diversification, utilization of non-family management ("I believe that who does not trust outsiders will not grow") and the inclusion of advisors and consultants, all represent changes in the innovative entrepreneurial family enterprise, that in turn bring about changes in attitudes and ways of thinking.

During succession from the more traditional to the innovative family enterprise, the roles in the family enterprise go through a process of clarification, development and formalization. Professionalization and role clarity are ways of making sense of relationships in the family enterprise; their complexity, and the overlap between the different systems and the inherited patterns of relating in the family business. Role clarity also reflects the next generations' wish for independence, separation from the dependence on the incumbents and reduced "groupishness" ("I'm a big believer in titles, discipline and order, my father has a different mentality; more free for all; everyone does what they want to do"). Diversification and the utilization of non-family management are also transformations towards further professionalization of the family enterprise.

3.1 Change in Parenting and Leadership Development

Another metamorphosis is in the parenting and leadership development of the subsequent generation. The change is in the definition and expression of free will, the importance given to tertiary education ("I definitely want my children to finish their studies; that is something I do regret; I wish I had pursued tertiary education"), the emphasis placed on family relational competence ("My mother said that the worst thing we can do, the biggest harm we can inflict on her, is that we don't get on well together") and the controversial subject of employment policies for family members ("Maybe in time we may implement employment policies for family members, however for now I don't see the need"). The proponents of such policies in innovative family enterprises believe that a threat to family enterprises exists when incompetent family members are only employed on the basis of family membership. The

change towards not only accessing the group as a result of birth right but accessing the group based on meritocracy is one that generates a number of fears and anxiety. Innovative family enterprises are also more open to the possibility that their children own but do not manage the family business. The distinction between ownership and the business is becoming more evident.

The shift from the traditional to the strategically innovative demands a shift in the role of advisors of such enterprises. Advisors are helpful during generational transitions when able to facilitate an environment that contains the anxieties of family members, therefore creating a sense of security. They may be "vehicles for the projection of good objects, such as qualities of goodness and virtue" (Shane & Venkataraman, 2000, p. 200). Consulting the innovative family enterprise entails the consideration of the complex social processes resulting from the interrelationship between the subsystems of family, business, ownership and management. Causality is multiple in family enterprises as the influences from different subsystems affect processes and in turn contribute to multi-directionality.

The question is how many family enterprises are truly making the leap from the traditional to the innovative. How many family enterprises are prepared to trust outsiders, such as advisors, to look into the intricacies of the family relations and open themselves up to possibilities of change in the family sub-system? How many family enterprises are ready to risk the stability of their known ways to embrace the ambiguity of transformation? Only the brave family enterprise leaders, who are ready to sacrifice the status quo and shake the security of their family and business, are open to such a transition ("It's very difficult to trust someone to work for you; it's very difficult for us to trust someone with our accounts").

3.2 Flipping the Iceberg: A New Model of Strategic Succession

Understanding fully generational transitions entails understanding both manifest and latent processes. In doing so, the iceberg analogy, as shown in Fig. 1, has been widely adopted in understanding the perceivable processes and what is hidden. Above the water level are the facets of successful succession and the lived experiences, whilst below the surface are unconscious disappointments, fantasies, thoughts, feelings and suppressed defence mechanisms. Utilizing the iceberg analogy results in a holistic conceptual model of successful succession, within a context that is both apparent and latent. Traditional knowledge, in the visible part of the iceberg, is now being confronted by the defence mechanisms, strong emotions, inheritance, optimism, trust, creativity and basic assumptions that lie beneath the surface, giving birth to an innovative way of making sense of succession.

Looking at what lies beneath the surface is part of the mental exercise of creative ignorance (Formica, 2015). Creative ignorance investigates the hidden nature of things and what lies beyond acquired knowledge, and it challenges the accepted and traditional and seeks innovative ways of understanding succession. The strategically innovative thinker of succession is not satisfied with defining successful succession

