

# **Contributions to Management Science**

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

João Leitão

# Open Innovation Business Modeling

Gamification and Design Thinking  
Applications

 Springer

João Leitão  
NECE, Research Center in Business Sciences  
University of Beira Interior  
Covilhã, Portugal

ISSN 1431-1941 ISSN 2197-716X (electronic)  
Contributions to Management Science  
ISBN 978-3-319-91281-3 ISBN 978-3-319-91282-0 (eBook)  
<https://doi.org/10.1007/978-3-319-91282-0>

Library of Congress Control Number: 2018943301

© Springer International Publishing AG, part of Springer Nature 2019

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Printed on acid-free paper

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

# Preface

The subject of this book, that is, open innovation business modeling, using gaming and design thinking applications, is per se innovative in the sense that crosses several management science and other recent topics, by reconciling distinct streams of the emerging literature on open innovation, absorptive capacity, strategic cooperation, and design thinking, in the same volume. For that reason, it may be considered complex and challenging, inasmuch as it involves topics still being explored, which need additional contributions to progressively build up their theoretical body, grounded on conceptual and empirical applications, of both a qualitative and quantitative nature. It therefore requires a wide-ranging literature review and an openness to perspectives based on the paradigm of open innovation, which transfers to outside the organization some of the mechanisms for stimulating research and development (R&D) and innovation resources, but without neglecting the strategic importance of the organization's dynamic competences, based on continuous attention to resources, competencies, capacity for management, and organizational (re) configuration.

The firm's absorptive capacity triggers its propensity to be engaged in capturing and assimilating knowledge, spurred either by internal factors or by cooperation liaisons, thereby stimulating cooperation for innovativeness.

In this line of reasoning, this book revisits the theoretical framework on innovation and recovers Zahra and George's (2002) model of absorptive capacity and other related work, aiming to analyze a set of internal and liaison factors of the firm that affect firm-level absorptive capacity and entrepreneurial innovation capacity, in the context of open business models' implementation in a strategic cooperation framework; to propose a new business model approach entitled "open innovation bridge"—a Tangram model; and to exemplify the identification of critical elements of the transactional structure of open innovation business models, using both gaming and design thinking applications.

As the firm is an open system, it is important to analyze internal firm-level factors that spur absorptive capacity, as well as the factors concerning resources and liaison flows used to absorb and communicate with external sources of knowledge, within a

transactional structure *rationale* that needs further understanding in the context of open innovation business models. By mapping these factors, managers can design a more efficient open innovation business model in order to generate more innovation.

In operational terms, this book contributes to providing an analytical tool for designing the business model entitled “open innovation bridge”—a Tangram model, which considering the gaps previously identified in the growing literature on business models allows identification of the resources and transactional elements of open innovation business models, in the context of strategic cooperation.

It also provides an empirical application, following the Tangram model, and an analysis of firm-level resources and transactional elements is provided, by making use of a dataset of 571 service firms and 562 manufacturing firms which participated in the European Community Innovation Survey (CIS), 2010. The results of a logistic regression analysis reveal that the resources represented by acquisition of external knowledge and internal R&D activities, as well as the transactional elements, namely, cooperative liaison relationships with consultants and universities, plus external R&D activities, have a positive influence on the entrepreneurial innovation capacity, although they denote different ranges according to the subsamples under analysis, outlining the advanced development stage of the open innovation business models of service firms.

Development of the proposed model and the subsequent test, besides revealing the applicability of the proposal, also provides axes of strategic action for managers and public policy decision-makers, as well as opening up avenues for future research.

The book also provides a new pedagogical tool for teaching and learning technological entrepreneurship using business modeling. For accomplishing this, an innovative syllabus is proposed, as well as new tools for inspiring, analyzing, ideating, prototyping, and testing entrepreneurial opportunities connected to forms of qualified entrepreneurship, integrating the previously referred analytical tool “the Tangram model” and other established tools for gaming and designing open innovation business models.

Covilhã, Portugal

João Leitão

# Book Plan and Objectives

Given the complexity of the topic, which seeks to converge four themes to be reconciled in the scope of the management science field, the book plan is structured as follows.

In Part I, aiming to define the theoretical framework governing this book and justify the design of the proposed model, a literature review is carried out to present the state of the art anchored on four main aspects, namely, (i) innovation, (ii) absorptive capacity in open innovation, (iii) cooperation links in open innovation, and (iv) open innovation business model.

