



Routledge Studies in the Economics of Innovation

INNOVATION IN KNOWLEDGE INTENSIVE BUSINESS SERVICES

THE DIGITAL ERA

Anna Cabigiosu



Innovation in Knowledge Intensive Business Services

Knowledge Intensive Business Services (KIBS) are becoming more and more relevant both for their innovative content and as innovation boosters for manufacturing firms and, with this scenario in mind, this book first offers an in-depth analysis of what innovation in KIBS is and its performance outcomes, and then synthesizes what we know about KIBS firms' innovation models, as well as their specific peculiarities and limitations.

This book examines the recent trends in innovation, service design and development in KIBS, starting from a review of the extant literature, explaining the role and specific traits of innovation in KIBS. Then, it progresses our knowledge about KIBS and about how new technologies are offering unique opportunities to use and share their knowledge, within and across boundaries. The book also includes several cases that show how, at the micro level, firms can effectively design their services and boost their innovation performance by overcoming some of the traditional limits of innovation in services. While KIBS literature traditionally emphasizes that innovative and performing KIBS firms rely on tight client-provider interactions with service customization, recent research suggests that alternative modes of innovation are viable for performing KIBS firms: KIBS firms can develop mass customization strategies, ease interactions with clients via ICT interfaces and leverage on focused collaborations with expert clients. Particularly, the digitalization and ICT technologies are fostering platform and modular architectural designs of KIBS, as in the software and web design services.

The book seeks a broader understanding of innovation in KIBS in the digital era and will be an essential guide for both academics and practitioners interested in KIBS innovation and design.

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First published 2020
by Routledge
2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN

and by Routledge
52 Vanderbilt Avenue, New York, NY 10017

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

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British Library Cataloguing in Publication Data

A catalogue record for this book is available from the British Library

Library of Congress Cataloging-in-Publication Data

Names: Cabigiosu, Anna, author.

Title: Innovation in knowledge intensive business services : the digital era / Anna Cabigiosu.

Description: Abingdon, Oxon ; New York, NY : Routledge, 2020. |

Series: Routledge Studies in the Economics of Innovation

Identifiers: LCCN 2019029029

Subjects: LCSH: Intellectual capital. | Service industries. | Knowledge economy. | Technological innovations--Economic aspects. | Information technology--Economic aspects

Classification: LCC HD53 .C33 2020 | DDC 658.4/063--dc23

LC record available at <https://lcn.loc.gov/2019029029>

ISBN: 978-0-367-34191-6 (hbk)

ISBN: 978-0-429-32439-0 (ebk)

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To Giovanni Maria, my father
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Introduction

Especially in the USA, but also in Europe, there are already algorithms that help professionals to carry out their activities to the point of partially substituting their work: software capable of seeking the most likely outcome of a lawsuit and programs able to carry out the due diligence for an accountant, to pre-set up a contract and to conduct independent research on the Web. In France and the USA, software exists that uses artificial intelligence and algorithms that promise to help lawyers in the process strategy, because they can extract from documents how certain judges decide certain types of cases, such as the position of the law, or even the opinion of a single judge on a certain subject, helping to choose the best strategy. Digital innovations are becoming part of knowledge intensive services.

Traditionally, in services, new technologies served as tools to improve the service delivery process. However, advances in digital technologies have modified service innovation at its core, and today service innovation is more digital in nature. Services are translated into digital bits, stored across multiple geographical locations and available almost everywhere in real time via the Web. Service providers can also collaborate and communicate more easily with digital tools, exchanging immediate feedback. The openness of this scenario offers generative and unbounded opportunities, resulting in new service innovation opportunities that may not have been foreseen originally.

This phenomenon is called digitalization and refers to “the encoding of analogue information into digital format and the subsequent reconfiguration of socio-technical context of production and consumption of the product and services” (Yoo, 2012). Today, digitalization is a key source of innovation in services and calls for specific contributions to understand service innovation in the digital age and the transformative role of digital technologies.

Emerging digital technologies allow product and service innovation but are also challenging many firms that lack the required competences. In this context, web designers, software developers, consultants, marketers, R&D firms and engineering service providers are examples of knowledge intensive business services (KIBS), which are becoming more and more relevant both for their innovative content and use of digital technologies and as innovation boosters for manufacturing firms. KIBS have increasingly attracted the attention of scholars in the last 20 years as their role in

the knowledge economy has increased. KIBS firms are continuously involved in the knowledge transfer with clients, research centres, universities and other organizations, and are high in terms of human capital compared with firms in other sectors.

With this scenario in mind, this book first offers an in-depth analysis of what innovation in KIBS is and its performance outcomes, and synthesizes what we know about KIBS firms' innovation mode, its peculiarities and its limits. Then the book expands our knowledge about KIBS and about how new technologies are offering unique opportunities to KIBS to use and share their knowledge, within and across their boundaries, redesign their services and increase their innovation performance by overcoming some of the traditional limits of innovation in services. This book seeks a broader understanding of innovation in KIBS in the digital era and aims at describing the recent trends in innovation, service design and development in KIBS.

While the KIBS literature traditionally emphasizes that innovative and performing KIBS firms rely on tight client-provider interactions with service customization, recent research suggests that alternative modes of innovation are viable for performing KIBS firms: KIBS firms can develop mass customization strategies, ease interactions with clients via ICT interfaces and leverage focused collaborations with expert clients. Particularly, digitalization and ICT technologies are fostering platform and modular architectural designs of KIBS, as in the software and web design services.