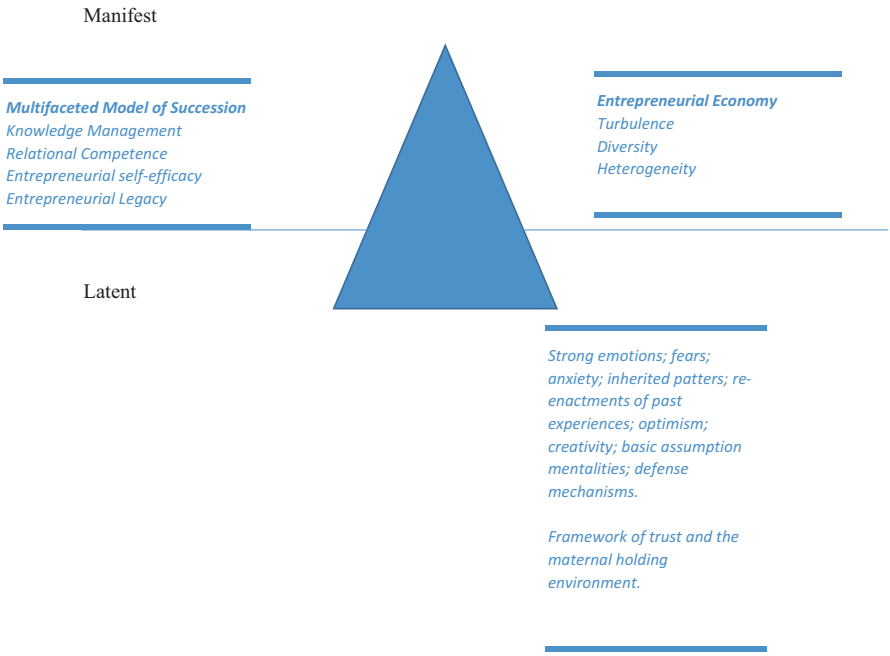


Fig. 1 Iceberg analogy. (Authors' own Figure. Source: Fenech, 2015)

as a function of the business sub-system, but looks deeper into the psychological make-up of the human being and organizations. The strategically innovative thinker embarks on a life long and arduous journey of understanding human and organizational behaviour from a multi-dimensional and multi-disciplinary perspective.

The strategically innovative thinker in an era of new Renaissance, who places the individual person at the forefront embracing creative ignorance, flips the iceberg bringing all that is not visible to the forefront, placing human beings and the family sub-system at the centre of comprehension and knowledge (Fig. 2).

Flipping the model allows family enterprises to be more truthful to themselves and more transparent. It is a painful and risky process to bring out unconscious processes and patterns that have been carefully guarded for years. However, when managed well, it can be a liberating turning point for the enterprise which is willing to move forward.

3.3 Rethinking Strategic Succession

Rethinking strategic succession does not discredit sound theoretical frameworks on knowledge management, relational competence, entrepreneurial self-efficacy and entrepreneurial legacy. It simply adds another layer of cognitive understanding,

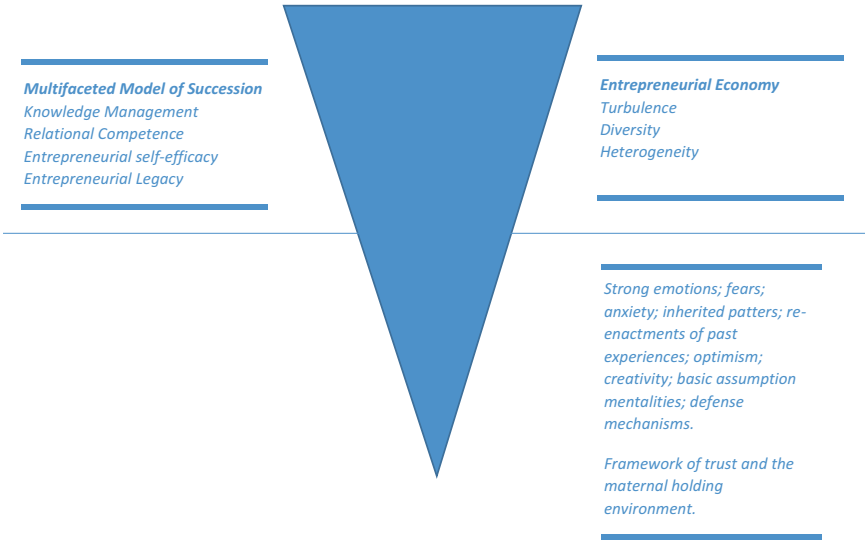


Fig. 2 Succession in an era of new Renaissance. (Authors' own Figure. Source: Fenech, 2015)

placing the person and family first, as well as making apparent those hidden processes that happen within the family sub-system.