The first of these explores different conceptualizations of innovation, sources, and ecosystems, identifying seven phases in the vast research literature on innovation management and allowing better understanding of the evolutionary path from the seminal work of Schumpeter (1911, 1942) to the contemporary framework of theoretical formalization and research, instigated by Chesbrough (2003), which deals with the theme of open innovation in multiple research dimensions, including that referring to business models. There is a brief presentation of the conceptualizations considered of reference for carrying out this study, bearing in mind the framework drawn up by Chesbrough (2003), Enkel et al. (2009), and Grimaldi et al. (2016), showing the importance of organizations finding appropriate mechanisms to identify external sources of knowledge and potentiating the elements to activate their absorptive capacity, which will tend to strengthen their capacity to create innovation.

In relation to the second aspect, referring to the contribution of Zahra and George (2002), the subject of absorptive capacity is revisited in an original way, in the context of open innovation, distinguishing between “potential” and “fulfilled” absorptive capacity, and underlining the importance of identifying those activating and stimulating elements, in terms of the organization’s internal factors and the so-called liaison factors, brought about through establishing cooperative relationships with external stakeholders.

The third aspect introduces a topic connected to the core of the book, but at the same time a challenging one, inasmuch as the interlinking of strategic cooperation

and open innovation remains to be achieved in the literature of reference despite the growing number of systematic literature reviews and empirical applications on both topics separately.

In the fourth aspect, the emphasis is on a priority mechanism for operationalizing an organization's strategy, i.e., the business model, which as defined by Foss and Saebi (2016) quoting Teece (2010; p.172) is "the design or architecture of the processes for creating and delivering value, including the mechanisms for capturing value." A brief review of the main business model conceptualizations is made, as well as of the most consensual dimensions of business models in the literature, i.e., content, structure, and governance. This serves to justify the focus of this book on exploring the transactional structure of business models. Also presented in this regard is a necessary distinction in order to clarify the concept of business model innovation, which considering the review carried out can be achieved through contingency approaches to business model innovation and through deeper knowledge of the elements of the model's transactional structure referred to above.

In this theoretical and investigation context, the research suggestion proposed by George and Bock (2011) is taken up again, pointing to the need to map the critical elements of the transactional structure identified in the analysis of business models, from an unexplored perspective of open innovation business models. Also from a perspective of reinforcing firms' absorptive capacity, these must have a dynamic vision of the open innovation business model to be implemented through a series of links that allow absorbing external sources of knowledge, as well as deepening knowledge about the critical elements of their transactional structure.

Therefore, considering the literature and previous research efforts on innovation management, this book aims to identify, explain, and draw up the transactional structure of open innovation business models, using internal and liaison factors as well as absorptive capacity and cooperation relationships, to strengthen the firm's capacity to create innovation.

Accordingly, after the literature review, a conceptual model is proposed, entitled "open innovation bridge"—a Tangram model, which aims, firstly, to provide a creative and innovative approach applicable to open innovation business models in the context of strategic cooperation and, secondly, to provide an operational instrument for identifying the resources and transactional elements of the open innovation business model, which will strengthen firms' capacity for innovation.

Part II develops an empirical application of open innovation business models, containing an analysis supported by a study applied to industrial and service firms that participated in CIS 2010—*Community Innovation Survey*, which aims to test the Tangram model proposed, identify the critical elements of the transactional structure of open innovation business models, and provide strategic axes for action for managers and public policy decision-makers, as well as avenues for future research on the emerging topic of open innovation business modeling.

Part III aims to provide a pedagogical tool, that is, a syllabus for technological entrepreneurship designing, which facilitates the organization of a course that crosses gamification and design thinking and helps all the entrepreneurial teachers and students to think critically on the design, exploration, and exploitation of open



innovation business models. Moreover, it provides a new tool for rethinking and innovating traditional closed innovation business models and for designing and exploring new projects of qualified entrepreneurship sourced on inventions, new technologies, and new modes of technology transfer and commercialization.

# Contents

## Part I State of the Art on Open Innovation Business Models

<b>1</b>	<b>Theoretical Framework and Proposed Model</b>	3
1.1	Innovation: From the Concept to Ecosystems	3
1.2	Absorptive Capacity in Open Innovation	12
1.2.1	Absorptive Capacity: Conceptualization	12
1.2.2	Absorption in Open Innovation and Coopetition	16
1.3	Coopetition Linkages in Open Innovation	17
1.3.1	Coopetition: Definitions	17
1.3.2	Coopetition Linkages: Benefits and Risks	18
1.3.3	Motivations and Applications of Open Innovation	20
1.4	Open Innovation Business Model	26
1.4.1	Business Model: Definitions	26
1.4.2	Elements of the Business Model Structure	30
1.4.3	Business Model Dynamics and Innovation	30
1.4.4	Organizational (re)configuration in Open Innovation	35
1.4.5	Identifying the Characteristics of Transactional Structure	38
1.5	Conceptual Model—Open Innovation Bridge: Tangram Model	43
	References	47