In the first chapter, the book presents the main definitions and classifications of KIBS firms and of the related industries. The aim is to present this specific category of services to a general audience. Then (in Chapter 2), the book underlines the role of KIBS in today's economy and in the Industry 4.0 paradigm, emphasizing that they are "bridges" of innovation that both provide crucial services to manufacturing firms and can benefit from the new technologies to manage their offer and growth. This section also provides multiple examples of how digitalization is shaping the business model of KIBS.

In Chapter 3, building on the extant literature, I describe the main categories of innovation in KIBS, distinguishing between product, process, concept, technological, organizational and interface innovations. This section also provides multiple examples of innovation in KIBS. Finally, the chapter synthesizes the existing debate within the innovation management literature about the need to use different categories of innovation to study innovation in KIBS, services and products. After having identified multiple categories of innovation in KIBS, Chapter 4 investigates how the KIBS literature measures innovation and specifically focuses on KIBS services' differentness (or radicalness) and novelty, while Chapter 5 discusses the specific traits of innovation in KIBS: the customized nature of the service, the client-supplier interaction in service design and production, the relevance of open innovation strategies and of knowledge workers and the contribution of KIBS firms to the innovation process of their clients.

Chapter 6 reviews the existing literature about innovation and performance in KIBS to understand how the identified categories of innovation, their novelty and their differentness affect multiple performance measures and which areas of research are underdeveloped, while Chapter 7 introduces the productivity

dilemma. KIBS are often customized and intangible and cannot be stored. KIBS and service literature published over many years suggests that these properties negatively affect the impact of innovation on KIBS firms' productivity and growth. This chapter discusses this assumption and the way in which digital technologies are modifying this scenario. Chapter 8 puts forward a critical view about if and to what extent collaboration and customization support KIBS firms' innovative performance. There may be another "face of the coin" for both customization and clients' engagement in innovation activities, and KIBS firms may combine different levels of customization and collaboration with clients. This chapter presents the theoretical arguments and the empirical evidence provided so far that question the emphasis on client collaboration and KIBS customization, delivers new hypotheses about how KIBS firms should design their service portfolio and client relationships and concludes by introducing the topic of mass customization in KIBS.

After having presented and critically reviewed the innovation literature in KIBS, Chapter 9 explains how new ICT technologies help KIBS firms to increase their level of internationalization. New technologies allow many traditional barriers of service replicability and exportability in foreign markets to be overcome. Examples are provided. Finally, Chapters 10 and 11 explain in detail how mass customization strategies are eased by new design approaches and by digital technologies. Platform and modular designs are the pillars of a mass customization strategy. Chapter 10 explains what modularity and platforms are in KIBS and provides multiple examples. This section also briefly synthesizes what modularity is in products and services to help the readers understand the specific features of modularity in KIBS. Finally, Chapter 11 focuses on modularity in software and websites, which are undergoing a profound architectural change and today are converging overall toward a modular structure.

Many of the ideas proposed in this book originate from my previous studies about KIBS firms that I have co-developed with Diego Campagnolo. Our joint work has been a fundamental source of inspiration for my research. I am also grateful to Francesco Zirpoli, Giovanni Costa, Andrea Furlan, Roberto Grandinetti, Eleonora Di Maria, Barbara De Bernardo, Stefano Li Pira and all the colleagues who have supported my work.

References

- Yoo, Y. 2012. Digital materiality and the emergence of an evolutionary science of the artificial. *Materiality and Organizing: Social Interaction in a Technological World*, pp. 134–154.



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Part I

Presenting KIBS firms



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1 What are KIBS firms?

This chapter presents KIBS firms, what they are, their relevance to the knowledge economy and their main features.

The service industry in the knowledge economy

After World War II, the service sector arose in many developed countries, which moved from being manufacturing-based economies to being so-called knowledge-based economies. This shift is labelled “servitization”¹ (Drejer, 2004). As a result, most of these economies today depend for the larger part of their GNP (gross national product) on services (Nijssen et al., 2006), which contribute over 70% of the employment in the OECD (Organisation for Economic Cooperation and Development) countries² (Baltacioglu et al., 2007).

Services include a heterogeneous set of activities from consumer services to business to business services. Traditionally, services were defined through a process of exclusion, which proceeds by identifying production industries and considering everything else as being part of the tertiary sector. This view has now changed thanks to the growing importance of this sector, and authors have provided multiple definitions and classifications of services (Metcalfe and Miles, 2000). Miles et al. (1995) classifies services on the basis of the functions performed and the markets served, and identifies the following groups: product services such as finance or business services; distributive services such as trade, transport and communication; personal services such as entertainment, hotels, catering and domestic services; and social services such as those related to medicine, health and government. Gadrey, Gallouj and Weinstein (1995) more generally define service providers as firms that organize a solution to a problem that does not principally involve supplying a good. Service firms put a bundle of capabilities and competences (human, technological and organizational) at the disposal of clients and use them to satisfy their needs. Generally, value creation in services is driven by the integration of intangible resources and capabilities, such as knowledge, competences, a cognitive-centric workforce and customer collaboration (Scerri and Randhawa, 2015). Sometimes tangible resources are also involved in service delivery, such as the use of cards in