3.4 Knowledge Resources

A knowledge-based view of the family enterprise recognizes knowledge as the most important of all resources in differentiating performance. The entrepreneurial economy is based less on the traditional inputs of land, labour and capital, and more on knowledge. Entrepreneurial family enterprises are very rich in idiosyncratic knowledge. Idiosyncratic knowledge is often tacit. Forms of tacit knowledge can be found in routines, organizational culture and cognitive schemes.

Effective knowledge transfer is supported by the following: the learning process starts early, preferably in childhood; commitment, expectations, values and perceptions of the incumbent/s are shared with the next generation; the next generation is given challenging, real-life problems to solve ("In the summer holidays, my father used to take me with him to work. We used to go out to do succession duty valuations. Obviously lots of experience over the years, from my grandfather, my dad, the workshop, and creating tailor-made jewellery for clients").

Incumbent variables that positively affect knowledge transfer to the next generation are: values (hard work, family orientation, growth, determination, ambition and business orientation), expectations and ideas; stewardship concept; social capital; availability of knowledge source; desire to transfer knowledge, and communication skills (Nordqvist & Melin, 2010; Thurik et al., 2013). "Inventions, products and

services, great and small, are created through talking. The best preceptor is a participative engagement in the conversation between knowledge seekers and knowledge users. Conversations are the sense making conduits through which knowledge flows" (Formica, 2005, p. 49). There is also a positive relationship between relational competence and knowledge transfer (Hatak & Roessl, 2011).

3.5 Succession and Relatedness

Succession threatens to upset all the relationships between the different components of the family enterprise and is the greatest long-term challenge that most face. There is no escape from relatedness; relational competence is an essential element in dealing with the complexities of family enterprises and generational succession. Entrepreneurship is also supported by family members' sense of unity with each other and the firm (Kamei & Dana, 2012).

Relational competence necessitates the following: empathy; ability to initiate relations and communicate; the ability to communicate convincingly; altruism; ability to communicate; ability to co-operate; ability to handle conflicts (Hatak & Roessl, 2011). The human risks in succession are as important as the financial and material risks. Innovation in relationships, as opposed to the simple reproduction of past family politics, is what leads to successful succession management (Kamei & Dana, 2012).

3.6 Self-efficacy

Next is the self-efficacy of the next generation of leaders whose sense of capability influences their perception, motivation and performance ("it's very important that you have self-confidence especially when it comes to clients. If you are shy and you don't show them that you are confident it's very difficult to convince clients"). Self-efficacy influences goals, learning, effort and persistence which are all essential in the generational transition processes (Lumpkin et al., 2008). In succeeding to take the family enterprise into the future the next generation require Entrepreneurial Self-Efficacy, which includes: developing new product and market opportunities; building an innovative environment; initiating investor relationships; defining core purpose; coping with unexpected challenges and developing critical human resources (De Noble et al., 2007).

3.7 Entrepreneurial Legacy

Lastly, transgenerational entrepreneurial families possess entrepreneurial legacy that facilitates succession across generations (Jaskiewicz et al., 2015). Entrepreneurial legacy motivates current and next-generation owners to engage in strategic education, entrepreneurial bridging and strategic succession. Strategic education occurs when the next generation engages in education and work experience in areas that are strategically relevant to the family enterprise's potential future entrepreneurial opportunities. Entrepreneurial bridging is a period of working together side-by-side wherein the older generation manages operations and gives the younger generation the opportunity to apply their strategic education. Finally, in strategic succession, the older generation protects the younger generation's key resources for entrepreneurship by ensuring no sibling buyouts (to preserve capital within the firm) and by quickly integrating potential in-laws into the family (to preserve the successor as resource).

3.8 Exploring Complex Realities

The traditional way of understanding succession would stop at an apparent and conscious layer of cognitive understanding, adding nothing to what is already known. What is needed is to move into the insecure and unclear territory of the unconscious and latent family processes that does not provide clear and measurable answers. Bringing to the surface latent processes of succession, to provoke cognitive conflict, is adding a layer of comprehension that is closer to the more complex realities of the entrepreneurial families. The outcome is reminiscence of the Renaissance humanism and its focus on the person and his/her complexities, strengths, unconscious and inherited patterns of behaviour, and his/her family.