## Part II Empirical Application of Open Innovation Business Models

<b>2</b>	<b>Methodological Design and Empirical Findings</b>	61
2.1	Sample, Database and Model	61
2.2	Variables	62
2.2.1	Dependent Variable	62
2.2.2	Independent Variables	63
2.2.3	Control Variables	66
2.3	Results	66
2.3.1	Descriptive Statistics and Multicollinearity Analysis	66
2.3.2	Synthesis and Contrast of the Empirical Evidence	67

- 2.4 Remarks, Implications, Limitations and Research Avenues . . . . . 75
  - 2.4.1 Implications for R&D Managers and Public Policy-makers . . . . . 76
  - 2.4.2 Limitations and Future Research . . . . . 78
- References . . . . . 79

**Part III Gaming and Design of Open Innovation Business Models**

- 3 Concepts, Methodologies and Tools of Gamification and Design Thinking . . . . . 85**
  - 3.1 From the Entrepreneur to Technology-Based Entrepreneurship . . . 85
  - 3.2 From Thinking Design to the Pentagon of Exploiting the Opportunity . . . . . 92
    - 3.2.1 Modelling Open Innovation Business . . . . . 92
    - 3.2.2 Design Thinking: Business Modelling Tool . . . . . 94
  - 3.3 Business Model: Gaming and Designing . . . . . 101
    - 3.3.1 Immersion/Inspiration with the Canvas Model: Value Screen . . . . . 101
    - 3.3.2 Analysis and Synthesis with the Open Innovation Bridge: Tangram Model . . . . . 107
    - 3.3.3 Ideation with the Succinct Plan of Business Opportunity . . . 109
    - 3.3.4 Prototyping with Value Proposition and Customer Segments . . . . . 109
    - 3.3.5 Test with the Business Plan . . . . . 111
  - 3.4 Course Program . . . . . 118
    - 3.4.1 Objectives . . . . . 119
    - 3.4.2 Results of Learning . . . . . 120
    - 3.4.3 Teaching and Learning Strategies . . . . . 121
  - 3.5 Concluding Remarks . . . . . 124
  - References . . . . . 125

# List of Figures

Fig. 1.1	Continuum of open business models. Source: Adapted from Foss and Saebi (2015) .....	38
Fig. 1.2	Pentagon of the symbiotic process of resources and transactional elements of the business model. Source: Own elaboration .....	44
Fig. 1.3	Open innovation bridge: Tangram model. Source: Own elaboration .....	46
Fig. 3.1	Principle theoretical concepts of the Technological Entrepreneurship Designing course. Source: Own elaboration .....	86
Fig. 3.2	Selecting the right opportunity and identifying the ideal point. Source: Elaborated based on Byers et al. (2015) .....	88
Fig. 3.3	Design thinking: the process. Source: Adapted from Kelley and Littman (2001) .....	97
Fig. 3.4	Opportunity exploitation pentagon. Source: Own elaboration .....	101
Fig. 3.5	Canvas Model: value screen design approach. Source: Adapted from Osterwalder and Pigneur (2010) .....	104
Fig. 3.6	Game of visual systematization of the business model. Source: Adapted from Osterwalder and Pigneur (2010) .....	104
Fig. 3.7	New canvas of value proposition and customer segments. Source: Bernarda et al. (2014) .....	110

# List of Tables

Table 1.1	Lines of research on innovation management .....	11
Table 1.2	Business model: selected definitions .....	27
Table 1.3	Main elements of the business model structure .....	31
Table 1.4	Business model innovation: research focus areas .....	33
Table 1.5	Business model innovation: selected definitions .....	34
Table 1.6	Open innovation business models: a contingency analysis tool .....	39
Table 2.1	Descriptive statistics and linear correlation coefficients .....	64
Table 2.2	Multicollinearity analysis .....	67
Table 2.3	Logit model: all firms—Dependent (or response) variable: Product/service innovation .....	68
Table 2.4	Logit model: industrial firms—Dependent (or response) variable: Product/service innovation .....	69
Table 2.5	Logit model: service firms—Dependent (or response) variable: Product/service innovation .....	70
Table 2.6	Literature versus Empirical evidence from the Tangram model .....	72
Table 3.1	Critical actions of the entrepreneur .....	87
Table 3.2	Process of identifying and exploiting an entrepreneurial opportunity by the founding team .....	89
Table 3.3	Combination of key activities and resources, capacities and competences by the entrepreneur .....	90
Table 3.4	Capacity to overcome a challenge: critical elements .....	91
Table 3.5	Design thinking: attributes, definitions and comments .....	96
Table 3.6	Summary of design thinking models .....	98
Table 3.7	Methods used in design thinking .....	99
Table 3.8	Questioning in the immersion/inspiration phase .....	102
Table 3.9	Structuring the business plan .....	112
Table 3.10	Learning results and teaching-learning strategies .....	122