The timeless allure that surrounds an entrepreneurial family enterprise is the manifestation of deeper and unconscious processes in the family sub-system. One such deeper and unconscious process is the trusted framework in the family sub-system. Allure, however, is what meets the eye, the beauty of the family enterprise; its wealth; reputation and family identity. The overt allure may be a reflection of the more covert family holding environment that is evocative of the mother–infant relationships in the early years of development (Fenech, 2015).

The multifaceted complexity of succession in entrepreneurial family enterprises lies upon a deeper complexity and reality. One facet is the attempt to re-enact patterns of relationships based on perceived equality within the family sub-system into the business; when this is inevitably frustrated, it gives rise to competition. Power struggles are a manifestation of regression to earlier family relationships. Competition may give rise to stagnation when unresolved and may result in family members being excluded from the business ("When people are self-centred that breaks up a family business").

Dualities are a reflection of the work group mentalities, which are the tendencies to work towards a task effectively, and basic assumption mentalities, which are the tendencies to avoid a task, that co-exist in an enterprise. The manifest work group mentalities are: authority and legitimate power of the incumbent; succession planning; cohesion; free will and creativity. These co-exist with the basic assumption mentalities of: dependency; flight and massification (a group that clings together). The basic assumption mentality of dependency is that of the control and reliance on the incumbent generation for security ("My big question is: *When my father retires do I have to deal with both shops? How will I cope, it's a headache*"). The basic assumption mentality of flight is the unconscious avoidance of succession ("I can't imagine the day my father will tell me, *I'm not coming to work*."; "To retire, it must be for a reason I don't have control over") whilst the basic assumption of massification is the annihilation of individuality and free will ("I was sucked up into the business; I would have preferred doing something by myself rather than doing something with the family"). There are studies that confirm this dependency fostered by incumbents (Dyer, 1986; Davis & Harveston, 2001; Brun de Pontet et al., 2007). However, differently to these studies, others found that incumbents are willing to let go of their control and engage in efforts to pass on the business to the next generation because this to them is an inevitable passage as they long for retirement (Cadieux, 2007) ("she administers everything, the eldest is responsible for 120 people").

In an entrepreneurial economy, motivating the next generation to participate in the creation and commercialization of new ideas has greater value than simply regulating their behaviour. In the entrepreneurial economy, decentralized decision-making in an industrial structure comprised of smaller firms leads to a greater diversity of approaches. This diversity, in turn, generates greater opportunities for breaking out of boundaries and ultimately success.

Family members alternate from one basic assumption mentality to another in times when strong emotions are experienced and as a result lose touch with their task. The basic assumption mentality interferes with the work group mentality leading to stagnation. When experiencing anxiety, associated with generational transitions, family members may unconsciously regress to a basic assumption mentality of dependency, flight or massification.

3.9 Boundaries

A further struggle entrepreneurial family members' encounter is that of managing the boundaries between family and business. This instils anxiety resulting from the infinite variability of one's world leading to the creation of artificial boundaries between the family and business. Another manifest struggle is that regarding the perception of in-laws as a source of conflict in family enterprises by both the current and next generation. At the unconscious levels, in-laws are used as a means to escape from uncomfortable thoughts of sibling rivalry. Blame for such thoughts is placed on "outsiders", so no responsibility is accepted for failure in relationships

within the family enterprise ("conflict happens when third parties are involved; in-laws influence the siblings negatively; it is greed, jealousy; when it's family but not direct blood, the in-laws, it is more challenging"). What results is the personalization of failure and the tendency to find guilty scapegoats as a way of reducing anxiety provoking situations into manageable chunks. The psychological splitting of self and others into good or bad results in projecting onto others one's bad "introjects" (Harvey-Jones, 1990; Kellermanns et al., 2011; Klein, 1959).

The transformation happening during times of succession is also varied at both a manifest and latent level. Younger entrepreneurial family enterprises are in a process of professionalization, role clarity, diversification, innovation and greater emphasis on meritocracy. In line with this process is a greater emphasis on the importance of tertiary education and the inclusion of non-family management and advisors. Within the family sub-system, there are changes specifically in parenting styles. These transformations are manifest representations of deeper and more unconscious processes. Advisors are used to facilitate an environment that contains the anxieties of family members, thus creating a sense of security.

The transformation towards not only accessing the entrepreneurial family enterprise as a result of birth right but accessing the group also based on meritocracy is one that generates a number of fears. Such feelings are reflected in the controversies such argument generates between the current and next generation, and the resistance to change by the older generation.

4 Conclusion

It is the emotional and unconscious dynamics that shape what happens in the family enterprise. A strategically innovative and deeper understanding of succession in entrepreneurial family enterprises, within an era of new Renaissance, entails eliciting the hidden and unconscious meanings, assumptions and collective anxieties of family members (Allcorn & Diamond, 1985). This innovative approach surfaces conflicts, disappointments and fantasies held by family members as well as the thoughts, feelings and suppressed defence mechanisms that compromise reality testing. Mechanisms must allow insights to develop creatively, develop free thinking, assist family members to get away from unhelpful patterns of thoughts and behaviour and facilitate change whilst containing the resulting anxiety (Shane & Venkataraman, 2000).

We need to better understand the deeper meaning of behaviour in family enterprises, including the challenges of entrepreneurship, management and leadership (Klein, 1975; Miller & Le Breton-Miller, 2005). Without reflection, individuals may be inclined to accept superficial explanations for many aspects of human experience. Stapley (2006) writes that "being reflective citizens means that we will not only be aware of the rational processes, we shall also begin to understand the irrational, sometimes unconscious processes that are occurring beneath the surface; processes that are having such an important effect on our lives and on our societies.

What we might term a parallel world, a different world, not as obvious but every bit as influential" (p. xxiii).

The need for reflective space is imperative in today's innovative organizations that operate in complex circumstances like the family enterprise open system. Professional intervention requires reflective responses rather than reactivity, in assisting individuals to make sense of ambiguous challenges. The professional advisor can contribute to the containment of anxiety and to the building of trust that supports adaptive systems (Cavanagh & Lane, 2012).

The entrepreneurial economy is characterized by turbulence, diversity and heterogeneity that may in itself elicit unconscious processes, fears and anxieties in individuals drawing them towards regressing into the traditional stability, and homogeneity of the managed economy. Approaching such turbulence, diversity and heterogeneity with creative ignorance, innovation, free thinking, embracing the uncertain, questioning the rational and setting aside assumptions is what will lead to innovative, uncertain and exciting entrepreneurial paths (Formica, 2015). Escaping knowledge maps and embracing change are opening the doors to deeper strata of understanding as we shift from a traditional to an innovative family enterprise and as our understanding of succession moves away from the traditional scientific knowledge to the innovative realms of understanding, as we flip accepted models of thinking. This is the rebirth of the person at the centre of comprehension, the new Renaissance.

References

Aldrich, H. E., & Cliff, J. E. (2003). The pervasive effects of family on entrepreneurship: Toward a family embeddedness perspective. *Journal of Business Venturing, 18*, 573–596.

Allcorn, S., & Diamond, M. A. (1985). The cornerstone of psychoanalytic organizational analysis. *Administration and Society, 17*, 217–239.

Aronoff, C. E., McClure, S. L., & Ward, J. L. (2011). *Family business succession: The final test of greatness*. Palgrave Mac Millan.

Audretsch, D., & Thurik, R. (2004). A model of the entrepreneurial economy. *International Journal of Entrepreneurship Education, 2*(2), 143–166.

Block, J. H., Miller, D., Jaskiewicz, P., & Spiegel, F. (2013). Economic and technological importance of innovations in large family and founder firms: An analysis of patent data. *Family Business Review, 26*, 180–199.

Brun de Pontet, S., Wrosch, C., & Gagne, M. (2007). An exploration of the generational differences in levels of control held among family businesses approaching succession. *Family Business Review, 20*(4), 337–354.

Cadieux, L. (2007). Succession in small and medium sized family businesses: Toward a typology of predecessor roles during and after instatement of the successors. *Family Business Review, 20*(2), 95–109.

Cavanagh, M., & Lane, D. (2012). Coaching psychology coming of age: The challenges we face in the messy world of complexity. *International Coaching Psychology Review, 7*(1), 75–90.

Cropanzano, R., Rupp, D. E., Mohler, C. J., & Schmike, M. (2001). Three roads to organisational justice. In J. Ferris (Ed.), *Research in personnel and human resources management* (Vol. 20, pp. 1–113). JAI Press.

Davis, P. S., & Harveston, P. D. (2001). The phenomenon of substantive conflict in the family firm: A cross-generational study. *Journal of Small Business Management, 39*(1), 14–30.

De Noble, A., Ehrlich, S., & Singh, G. (2007). Toward the development of a family business slef-efficacy scale: A resource based perspective. *Family Business Review, 20*(2), 127–140.

Dyer, W. G. (1986). *Cultural change in family firms: Anticipating and managing business and family transitions*. Jossey-Bass.

Fenech, R. (2015). *Passing the baton: Successful succession in family businesses*. Unpublished PhD thesis. Birkbeck College, University of London, London.

Formica, P. (2005). Knowledge entrepreneurs: Leveraging knowledge clusters for economic development based on innovative advantage. *Intellectual Capital Magazine, 1*.

Formica, P. (2015). *The role of creative ignorance: Portraits of path finders and path creators*. Palgrave MacMillan.

Harvey-Jones, J. (1990). *Troubleshooter*. BBC Books.

Hatak, I., & Roessl, D. (2011). Relational competence as a determinant of knowledge-transfer within intra-family succession. In *Back to the future: Changes in perspectives of global entrepreneurship and innovation*. ICSB Conference.

Jaskiewicz, P., Combs, J. G., & Rau, S. B. (2015). Entrepreneurial legacy: Toward a theory of how some family firms nurture transgenerational entrepreneurship. *Journal of Business Venturing, 30*(2015), 29–49.

Kamei, K., & Dana, L. P. (2012). Examining the impact of new policy facilitating SME succession in Japan: From a viewpoint of risk management in family business. *International Journal of Entrepreneurship and Small Business, 16*(1), 60–70.

Kellermanns, F., Sarathy, R., Eddleston, K., & Murphy, F. (2011). Innovativeness in family firms: A family influence perspective. *Small Business Economics, 38*(1), 85–101.

Klein, M. (1959). Our adult world and its roots in infancy. *Human Relations, 12*, 291–303.

Klein, M. (1975). *Envy and gratitude and other essays 1946-1963*. Hogarth Press.

Lee, K., Lim, W., & Lim, G. (2013). Family business succession: Appropriation risk and choice of successor. *The Academy of Management Review, 28*(4), 657–666.

Lumpkin, G., & Dess, G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of Management Review, 21*(1), 135–172.

Lumpkin, G. T., Martin, W., & Vaughn, M. (2008). Family orientation: Individual-level influences on family firm outcomes. *Family Business Review, 21*(2), 127–138.

Lunenburg, F. C. (2011). Self-efficacy in the workplace: Implications for motivation and performance. *International Journal of Management, Business and Administration, 14*(1), 1–6.

Miller, D., & Le Breton-Miller, I. (2005). *Managing for the long run: Lessons in competitive advantage from great family businesses*. Harvard Business School Press.

Miller, E. J., & Rice, A. K. (1976). *Systems of organisation*. Tavistock Publications.

Nordqvist, M., & Melin, L. (2010). Entrepreneurial families and family firms. *Entrepreneurship and Regional Development, 22*, 211–239.

Poutziouris, P. Z., Smyrnios, K. X., & Klein, S. B. (2006). *Handbook of research on family business*. Edward Elgar Publishing in association with International Family Enterprise Research Academy (IFERA).

Shane, S., & Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *The Academy of Management Review, 25*, 217–226.

Stapley, L. (2006). *Individuals, groups, and organizations beneath the surface: An introduction*. Karnac.

Steier, L. (2001). Next-generation entrepreneurs and succession: An exploratory study of modes and means of managing social capital. *Family Business Review, 14*, 259–276.

Thurik, A., Stam, E., & Audretsch, D. (2013). The rise of the entrepreneurial economy and the future of dynamic capitalism. *Technovation, 33*(8–9), 302–310.

Index

N. Faghih, A. Forouharfar (eds.), *Strategic Entrepreneurship*, Contributions to Management Science, https://doi.org/10.1007/978-3-030-86032-5